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# THE BUILDER

**A**N : ILLUSTRATED : WEEKLY  
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ARCHITECT : ENGINEER : ARCHÆ-  
OLOGIST : CONSTRUCTOR : SANI-  
TARY-REFORMER : & : ART-LOVER

CONDUCTED BY

**H. H. STATHAM,**

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

“EVERY man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruition, the comfortableness of his own life, the noblest of his sonnet's inheritance, a kind of private princedom, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned.”

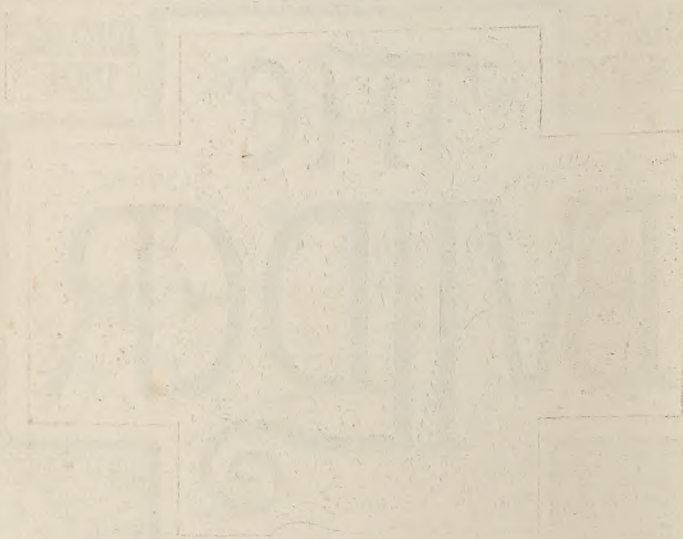
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*The Appreciation of Sculpture.*



HERE is no art, unless we were to except architecture, which is so little understood and so little cared for by the general public in this country as sculp-

ture. Painting, though also little rightly understood, may be said to be a popular art in England; but sculpture is distinctly an unpopular one, as is obvious enough from the answer one constantly gets in asking people how they liked the sculpture at the Academy—"Oh, we did not look at the sculpture." Yet there is no doubt that sculpture is at the present time the art which is at its best in England. English sculpture has made immense progress during the last quarter of a century; there is far less of it than there is of painting (and no wonder, seeing the poor encouragement our sculptors get).

but the proportion of it which is of a high class is much greater than in painting.

Any effort to promote a better understanding of sculpture on the part of the public ought to be welcomed; and for one effort in this direction we have to thank a well-known and intellectual American critic Mr. Russell Sturgis, whose short treatise on the subject\* is published both in New York and London. We do not know that the scope of the work quite answers to its title. "The appreciation of sculpture" would seem to imply a direct and formal attempt to expound the aesthetics of sculpture; what is to be looked for from it as an art, and what is beyond its proper limits. A good deal of this may be gathered from Mr. Sturgis's book, but it is to be gathered from putting together isolated remarks rather than from any continuous exposition. Considering the difficulty of the subject to the average

\* "The Appreciation of Sculpture: A Handbook."  
By Russell Sturgis, A.M., Ph.D. New York: The Baker  
& Taylor Co. London: B. T. Batsford.

reader, it might have been more useful if the central line of the argument had been more clearly emphasised throughout. But those who read it with attention may learn much more as to philosophy of sculpture than is usually present to the minds of the laity.

Mr. Sturgis's method is to consider in succeeding chapters the predominant characteristics of sculpture of several great periods of the art—the Greek Period; the Roman Period; the European Middle Ages; the Italian Revival; the Italian Decadence and French Transition; and Recent Art. The latter section, as the author tacitly assumes, is capable of being considered in its broad aspect independent of nationality, since modern European art is that of Europe rather than of its component nations; and national differences are rather differences of power and genius than of theory or aims—at least in respect of the most highly civilised nations of the world, among which we must of course reckon the United States as a member of the



same artistic family. American sculpture has not attained to the power of the best French or (we are inclined to think) of the best English sculpture, but its aims are the same.

In his first chapter the author sets before us the Greek standard of excellence, as the best basis for the consideration of the subject; not forgetting, however, the important fact that we do not see the Greek sculpture with the colour with which its creators embellished it, but he is clear that the modern world is nevertheless quite right in taking it as a standard of excellence; we do not see all that the Greek sculptor did, but as far as it goes it remains the finest example of pure form that can be seen. And the author is right also in drawing attention to the element of artistic convention which is present in the great period of Greek sculpture, in spite of its general truth to nature. The desire for decorative and artistic quality of design came before (even in regard to time) the desire for realistic truth to nature. The conscientious adherence to the details of the nude model will not produce the quality of style which we realise, but which it is so difficult to define, in the sculptures of the Parthenon. This is a point to be borne in mind in reference to the foolish outbreak of exaggerated praise about a certain statue in the New Gallery, which has been said to be like Greek art revived. That is exactly what it is not; it is a piece of realistic modelling, and Greek sculpture was not realistic modelling. A perusal of Mr. Sturgis's chapters on Greek sculpture should at any rate enable people to perceive the fallacy of this kind of criticism.

The chapter on Roman Empire sculpture includes the suggestion, which was not uncalled for, that there is more in Roman sculpture than it has been the fashion to think lately, and that it need not be dismissed as merely commonplace, though no doubt the habit of erecting multitudinous statues as a part of the *ensemble* of a building did lead to the production of many works which were rather decorative furniture than sculpture in the higher sense of the word. And the author suggests one reason for the superior sculptural suitability of the Roman costume as compared with modern costume, viz.: that it is a kind of abstract form of dress which was not affected, as modern dress is, by rapid changes of fashion. A modern sculptor, in representing some event which happened 50 years before, would have to study the dress of the period to produce a true representation; the Roman sculptor, in representing such an event in a relief sculpture, was not under this necessity. Of course there is the additional and still greater advantage of the simplicity and breadth of line of the classic costume, and its freedom from small disturbing details. In referring to this point at the end of the book, he observes—"That Roman relief" (Marcus Aurelius offering sacrifice) "is a splendid piece of ceremonial record; now let one of our modern men treat the great events of our time in a way as abstract—with a few figures—in a form as susceptible of being built into a wall; but with the grace of the Italian XVth century, and the faultless details of early Greece.

There is nothing contradictory in that." Well, the conclusion is rather doubtful. Such a production would certainly not be on all-fours with the Marcus Aurelius bas-relief, because that represented the costume pretty much as it really was. The real escape from the difficulty of modern costume in personal monuments—that frequently employed by the French with such good results—giving only the portrait bust and adding symbolical figures, Mr. Sturgis does not, as far as we observe, insist upon. On the other hand, he gives an illustration of an American sculptor's realistic portrait of Horace Greeley, seated in coat and trousers with a newspaper on his knee, apparently with commendation. It has a certain interest, but that is not "sculpture"; it is not what the art of sculpture is for; it is a treatment, in our opinion, only suited for painting.

Granting with the author that sculpture practically died, as far as we have any record, between the sixth and the tenth centuries, and that there is an interesting attempt at revival of it in the Romanesque churches of the Xth century, we think the author quite exaggerates the sculptural importance of such work as the long shapeless sculptures of Chartres shown in his Plate XIX. These are not so much sculpture as carved architectural features; they are rather a part of the architecture than an example of sculpture; and to say that "it was left for the Frenchmen of the XIIth century to teach the world what sculpture might be when closely affiliated with architecture" is to say what is in the fashion now, no doubt, but what is hardly sound criticism. The mediæval sculpture of that period is only good relatively, and according to an imperfect mediæval standard, not according to a central standard; and we see not what is the point of drawing the reader's attention in the first chapter to Greek sculpture as the highest example of form, if he is to find such exaggerated praise given subsequently to such comparatively naïve and childlike work as the Gothic sculpture of the XIIth century. True, that it becomes in a remarkable way a part of the architecture, as in the lower portion of Wells Cathedral; but that is because of the rigidity of line and lack of vitality in the sculpture itself. If sculpture is to be closely assimilated with architecture, it must be by some better method than killing the sculpture in order to assimilate it with masonry.

We are the more struck with this when we consider the cold and half-hearted tone in which the author speaks of Michelangelo's Medici tombs and their wondrous figures, which are in fact above and beyond criticism. In regard to some of the eminent sculptors of the Italian Renaissance, less great and more measurable than Michelangelo, there are some useful remarks. But we prefer to come to some of the questions raised in respect of recent sculpture. The author remarks on the continued vitality of sculpture; that is, that it has at no time become, like architecture, an effort to revive the art of the past, because it is an art which is constantly getting new life from the direct reference to nature. This is true of the art

generally though not of all individual sculptures—Gibson for instance. Among modern elements in sculpture is mentioned that of the sculpture of sentiment, a thing, as Mr. Sturgis says, almost unknown to the great past, and which in our opinion has been carried a good deal too far in the present. What then is sculpture to aim at now? In our opinion, either the expression of abstract thought, or the realisation of abstract forms of life and energy. By "abstract" in this case we mean divested of trivialities and peculiarities of detail, and invested with the broader and more universal characteristics of human life and action. That is why we consider that life size representations of figures in their ordinary costume, whether of high or low life, whether of rural labourer or Field Marshal in uniform, are beside the real ends of sculpture, which is a high and severe form of art, dealing with essentials and not with accidentals. The author raises the question as to the fitness, in an artistic sense, of the representation of nude figures employed in labours, as in M. Boucher's "à la Terre" and Mr. Nicaus's figure of a man hammering at a drill, and does not seem to suggest quite a decisive answer to it. Our answer would be quite decisive; the fact that there are no nude workmen in modern life has nothing to do with it; sculpture is concerned with human form and action, which belong to what is permanent, and not with details of clothing which are in comparison trivial and transitory. And it is in the abstraction of the subject from non-essential details, in the lifting it above the ordinary circumstances of realism, that much of the quality which we feel as "style" in sculpture consists. In a book on the appreciation of sculpture we should have wished and expected to see some definite attempt to explain to the reader what style means, and (by example) what is the difference between a work with style and a work without it. Mr. Sturgis does not, as far as we can find out, mention the word "style"; it is certainly not in his index. But he is conscious that there is something unsatisfactory in the relief by Mr. Saint-Gaudens forming the memorial to Colonel Shaw. In a way we like that work; it is simple and sincere; but what we said the moment we saw the model of it at the Paris Exhibition was that it was totally without style. If Mr. Sturgis could have got his readers to realise what is the difference between a work with style and a work without, he would have done a great deal towards advancing the comprehension of sculpture in public mind.

One curious mistake we must correct; the assertion that the Parthenon frieze marbles at the British Museum suffer in effect from being seen under glass, a point which is more than once referred to. There is no glass whatever; there are top and bottom frames with vertical iron stays between them, which in a photograph might give the appearance of glazing. The point of the mistake is that it shows that Mr. Sturgis has not been in the British Museum, and is only judging from photographs.



## A FURTHER EXAMINATION OF THE BUILDINGS AT BAALBEK.

By R. PHENÉ SPIERS, F.S.A.

### I.—THE CIRCULAR TEMPLE.

**T**HE circular temple, the remains of which are in the village and situated about 100 yds. to the south of the propylæa, is enclosed within a private dwelling, and, although visitors have been allowed to photograph it, it was not possible to ascertain by excavation the nature of the substructure until the Germans went there in 1900. Their researches have shown that, although so far as the interior and parts of the upper structure were concerned, Messrs. Dawkins and Wood's work is in the main correct, the plan shown in their drawings falls short in some particulars. At present the Germans have only published a plan showing the podium and steps on which the temple was raised. Instead of a single flight of steps in front of the porch, after the first eight steps descending, there is a narrow landing, and then four more steps, all these standing within the podium projection. Then follows a second flight of seven steps which return at the angles, as shown on the plan. The detached columns round the outside of the circular cella, which in Dawkins and Wood's work are shown as 9 ft. from the responds on the cella walls, are in reality only 2.9 ft., as can be seen in the photographs.

A view of the front of the temple made by L. F. Cassas towards the close of the XVIIIth century, and published in the work which bears his name ("Voyage Pittoresque de la Syrie"), shows by the breaks in the entablature that in front of the existing columns of the portico (two of them attached and two detached, on the right and left) there were four other columns, which are shown on Cassas's plan. Whether he was able to excavate and found the bases or simply surmised their existence is not known, but at all events the Germans have found them and shown them on their plan. Unfortunately Cassas died before his work was published and left but few notes, so that when his drawings appeared, descriptions were given of very few of the plates and nothing was said about the circular temple. His plan of the temple also must have been incomplete, as the editor copied that of Dawkins and Wood's with all its faults, going one step further and putting dimensions between the columns round the cella and their responds. These we have already shown were incorrect; they would both of them seem to have concluded that the distance of the columns round the cella was the same as that of the angle column of the portico for the same. The plan we publish shows the correct arrangement.

The capitals of the columns round the cella, which in both these works are shown square, are really pentagonal, as are also the bases, with one exception. Messrs. Dawkins and Wood indicate on their drawings all the small columns which in two stories decorated the interior of the cella, and may have been there in 1751 when they visited the town. Towards the close of the century, however,

the church was abandoned, and they are not indicated in Cassas's drawing. We have indicated them in our restoration to account for the circular and triangular pediments which, built into the wall, still exist, and also for the support of the projecting entablature of the lower story. From photographs of the exterior and interior we have restored the cella, and suggested the possible design of the tetrastyle portico in front. The bases only of the four front columns have been found; of those in the rear the left-hand column (A) and the attached column only remain, and there is but too much reason to fear that the first-mentioned column may fall over any day.

There is absolutely no historical record of this temple, which owes its preservation to the fact that it was converted into a Christian church, probably by Theodosius, and dedicated to S. Barbe, the name by which it is now known. Crosses have been cut in the walls externally and internally, and on the east side of the cella are the traces of a fresco representing a Greek cross within a circle.

As will be seen by the plan, the design is of an unusual type, and a unique example of its kind. It is supposed to have been dedicated to Venus, whose statue was erected in the centre of the cella, and to have had other statues in the niches of the upper story and between the columns of the lower story. Externally the building is of the richest description; between the responds of the columns were niches sunk in the wall with elaborate shell-heads and curved entablatures, a favourite feature in all these Syrian temples. In these niches there were probably statues, of which the pedestals only remain. Above the niches were swags of flowers. The most remarkable feature of this temple, however, is the brilliant way by which the junction of the entablature of the rectangular portico with that of the circular cella has been effected. The latter, as will be seen by the plan (left-hand side), sweeps back with segmental curves, which not only give a remarkably picturesque combination to the exterior, but solve a very difficult problem in the juxtaposition of a circular and rectangular feature.

The elaborate carving of all the mouldings of the entablature (seen to a larger scale in the plate, which shows fragments of the cornice of the cella of the Temple of Jupiter, and is of similar design), and the setting out of the modillions, have produced a richness of effect which, notwithstanding the decadence of the style, must have been quite unparalleled. Far away from the Roman centre and unbridled by the principles of Vitruvius, the Syrian sculptor gave free play to his imagination, and not only conceived an original treatment of the main lines of his entablature, but in the arrangement of the foliage of the capitals produced a novel design in which there are three ranges of leaves, the upper row taking the place of the stems from which the volutes usually rise. As the leaves of the upper range come in the centres and the diagonals the leaves of the lower ranges have changed their axes.

In the conjectural restoration we have made of the portico the slight projection

shown of the entablature over the two centre columns in order to introduce the pediment is authorised by the well-known coins of Philip and later emperors, published in Donaldson's "Architectura Numismatica," which represent the front of the propylæa.

The precarious condition of the building has been already referred to; the accompanying small photograph of one of the bays shows how the entablature is falling apart.



Portion of Circular Temple, Showing State of Entablature.

### II.—THE CHRISTIAN BASILICA IN THE GREAT COURT.

In a previous article on the acropolis of Baalbek\* it was stated that the clearing away of the superincumbent rubbish by the Germans had revealed the fact that the triple apse of the Byzantine church, erected in the middle of the great court, had been built on the flight of steps leading up to the Great Temple, and that the lower stage of this flight had been found buried beneath the rubbish and in the walls of this triple apse. Portions of the walls of this church had long been visible above ground, as may be seen in Joyau's plan published February 11. The clearing of the site down to the pavement of the church and subsequent examination below the same brought to light the existence of the podium of an altar built in the great court. At first the great size of the stones of this podium suggested that it had been cut in the solid rock. This, however, was found not to be the case, the podium being built in large blocks of stone coming from the same quarry as that which had furnished the trilitheon and all the masonry in the acropolis, its foundations being carried down to a considerable depth. On the east side of this podium were a series of steps leading to the top, on which it was supposed that the altar proper was built. The steps being on the east side showed that the priests when performing the sacrifice faced the temple, which is contrary to the usual custom. This may have arisen from the fact that the altar was built on the site of an earlier altar dedicated by the Phœnicians to Baal, and happened to be much farther than usual from the flight of steps leading up to the temple.

It is difficult to understand why the Byzantine Christians who built the church should not first have levelled to the ground all remains of the Roman

\* See *Builder* of February 11 of this year.



sacrificial altar, especially as it necessitated the erection of an immense platform on which to build the basilica in order that its pavement should rise above the podium. The floor of the church was thus raised 8 ft. above the pavement of the great court, and necessitated the erection at the east end of a flight of steps and a landing in front of the three eastern doorways. It is possible, however, that the Christians desired to erect a church which should rise above the peristyle and the great halls which surrounded the court.

The plan of the church as first built (see below) consisted of nave and aisles 179 ft. long and 110 ft. wide within the walls, the nave being divided from the aisles by three great semicircular arches on each side carried on two rectangular piers 13 ft. 6 in. by 3 ft. and abutments 15 ft. long against the east and west walls. At the west end were three semicircular apses, the central one twice the

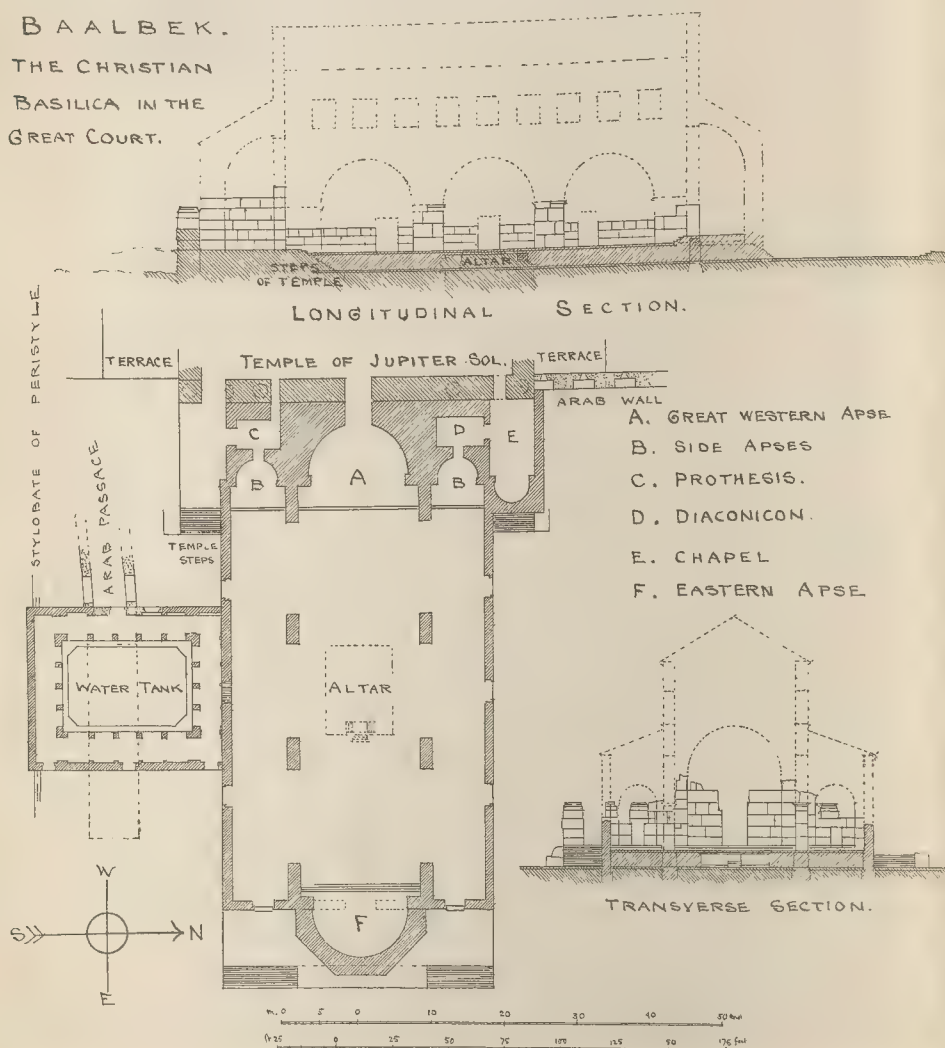
width of those terminating the side aisles.

In the centre of these side apses were doorways leading on the right to a small chamber in the rear, which we assume to be the diaconicon, and on the left to a similar chamber, probably the prothesis or room where the offerings of the faithful were deposited, there being two other entrances to it, one on the south, the other on the west side. From the diaconicon a door led to a small chapel on the north or right-hand side with an eastern apse. The diaconicon or priests' chamber served therefore the basilica and the small chapel. At a later period, probably on account of a second change in the ritual, an apse was built at the east end of the church, and the great central doorway and wall on each side of it were cut away to open out the apse to the church. This apse was built on part of the landing and flight of steps already referred to, leaving steps on each side to

approach the side doorways. At the same time a wide opening was cut in the centre of the great western apse, which thus became the principal entrance to the church. Besides the doorways already mentioned, there were three others on the north and south sides, but no trace of any steps leading up to them. Similar side entrances are found in other Syrian churches, and notably in the great church of St. Simeon Stylites at Kalat Sema'n, and they may have been provided in those cases where at certain periods of the year a large number of pilgrims assembled, who, standing outside, might still take some part in the ceremonies going on inside, unless temporary wooden flights of stairs were provided for the incoming and outgoing worshippers. Two distinct periods therefore must be ascribed to the church, and it remains to be considered to which the great arches of the nave belong.

In the earlier churches, built not only

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THE CHRISTIAN  
BASILICA IN THE  
GREAT COURT.





in Syria but throughout Europe, the builders availed themselves of the materials found on the spot, and utilized not only the columns but the entablatures carried by them, on which they built their clearstory walls. This, however, made the distances between the columns too small to allow of the services being followed by the worshippers in the aisles, and consequently at an early period, whilst still employing the old columns if available, they spanned them with arches to carry the superstructure. In Europe, when columns were not procurable, they replaced them by square piers; but in Syria, where the masons at an early period were able to work columns, sometimes cutting both base and capital out of the same block, there are no churches with square piers carrying arches dividing the nave and aisles. About the middle of the VIth century, according to M. De Vogüé, they conceived another system, viz., that of three great arches carried on rectangular piers with deep abutments against the end walls; and it is a singular fact that this system of wide semicircular arches resting on long rectangular piers never seems to have been followed in Europe.

In the plan published by the Germans the whole of the structure, including the triple apse with the exception of the eastern apse, is hatched as belonging to one period, from which we may assume that the abutments of the nave arcades and the walls of the triple apse are in their opinion coeval; but the description which accompanies the plan is not quite intelligible. The statement that Theodosius the Great (374-395) destroyed in Basilek the renowned great temple and transformed it into a church is not in accordance with the text quoted in note (p. 139, Feb. 11), wherein it is stated that Theodosius destroyed some of the Pagan temples, but converted the Great Temple dedicated to Baal, and known as the Trilithon, into a Christian church, and the passages following in the German text are still more contradictory, viz., "the conceived opinion that in the basilica, at least in the original plan without the eastern apse, we still possess the church of Theodosius," is not in accordance with what follows: "The system of the nave\* agrees with that of the basilica of Qalb-Louzé, which De Vogüé places in the VIth century." It is difficult to understand how Theodosius at the close of the IVth century could have conceived a type of plan which was not evolved till the VIth century.

De Vogüé gives illustrations of a second church with a similar plan at Roueih. Mr. Howard Crosby Butler, in his work recently published on "Architecture and Other Arts" in Syria, gives plans of three other churches of the same type at Djuwaniyeh, Bettir, and Bashmisi, to which he ascribes the same date, and adds that this was the last principal change in the plans of these Syrian churches. In connexion with this basilican church at Basilek there is another important consideration which would determine its date. Dr. Edwin Freshfield, in a paper contributed to the Society of Antiquaries on April 3, 1873, pointed

out that during the reign of Justin II. (565-574), owing to a change in the liturgy, it became necessary to have three apses, and he affirms that previous to that period only one apse was provided, and that the triple apse of St. Simeon Stylites was a later addition. If that is the case this basilica at Basilek may date from the second half of the VIth century and the eastern apse must have been built at a still later date.

There still remains sufficient of the western end to determine the height of the three apses. The great arches of the nave are gone, but two of the piers retain their impost mouldings, so that as the arches in other Syrian examples of the same class are always semicircular, the height of their crowns can be determined. Of the eastern apse the plan only remains. According to the Germans the interior of the church was lined with marble, suggested by the holes for the cramps of the slabs and the discovery of numerous fragments of marble in the excavations. Of the upper part of the superstructure only gigantic console brackets of two sizes have been found, on which the roof trusses were carried, as in the church at Qalb-Louzé. Based on this latter church and of that at Roueih, we have indicated in dotted lines a conjectural restoration of the whole church.

When clearing away the soil on the south side of the basilica the Germans discovered the remains of an open court surrounded by what was probably a vaulted arcade, judging by the remains of the piers and wall responds, and in its centre the traces of a large tank. The plan only is given in the German publication, so that the height of the walls and the depth of the tank are not known. Although built up against the south aisle wall, there was no entry from the church, the central doorway in this aisle having been blocked up. There were entrance doorways on the east and west sides, and a covered corridor, originally vaulted over, led up from the lower level on the south side of the Great Temple, this latter, of Mahommedan work, suggesting that they had utilised this open court with its tank for their own ablutions when the Christian church was converted into a mosque. The junction of this corridor with the arcade round the court shows that it was a later addition. But whether the court with its tank was built by the Christians or the Mahommedans there is at present no evidence. The south wall of the court was built on the stylobate of the peristyle round the great court, and other rooms were built across the peristyle pavement. In this tank, or piscina, the Germans say, "One will hardly venture to recognise an ancient Christian baptistry, but in all likelihood the swimming pond of a larger bath, which, in accordance with a custom frequently attested in ancient times, was united with the basilica." We cannot call to mind the existence of any such feature attached to Christian basilicas, but if the church had been utilised as a mosque its use becomes at once apparent.

UNIVERSITY HONOUR TO AN ARCHITECT.—The Senate of Dublin University have passed a "grace" for conferring the honorary degree of LL.D. upon Sir Thomas Drew, President of the Royal Hibernian Academy.

## NOTES.

The London Water Board.

MR. BRUDENELL CARTER, the well-known oculist, formulated a complaint last week in the *Times* against the Water Board of some public importance. It was that he and other residents at Clapham Common and Brixton were deprived of water for more than a day without notice, and apparently on the ground that water had lately been difficult to filter owing to recent rain. The charge is really one of absolute incompetence on the part of the officials of the Water Board. It is not the first time that complaints have been heard against the administration of the new Board. It is of the first importance that public attention should be drawn to these delinquencies, since it is only by public protest that they can be prevented in the future.

Workmen's Compensation.

THE Court of Appeal in two cases, *Wilson v. The Ocean Coal Company*, and *Treherne v. The Ocean Coal Company*, have just decided a point of some interest to employers under the Workmen's Compensation Act. The facts were the same in both cases, save that in the first the workman was suing the Company for a sum deducted from his wages in respect of a contribution to a provident scheme; whereas in the second case the workman was claiming to be entitled to the benefits of the Workmen's Compensation Act, and the Company alleged that he had contracted himself out by reason of his acceptance of a scheme. In November, 1898, a scheme had been duly certified by the Registrar of Friendly Societies, under section 3 of the Workmen's Compensation Act, and it was to remain in force for five years, and the plaintiffs in both cases had become parties to the scheme. On December 9, 1903, the date fixed for the termination of the original scheme, it was renewed for a further period of five years, and notices to the effect were posted in the colliery. The plaintiffs had not enrolled themselves under this new scheme, which differed in its terms in some respects from the old scheme, and they had joined in meetings, at which it had been decided that the men preferred to remain under the Workmen's Compensation Act, but no formal steps had been taken by them to revoke the scheme. Under the original scheme the practice had been for the men who wished to leave the scheme to give one month's notice, and the County Court judge had held in both cases that since they had given no such notice they remained bound by the renewed scheme. The Court of Appeal reversed this finding in both cases, and held that the workmen had not assented to the new scheme. It will be observed that the Act provides for a scheme being certified by the Registrar of Friendly Societies, and when once such a scheme is in existence then the employer may contract with his workmen that the provisions of the scheme may be substituted for the provisions of the Act. There is also machinery provided in the Act by which the workmen can obtain a revocation of the scheme, but the employer must bear in

\* Viz., the three great arches on either side between nave and aisles.



mind that the adherence of the individual workman to the scheme when in existence is solely a question of contract, and unless the workman has subscribed to the scheme or so conducted himself (as, for instance, by accepting benefits under the scheme) that a contract can be presumed from his actions, he will not be bound by the scheme and can rely on the Act.

**The Unemployed Workmen Bill.** The Bill was read, as some of our readers may have noted, a second time in the House of Commons last week. But this proceeding was little more than an approval of the extension of the present system of poor law relief. As we all know a pauper can obtain parish relief, and in the rural districts in winter it is still allowed for unemployed workmen to obtain outdoor relief, or even to enter the workhouse—a statute to enable relief to be given to unemployed workmen is therefore not one which establishes a new principle. But the practical extension of the system of public relief is one of great difficulty. Why, for example, is the relief to be for manual labourers? Why is the type-writing clerk out of work by no fault of his own not to be provided for? Again, as the Bill at present stands, a man in order to obtain relief must be “temporarily unable” to obtain work “from exceptional causes over which he has no control.” Here is a question of great difficulty. For example, A., a bricklayer, is thrifty and puts by a little money in the summer for the winter; B., is likewise a bricklayer, but spends his wages as he gets them, and in the course of a month’s frost is thrown wholly out of work and becomes temporarily destitute. Why should the State provide work for the spendthrift? These and many other similar problems are raised by the Bill, and we should feel no surprise if it did not at present become law, though it will probably be the beginning of some scheme of like character in the future. But it is a question not easy of solution how to reconcile what may be termed humanitarian desires with the encouragement of thrift.

**Disused Burial-Grounds.** A SOMEWHAT curious point came before the Court of Appeal in the case *The Bosworth v. Corporation of Gravesend* (June 8). The Corporation were purchasing a cemetery at Gravesend, and part of the cemetery so to be purchased was an old cemetery belonging to the Gravesend and Milton Cemetery Company, incorporated by special Act in 1838. In 1859 a predecessor of the present vendors had acquired an additional piece of land adjoining the cemetery, and in 1884 the additional piece of land had been set apart and consecrated as a burial-ground, and part of it had been so used. On August 11, 1854, under the Burial Act, 1853, an Order in Council had been made ordering that no new burial-ground should be opened without the previous approval of a Secretary of State. This approval had never been obtained as regards the addition to the cemetery, and the questions for the Court were whether, without such approval, the land could legally be used as a burial-ground, and, if not,

whether that portion of it not actually used for burial could be used for building, and must be valued accordingly. The Court decided that the Burial Act, 1853, applied to an addition made to an existing burial-ground, and that therefore the addition could not be used as a burial-ground, but that the prohibition against building on disused burial-grounds in the Disused Burial-Grounds Act, 1884, applied to any land “set apart for the purposes of interment” within section 1 of the Metropolitan Open Spaces Act, 1881, were in breach of the Order in Council, and that therefore the land should not be valued as building land.

**The Strength of Columns.** MANY years ago the experiments of Fairbairn & Clark demonstrated the fact that the ultimate strength of hollow tubular columns of wrought-iron depended very largely upon the resistance of the cylindrical plate to buckling. This means, of course, that a certain minimum thickness must be provided for a column of any given diameter if safety against secondary flexure is to be secured. It is easy to make the thickness such that the column shall be safe against buckling, but not so easy to hit upon the precise thickness which jointly satisfies the conditions of safety and economy. The point is an interesting one, and has been elucidated to some extent by the experiments conducted by Professor W. E. Lilly, of Dublin University. Up to the present time the investigation has been limited to round-ended columns. The results obtained are stated in a paper read before the Institution of Mechanical Engineers last week, and show clearly that the strength of the columns tested depended upon the value of the ratio  $r/t$  (ratio of gyration ÷ thickness of metal). The practical outcome of the paper is the statement of an equation, based on the Rankine formula, for the calculation of economic proportions for hollow tubular columns. As this new rule takes due account of the relative values of the radius of gyration and the thickness of metal for a given length, it marks a distinct advance, although its scope is limited to the particular class of columns examined by the author. We should be very glad if the leading engineering and architectural institutions could arrange to appoint a committee for the purpose of undertaking an inquiry into the strength of columns generally.

**Concrete-Steel in Belgium.** A SHORT paper read by M. E. Noailon before the Institution of Mechanical Engineers at Liège contains particulars relative to characteristic applications of “ferro-concrete” in Belgium. Before describing the works in question the author makes some suggestions for the guidance of the designer, who will find a useful summary of the general principles governing concrete-steel building construction in six rules drawn up by Professor Rabut. Among the typical structures described are the dome of the Gare Centrale at Antwerp, the Renommée Hall at Liège, and the La Bouverie Bridge at Liège. The dome at Antwerp, commencing at a height of 130 ft. above ground level, rises for a further height

of 130 ft. to the spire. It is an example of the convenience offered by the new material, for the architects discovered that the original intention to build the dome in stone could not be carried out owing to the insufficiency of the foundations to support the weight involved by a masonry structure. This dome, however, follows the form of the original design, and, therefore, is nothing better than sham, in the sense that the concrete pretends to be stone. The Renommée Hall, on the contrary, was designed in such manner as to give full play to the special properties of concrete-steel. M. Jaspas, the architect, set his face against the practice of employing concrete as an imitation stone, and has succeeded in producing a design which admirably displays the characteristic features of concrete-steel construction.

**Christ Church Cathedral, Dublin.** In a pamphlet on Christ Church Cathedral, Dublin, Mr. Butler draws attention to the decay which has taken place in several portions of the dressed-work of the exterior. The Caen stone, which was unfortunately chosen has, as one is not surprised to hear, proved to be unsuitable for external work, particularly in the Irish climate, and if the examples taken from the south-west doorway, and the clearstory window of the nave, and illustrated by very clear photographs, are at all typical of the general condition of the dressed-work of the exterior, its condition is, as the writer says, “lamentable.” Considering the large sums spent by the late Sir Benjamin Guinness in the restoration of this interesting building, it should not be difficult to raise a sufficient sum to deal with the mischief before it extends further.

**The Parish Chapel, Marylebone.** A RESTORATION is about to be effected of the tomb with obelisk in the churchyard of Charles Wesley, author of many favourite hymns and younger brother of John Wesley. There were buried also his wife, and Samuel Wesley, the composer and organist during a long period of the parish church. The chapel, originally built in 1400 by Roger de Braybrooke, to replace that of St. John the Evangelist at the south end of Marylebone-lane, Oxford-street, formed the parish church until the erection, 1813-17, of the present church, by T. Hardwick, in Marylebone-road. A tablet records the death on August 5, 1754, of James Gibbs, who in 1740-2 rebuilt the old church, to the building fund of which he bequeathed 100%, and was buried in an adjoining vault. Some years ago Viscountess Ossington, a daughter of the fourth Duke of Portland, restored, at her own charges, the numerous mural tablets in the chapel which constitute an uncommon collection, most of them being distinguished by the elegance and purity of their design. The oldest two commemorate Sir Edmund Douce (1644), cupbearer to the Queen Anne of Denmark and Henrietta Maria, and members of the Forset family (1658), owners of the manor, possessed until lately by the Dukes of Portland.\* Other memorials include those of James Ferguson, the astronomer, his wife, and their

\* For the descent of the property, see an article in the *Builder* of December 3, 1887.



eldest son; Barette, by T. Banks, R.A.; Caroline Watson, engraver; and Humphrey Wanley, keeper of the Harleian Library and MSS., which were credibly informed were stored in Oxford House, in the High-street, formerly a girls' school and now Messrs. Tilbury's offices; and there are two recent tablets to several members of the house of Bentinck, buried in the family vault. In the parish chapel were baptised Lord Byron and Nelson's daughter Horatia (Mrs. Ward). Hogarth depicts the interior of the first church in the marriage scene of his *Rake's Progress* (1735), and the churchyard, with the Deschamps altar-tomb, in a plate of his *Industry and Idleness* (1747). Of the many notable interments in the adjacent burial ground we may mention those of Joseph Bonomi, architect, and John White, architect to the Duke of Portland and honorary architect, 1776, of the parish workhouse, latterly rebuilt; Francis Wheatley, R.A., Rysbrack, sculptor; Guthrie, historian; George Canning, father of the statesman; and Woelfl, composer, the pupil of Leopold Mozart and Haydn.

Harvard House, in the High-street, has just been sold at auction for 945*l.* It was built in 1596 by Thomas and Alice Rogers, whose daughter Katharine was the mother of John Harvard, the Puritan minister, and practically the founder of the University at Cambridge in America. The front is elaborately carved, and bears the initials and date "T R 1596 A R," with roses and fleurs-de-lis, and the badges, the bull and bear, respectively, of the Neville and Beauchamp families. Thomas Rogers, alderman of Stratford, was member of a family who lived there in the XVth-XVIIth centuries. His daughter married, for her first husband, Robert Harvard, a butcher of St. Saviour's parish, Southwark. In 1607 their son was baptised in St. Saviour's church, to which Mr. Choate two or three weeks ago presented a stained-glass window in memory of John Harvard.

At the Leicester Gallery there are two interesting exhibitions of water-colours; Mr. Talbot Kelly's of Burma, and Mr. Walter Tyndale's in illustration of "Thomas Hardy's Country." Mr. Kelly expresses a hope, in the preface to the catalogue, that this collection of sketches may convey some idea how beautiful and attractive a country Burma really is. They certainly succeed in this aim; many of the landscapes are of great beauty both in composition and in colour effect. Among the best in this respect are "Waiting for the Steamer early morning" (32); "Promo—evening" (48); "The Lower Defile of the Irrawaddy" (52); "Mining Camp on the Nan-tu River" (54); "The Irrawaddy Banks, near Malé" (62). These and others bring before us vividly the character and colour of a scenery different from any of which we have seen illustrations. Mr. Kelly is also very careful in his illustrations of native architecture. He shows us, in "The Shrine at the

Shwe Dagôn Pagoda, Rangoon" (25), the curious effect of the plain thick gilt columns carrying a conglomeration of carved and painted wood roofs; the "Portico of the Queen's Golden Monastery, Mandalay" (56), with its barbarous gigantic scroll ornaments; and the extraordinary collection of architectural curiosities on "The Platform of the Shwe-zi-gôn Pagoda, Pagan" (27), including a number of huge semi-globes of stone ranged in a row, the flat side upward, like a number of gigantic curling-stones. To go into the next room and look at Mr. Tyndale's Wessex sketches seems like going not merely into another country but into another planet: it affords the most extraordinary contrast between the scenery and the buildings of East and West. Mr. Tyndale's water-colours are small works, very artistic in composition and very careful and correct in regard to the buildings shown; and familiarity with some of the scenes and places enables us to realise that the representations are not only picturesque but accurate. Of the seventy-seven drawings none can be selected as of particular excellence; their merits are equal, but they are all good, and form a most interesting illustration of the scenery and houses of a district which does not require its connexion with the works of an eminent novelist to render it attractive, though readers who are familiar with Mr. Hardy's novels will no doubt find an additional interest in the views of the actual places which, under altered names, have furnished the novelist with the setting for his stories.

A Sonnet  
on  
Architecture.

The publication of this week among our illustrations of a monument to the late French Poet and Romanist, Armand Silvestre, led us to turn over his poems, and it is of some interest to find that the last thing in his latest volume of poems, "Les Aurores Lointaines," and therefore perhaps the last poem he published, is a sonnet in praise of architecture. Though many references to architecture can be found among poets, it is rare to find a sonnet specially written on the subject, so it may be worth quoting, if only by way of showing that Silvestre had some claim that his monument should be illustrated in an architectural journal:—

#### "SONNET DE L'ARCHITECTURE."

Celui qui, le premier, dans l'histoire, a tenté  
D'enfermer le granit, dans la splendeur des lignes,  
Bien qu'il inconnu de nous, est parmi les plus  
dignes

De ceux que le temps lègue à l'Immortalité.

Par lui, le dur métal et le marbre dompté  
S'assoupissent ainsi que les tiges des vignes;  
Des blocs harmonieux et des formes sages,  
Il fit jaillir du sol le secret enchanté.

La Gloire des palais s'élève dans l'espace,  
Dominant, de son ombre auguste, ce qui passe,  
Héritage sacré d'un art toujours vivant.

À la seule nature empruntant ses modèles,  
L'architecture montre, en des reflets fidèles,  
La matière ployée à l'esprit triomphant.

The suggestion in the first line of the closing triad, that architecture took its models from nature alone, is rather open to criticism, unless we take "nature" in a very wide sense; but the closing line, characterising architecture as representing matter obedient to spirit or intellect, is an admirable summing up. That is what architecture essentially is: material moulded by thought.

#### RECENT DISCOVERIES ON THE CÆLIAN HILL, ROME.

The Cælian Hill appears to have been occupied in ancient times mainly by the barracks of a portion of the troops quartered in Rome—the *Castra Equitum Singulorum*, the *Castra Peregrinorum*, and the barracks of the 5th cohort of the *Vigiles*—and by a considerable number of large private houses. Among these was the palace of the Valerii, transformed early in the Vth century into a monastery and church of S. Erasmus, situated a little way to the east-north-east of the church of S. Stefano Rotondo, itself a building of considerable interest. Many discoveries were made in the XVth and XVIIIth centuries, particulars of which are given by Professor Lanciani in *Ruins and Excavations of Ancient Rome*, 347; and in 1902 portions of the building came to light again, the site having been selected for a large convalescent hospital. The excavations resulted in the finding of remains both of the original palace and of the later monastery, and are fully described in the *Bullettino della Commissione Archeologica Comunale* 1902, pp. 74 *seq.*, 145 *seq.* In 1904 the English Nursing Sisters (the Blue Nuns) commenced to build a new convent and nursing home to the south-west of the *Domus Valeriana*, immediately to the south-east of S. Stefano Rotondo. The work is still in progress, but it may be interesting to give an account of the discoveries that have so far been made.

A building of considerable size and importance, belonging apparently to the II<sup>nd</sup> century A.D., and showing some traces of reconstructions and alterations, has come to light in the course of the excavations that have been made for the sinking of the foundations.

From the character of the inscriptions found, it seems not improbable that we have here a portion, at any rate, of the *Castra Peregrina*, the exact site of which has, up till now, been uncertain, though it has long been known that they stood somewhere in this neighbourhood. They were the barracks of a picked corps of soldiers detailed from the various legions for special service in the capital called *peregrini* (foreigners), who apparently acted as police and had the custody of State prisoners (St. Paul's fellow-prisoners, on their arrival in Rome, were handed over to the "princes" (or commander) of the *peregrini*, he being allowed to live in the city under guard) and also as a kind of secret service or intelligence department, having originally, as the name *frumentarii* (which also belongs to them) implies, been employed on commissariat duties.\*

We have a fragment of an inscription mentioning the *peregrini* or the *castra peregrina*, another of a dedication to Jupiter, and a third (preserved only in its impression in plaster) of an inscription of Septimius Severus, while in a semi-circular apse decorated with niches, which may have been a shrine, were found three small altars, one (without inscription) entire and about 7 in. in height, the other two broken. The former bore a dedication to Pallas in Greek, the latter an inscription recording that it was set up by Tiberius Claudius Demetrius in payment of a vow made to Mercury (!) as a *miles frumentarius* of the 15th legion, which he now fulfilled as a centurion.

A similar altar, with a fragmentary inscription, of the time of one of the Gordians, was found in the course of these excavations. The fact that all these indications of pagan worship were found in a fragmentary condition shows that they must have been destroyed on the introduction of Christianity.

Two sepulchral inscriptions were also discovered, and three interments in the virgin soil, two of them protected by tiles. It was impossible to determine the date of the latter, as the tiles bore no stamps and no coins were to be found with the bodies; but that they did not belong to a very late period is shown by the fact that one of them lay directly beneath the foundation wall of a row of white marble columns, with composite capitals, which may be assigned to the III<sup>rd</sup> century A.D. The columns were 10 Roman ft. in height and 1 2-5th in diameter at the bottom.

The discovery of the tombs has some topographical importance in regard to the course

\* *Peregrini* is used of the whole corps collectively, *frumentarii* of its individual members.



of the Servian wall, outside which they must have lain, though it is surprising that no traces of it have been discovered either here or in the excavations made in the adjacent property in 1902.

A good mosaic pavement with geometrical designs (circles in black on a white ground) was discovered during the present year, but much damaged by frost, so that only small pieces of it could be successfully removed; a drawing of the whole was, however, made.

Among the other finds made may be noticed that of a marble head, which is derived from a Greek type of the first half of the Vth century B.C., and of a large head (about 3 ft. high) of a bearded Hercules in plaster, which was painted and gilded, and must have served for the decoration of a wall, the back of it having apparently never existed.

The brick-stamps and other small objects which have been found are carefully preserved on the spot, and the small museum which will be formed out of them will greatly add to the interest of a visit to the new hospital, which occupies one of the most beautiful sites in Rome, with an uninterrupted view towards the Alban Hills.

I must not close without expressing my thanks to Mr. Edward Descuifi for having promptly called my attention to all discoveries of any importance as they have occurred from time to time.

T. A.

#### LETTER FROM PARIS.

THE Government have done a wise act in purchasing the Château de Maisons Laiffite. This fine building, designed by François Mansart, and thus saved from imminent destruction, is to become an annexe to the Louvre, and will give opportunity for the exhibition of works for which at present there is no wall-space.

The exhibition of English pictures at the Château de Bagatelle has brought in considerable receipts, which will go towards the purchase of works of art by the Municipality of Paris, forming the commencement of a collection which will probably be permanently placed in the Bagatelle Museum. The Municipal Administration are also about to complete the decoration of the Petit Palais, in which there are many exterior niches still awaiting the sculpture for which they are intended, while internally the cupola and hemi-cycles of the main gallery are to be decorated with paintings.

The collection of sculptures by Dalou, and that of the productions of the manufactory at Sévres, now in the northern portion of the Palais des Beaux-Arts, are to be opened shortly.

At the Galliera Museum the exhibition of artistic metal-work, which continues to have great success, is to be followed by an exhibition of various applications of silk—paintings on silk, figured silks, furniture coverings, ladies' dresses, fans, etc. This exhibition will open in April next year, but will be preceded by a furniture exhibition consisting mainly of a re-arrangement of the furniture sent by eminent Parisian firms to the St. Louis Exhibition.

The enlargement of the gardens of the Louvre, which now extend up to the entrance gates of the Carrousel, is to be carried further, and the gardens are to be connected by a stone balustrade to the Arc de Triomphe, which now stands in so isolated a position. Among the flower-beds and lawns at the sides there will be fountains disposed; the whole lighted by electric light.

The Municipal Council of Paris, which, as in former years, has made considerable purchases from the two Salons, intends to purchase, in co-operation with the Government Department of Fine-Arts, a large bas-relief by M. Moncel which was exhibited in the Old Salon. The work, entitled "Rêve du Poète," represents Alfred de Musset seated in a meditative attitude, while the figures representing or symbolising his works pass before him. The work is to be executed in stone and set up behind the Grand Palais on the border of the Cours la Reine. Along the same border, but in the rear of the Petit Palais, is to be erected M. Mercier's monument to Silvestre; and again, at another point in the same line, is to be erected the large monument proposed by M. Dujardin-Beaumetz in memory of great French landscape-

painters—Corot, Theodore Rousseau, Millet,\* Dupré, and Daubigny. To this list of proposed monuments may be added that which the Collège de France proposes to raise in its own honour. This is the work of the late M. Guillaume, and represents France writing, from the dictation of his sister Marguerite de Valois, the Act of Foundation of the Collège de France.

The Académie des Beaux-Arts has awarded to M. Laloux, the eminent architect, the prize founded by J. Jacques Berger to give a reward "for any work of art relating to the history of Paris, or serving as a decoration to the city and increasing its artistic reputation." The prize has been awarded to M. Laloux in respect of his fine building for the Orléans railway terminus. The Académie has conferred the Antoine Bailly prize, for the author of a publication on architecture, on M. Albert Ballu, for his work on the ruins of Timagad.

The celebrated Marché du Temple, erected on the site of the prison in which Louis XVI. and his family were imprisoned, has almost entirely disappeared. In its place is to be a Municipal School of Industrial Art built a "Théâtre Populaire": this at least is the intention of the Municipal Council, which, if carried out, will be a real benefit to the cause of artisan education, much limited in its scope in the schools named after Bernard Palissy and Germain Pilon. As to the "Théâtre Populaire," it is a doubtful kind of project, often attempted but never hitherto successful, as the masses in Paris always have preferred either the music-halls or the modern drama to entertainments of classical music and literary drama.

M. Lafenestre, who has been appointed Professor of "Esthétique" at the Collège de France, has been succeeded by M. Leprieux in his former position of curator of pictures and drawings at the Louvre. M. Quadet, the architect, has succeeded the late M. Thomas in the Conseil Supérieur of the Ecole des Beaux-Arts.

At one of its recent sittings, the Chamber of Deputies decided on the creation, at Paris, of an "Ecole Nationale des Arts et Métiers." The cost of the building and of the installation of the establishment is estimated at something over six million francs.

#### THE HELLENIC SOCIETY.

THE Hellenic Society held their annual meeting on Tuesday last at the rooms of the Society of Antiquaries. Sir Richard Jebb was in the chair. The Hon. Secretary, Mr. G. A. Macmillan, read the annual Report. The Society, the Report stated, wished to offer to the Crown Prince of Greece, President of the recent Archaeological Congress at Athens, to Dr. P. Kavvadias, and to the Greek nation at large, their sincere felicitations on the success of that important international gathering.

In accordance with a vote of the Council, an address, written on behalf of the Society by Sir Richard Jebb, had been sent to Professor Adolf Michaelis, Director of the Institute of Art and Archaeology at Strassburg, on the occasion of the celebrations attending his seventieth birthday, which fell on June 22. It was felt that this compliment was especially due from English archaeologists to the author of *Ancient Marbles in Great Britain*, and one of the original honorary members of the Society. By the death, mentioned in last year's report, of Professor Ulrich Köhler, Professor of Ancient History in the University of Berlin, and at the time of the Society's foundation Director of the German Archaeological Institute at Athens, the Society had lost one of its original honorary members. As this year had been signalled by the Archaeological Congress at Athens, the Council propose to invite the Crown Prince of Greece, as President of the Archaeological Society of Athens, to do the Society the honour of accepting the vacant place in the list of honorary members. It was also recently decided, in recognition of his long services to the Society, to create the Honorary Secretary, Mr. George Macmillan, a life member *honoris causa*.

The Council had again granted the sum of 1000, to the Cretan Exploration Fund, and Mr. Arthur Evans had pursued with his usual

\*We confess that we do not understand how Millet comes to be included among "great French landscape-painters."—Ed.

vigour and success his investigations on the site of Cnossos. The usual grants had been made of 1000, to the British School at Athens and 250, to the School at Rome, and in connection with the latter the Council had recently authorised the President and Honorary Secretary to sign in the name of the Society a memorial to the Treasury in favour of a grant of 5000, a year to the School from public funds. The sum of 250, had been granted to Professor W. M. Ramsay for research in Asia Minor, and 100, to Mr. Hogarth for exploration in Cyrene. In last year's Report the attention of members was drawn to the increasing difficulty, owing to the limited accommodation at Albemarle-street, of keeping the Society's library on a plan readily intelligible to students and visitors. That difficulty the Council had been able, in a measure, to obviate by the acquisition of a small adjoining room, with the result that the subject order room of the books remained undisturbed, and the accommodation for students was somewhat improved. Another small improvement was that the system of classifying and binding the forty volumes of archaeological tracts from the Library of the late Dr. Overbeck had been extended to the hitherto scattered pamphlets and smaller monographs. A subject catalogue of all the pamphlets would shortly be ready for use in the Library. The records showed that 375 visits were paid to the Library in the course of the year, as against 338 for the year 1903-4, and 250 for the year 1902-3.

Among members lost by death during the year, special mention was made of the Bishop of Southwell; Dr. Thomas Fowler, President of Corpus College, Oxford; Admiral Sir Erasmus Ommaney; the Rev. Augustus Austen-Leigh, Provost of King's College, Cambridge; Canon Adam Farrar, of Durham; and Mr. F. D. Mocatta, lent a generous supporter of this as of many other learned societies. During the year, 118 new members had been elected, while thirty had been lost by death or resignation. The number of members at present on the list was 926, and there were in addition 162 subscribing libraries and forty honorary members. The Report tended to show that, as regards both the efficiency and the scope of its work, the session 1904-5 showed a marked improvement in the Society's position.

#### THE NEW TESTING STATION OF THE BRITISH FIRE PREVENTION COMMITTEE.

THE British Fire Prevention Committee was founded in 1897, and incorporated in 1899. Its first testing station was installed in 1899 at North Bank, Regent's Park, and comprised two testing chambers, each measuring 10 ft. by 10 ft., with the necessary equipment. The second testing station was erected in 1901, and was situate at Porchester-road, Baywater, when, beyond the 10 ft. by 10 ft. huts, an additional testing chamber was erected, 22 ft. by 10 ft.

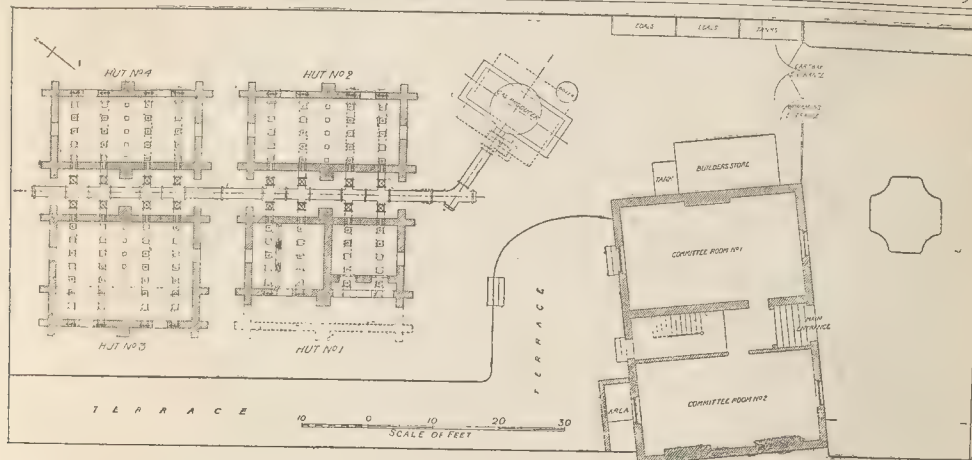
The new testing station, to be opened on June 28, is again situated in Regent's Park, at North Bank (off Lodge-road), and is on a larger scale. Besides the usual equipment, it comprises one testing chamber, 22 ft. by 10 ft., for floor tests, one 22 ft. by 15 ft. for floor tests, and a third chamber, measuring 22 ft. by 10 ft., divisible and convertible for various purposes of partition tests, door tests, glazing tests, etc. A fourth reserve testing chamber is in course of erection, measuring 22 ft. by 10 ft.

The number of tests conducted by the Committee up to the opening of the new testing station is ninety-one. The tests for the opening day comprise a floor test of the National Fireproofing Co., of U.S.A., two door tests of the Gilmour Door Co., of Canada, and two skylight tests of Messrs. Pilkington Bros. (St. Helen's).

*Plant.*—The huts are laid down in two rows, their construction being explained on the plan. The materials used in their construction are stock bricks, with lime mortar. The builders were Messrs. J. D. Pitcher & Son.

The fuel generally used is gas, produced on the spot by a generator supplied by Messrs. Mason, of Manchester. The gas is conveyed from the generator by pipes to the several huts, and the supply is regulated by valves and dampers, and as the gas enters the huts from the branch pipes it is diffused by means of mixing chambers of firebrick, as shown. Each





Plan of the British Fire Prevention Committee's New Testing Station.

but has door openings, ventilation and observation holes, the doors being closed by brick-work during a test, and the ventilation holes blocked, according to requirements, by fire-brick or fire-clay. Each chamber for a floor test allows for the floor under investigation to be placed at least 8 ft. above the floor of the hut. The chambers are roofed in with galvanised iron or tarpaulin when necessary. Bricks or pig-iron are used for any loads that may be applied to floors under investigation, and water is applied from a steam fire-engine or from a manual pump, as required.

Records of temperatures are taken as far as possible by pyrometers. The instruments used are recording pyrometers designed by the late Sir William Chandler Roberts-Austen, K.C.B., F.R.S., and manufactured by Messrs. James Pitkin & Co., of London. They rely for their indications on the measurement of the current generated by thermo-junctions, which are placed in various parts of the huts. These thermo-junctions are connected by insulated wires to the recording instruments, and the temperature at any point can be recorded or observed at any instant of time. The metals composing the thermo-junctions may be varied with circumstances, but in the majority of cases the platinum-iridium junction, as used by Professor Tate in 1873, is adopted. These thermo-junctions give accurate indications of temperature up to 3,000 deg. Fahr., which is considerably higher than has so far been required at the testing station. Kew standard thermometers are also used for low temperatures.

Visual observations as to work under investigation are also recorded, as far as possible, by photography. Deflections are measured by level and staff, or by weights and pulleys. There is a supplementary equipment available for any necessary laboratory tests with fire preventive, fire alarm, and fire-extinguishing appliances, such as thermostats, sprinklers, etc. Similarly arrangements have been made for conducting special tests with lamps, stoves, electrical apparatus, etc. The necessary electrical energy or hydraulic power for special tests is obtained from the Central Electric Supply Co.'s generating station.

Fire tests with materials and systems of construction and appliances used in ordinary practice, and not subject to proprietary rights, are undertaken from time to time by the executive, as the limited resources of the Committee permit. Considerable importance is attached to such investigations by the executive, as the information available regarding the efficiency of the more common forms of fire-preventive building construction and appliances is most incomplete.

Parties interested in fire-resisting materials, systems of construction, or appliances, can apply for tests, subject to a scale of charges which varies according to the subject put forward for investigation and the preparations necessary. These charges are intended to cover in part or whole the expenses incurred upon the tests.

This work subject to proprietary rights can come before the Committee for review, and inventors, manufacturers, and others are given an opportunity of obtaining official reports as to the efficiency of their specialities at or below the cost involved in such investigations.

In all cases, whether the tests be with preparatory work or not, the actual skilled conduct and supervision of the tests, as also the preparation of the reports by the members, is undertaken voluntarily, no fees of any kind, or even out-of-pocket expenses, being paid to the members of the Committee for any such services.

Sir William Preece, as senior member of the Council of the British Fire Prevention Committee, started on Wednesday the first test at the new Testing Station, when various systems of floor construction, doors, and fire-resisting glazing were under investigation. There was a large attendance of public officials during the afternoon, including several representatives of foreign authorities. In his opening address Sir William Preece specially remarked upon the necessity of the municipal authorities aiding the voluntary efforts of the Committee in the investigation of fire-preventive questions.

#### THE INCORPORATED INSTITUTE OF HEATING AND VENTILATING ENGINEERS.

The summer meeting of the Incorporated Institute of Heating and Ventilating Engineers was held on the 20th ult. in Bristol. Members attended from various parts of the country, and a drive round the Downs and thence over the Suspension Bridge to Ashton Court was planned for the morning, a visit being paid to Redcliff Church on the return journey. At Redcliff Mr. J. T. Francombe received the party, and guided them round the church. In the afternoon the members assembled in the Royal Hotel to hear papers read and transact business connected with the Institute, and Mr. George Crispin, President, occupied the chair. The President mentioned that there were twenty-two new members and the list having been read through, the names were approved.

The President then gave a hearty welcome to the whole of the members and friends to Bristol.

#### Heating of Buildings and Dust-Prevention.

Professor W. F. Barrett, F.R.S., M.I.E.E. (hon. member), had prepared a paper on the heating of buildings and on dust deposition, and in his absence it was read by Mr. Kenyon. Professor Barrett spoke of the educational aspects of the question. He urged that scientific and technical training should begin with the professional classes and employers of labour, and work downward to the artisan. Greatly to our injury, he said, this process, so successful in Germany, was reversed in our own country; we have established technical

schools, chiefly evening instruction, for the working classes, whilst in our public schools and in our Universities scientific and technical teaching, if not altogether neglected, has been most inadequate, until quite recently. Happily a great change has come about in recent years, and in the large and well-equipped colleges which now exist in so many of our large cities the paramount claims of scientific training are fully recognised. Proceeding to discuss some of the scientific aspects of heating and ventilating, the lecturer mentioned that all heating appliances depend upon the transference of heat from some source to the parts of the building it is intended to warm. This transfer can, he continued, be effected in three ways: by the slow process of conduction, by the quicker process of convection, or by the swift process of radiation. In the case of hot-water pipes all three processes are at work; the heat is conducted through the iron pipes, which warm the room both by radiation and convection. In the case of an open fire, radiation is practically the only agent by which the heat is distributed to the persons in and to the walls of the room. As the air is almost as transparent to radiant heat as it is to light, the air of a room cannot be warmed by radiation, and hence our domestic open fire-grates warm the room indirectly by heating the floor, walls, and furniture, and these, absorbing the radiant heat, warm the air by convection. This latter process consists in the transfer of heat by moving masses of the warmed air or other fluid, the motive force being gravity, the colder denser air displacing the lighter warm air. These currents are the means by which all fluids are heated, as both gases and liquids are extremely bad conductors of heat. Professor Barrett's paper then touched on his own experiments. A few years ago a makeshift method of warming a small room was introduced. The ordinary glass globe was removed, and the flame surrounded by an enamelled iron globe, closed at the top. Curious as it might seem, better heating was effected in the lower parts of the room by this arrangement, without increased consumption of gas, the naked flame wasting its heat in the layers of air near the ceiling. The system, of course, vitiated the air by the products of combustion. Discussing systems of warming large public buildings, Professor Barrett said no adequate explanation had been found for the fact that in buildings mechanically ventilated by driving in warmed air a lack of freshness was produced. The advantages and disadvantages of the "Plenum" system of ventilation having received attention, the writer suggested that brief contributions recording their experience from members of the Institution who had had considerable practical acquaintance of the working of various systems of heating and ventilation would be of the very greatest scientific value. Even a few lines of reply to a printed form of questions sent out by the Secretary, if answered by those who



had no axe to grind, would be of great value. It is much to be regretted that they had so little exact knowledge of the best system of heating and ventilating large buildings. As regards steam heating, he remarked that one disadvantage was that no heating occurred until the water in the boilers was actually generating steam, whereas with a hot-water system warming began directly the heat was applied to the boiler. He found those who had experience of different systems generally preferred hot-water circulation, independently of the ease with which it could be controlled. The heating of hot-water radiators by injecting high-pressure steam into the system seemed to him one of the simplest and best ways of transmitting heat throughout a building. Ideally, of course, electric heating would be the best, as the electric current could be conveyed with the least possible loss throughout any building, and then by traversing suitable resistance coils the current could be made to generate heat in any room and at any moment by merely turning a switch. But at present this system was impracticable, except as a luxury, owing to the cost of electricity. In the neighbourhood of a waterfall, however, the utilisation of the energy of the fall and its transformation into electricity—and thence to heat—would be a practical project. When there was waste steam, at, say, 40 lb. to 50 lb. pressure, coming from a boiler used for power purposes, nothing could be more economical nor simpler than to utilise this steam for the transmission of heat by injecting it into a hot-water system whenever needed. Properly jacketed steam pipes were used in America to convey heat and power to remote distances, and he did not know why the method of heating by steam injected into a water system had not become more general; the circulation of the water was accelerated by the steam jet, and the regulation of the heat was perfectly under the control by simply turning the steam jet on or off. In systems where the air was warmed the walls were cooler, and became more rapidly covered with dust than where the heating was by the radiation of heat from a fire. In the latter case the air was the cooler, and the walls remained cleaner. This was notably seen in the difference between wall-papers in rooms heated by stoves and open fires. Those where the stove was used became dirtier, and this was not due, as some supposed, to leakage from the stove. The same thing might be noticed where hot-water pipes ran along the wall; near the pipes the wall was blackened. An objection had been raised to radiators owing to this tendency, and it became a matter of great importance to try and ascertain the cause of this, and, if possible, find a remedy. The general result of experiments showed that the invariable tendency was for fine dust particles to be driven away from warm surfaces, and to deposit themselves on any neighbouring cold surface.

The paper provoked a good deal of discussion, several of the points it raised being subject to criticism, as well as approval. Mr. J. Buley (London) attributed the deposit of dust to the vortex of air created by a heated surface. He quoted the case of ceilings blackened by incandescent gas burners, which he referred to as the filthiest of all means of illuminating a house. He urged that engineers should keep their radiators sufficiently far from walls to allow an air current to flow between. Other members spoke for and against the use of steam by injecting it into a water-circulating system for heating purposes.

Professor Ferrier, of the Bristol University College, remarked that he could not pose as an expert with regard to any particular system, and he could only claim to have had the ordinary experience. At one building he had various systems. At one building he had experience of lecturing in competition with the steam hammer caused by injecting steam into water-pipes, as suggested in the paper, and it was trying to one's temper.

The President then presented to Mr. Geo. Chasser, Stourbridge, a cheque for £10 10s., being the first prize in the assistants' competition, for a paper on "Hot-water Supply by Indirect Heating."

Mr. O. M. Row next read a paper on "Steam Economy in Connection with the Heating Trade." The argument of the writer was in favour of the low water pressure hot-water system, in which temperature was

secured and maintained by calorifiers, through which the water constantly circulated. This paper was also fully discussed.

It was decided to hold the next meeting of the Institution in London, on October 17.

In the evening the members dined at the Royal Hotel. The toast of "The King" having been honoured.

Professor Ferrier submitted the toast of "The Institution of Heating and Ventilating Engineers." Experience was a valuable thing, but it was also true that, if they were to cope with the problems that arose in the future, they must be trained and educated so that they might approach them in a different way to the rule of thumb method customary in the days of their forefathers. Experience of the past would be of little use unless they learned what to avoid as well as what to copy.

The President, in reply, said they sincerely trusted that before many years elapsed a number of professors at the various Universities and colleges of the United Kingdom would more carefully consider the matter of heating and ventilating. They hoped these gentlemen would give them the benefit of their scientific research as their American cousins had received from Professors Carpenter and Kencally, who had devoted an enormous amount of time and thought to the study of hygiene, more especially as regarded heating and ventilation, and the whole world had benefited thereby.

Professor Lloyd Morgan gave the health of the "Past Presidents," and Mr. J. Palmer replied. Mr. D. M. Nesbit, who also responded, referred to the neglect in the past to make their public buildings habitable, and said he was glad there had been a radical change in regard to that matter. Mr. W. Jones, also speaking in reply to the toast, congratulated the President on a record meeting of the Institution. Other toasts followed.

The following day the members and their friends, at the invitation of the President, joined in an excursion to Blagdon, Burringdon, Coombe, and Cheddar.—Abstracted from a report which appeared in the *Western Daily Press*.

#### THE INCORPORATED BRITISH INSTITUTE OF CERTIFIED CARPENTERS.

The annual dinner of this Institute was held on Saturday, June 24, in the Duke's Room, Holborn Restaurant. Mr. John Willson, J. P., President, occupied the chair, supported by Messrs. E. M. Eagles, M.A.; J. Hutton Freeman, Clerk to the Carpenters' Company; J. Inkpen, hon. treasurer; W. E. Cutler, late secretary, and others.

The toast of "The King" having been honoured,

Mr. Eagles proposed the toast of the evening, "The Incorporated British Institute of Certified Carpenters," coupled with the name of the Chairman. The membership of the Institute totalled 139, exclusive of the honorary members, and the financial position was satisfactory, there being a good balance in hand.

The Chairman, in response, said he was pleased to know that the Institute was flourishing and that they were increasing in numbers. They would be glad to know that at the examinations held by the Carpenters' Company the previous week there were fifty candidates, of whom forty-eight succeeded in passing, which he thought was a record percentage. The examination was quite as strict as on any previous occasion, and he believed that every man who passed was a fit and proper man to receive a certificate. He hoped that the majority of those who had passed would join the Institute. He noticed in the *Journal* of the Institute that an alteration had been made in the qualification for membership. Formerly it was a *sine qua non* that members should hold the certificate of the Carpenters' Company, and he was not sure that the alteration was not a wise one, for any change that would tend to enlarge the circle of the Institute was a good one, if made with circumspection. As to the examinations of the Carpenters' Company, the examiners were all men of practical knowledge. In the case of building construction, if a man's knowledge was derived entirely from books he was hardly qualified to be an examiner, for which work practical knowledge was absolutely necessary, and that knowledge was possessed by the examiners

of the Company, and he hoped they would remember that, and realise that the Company would not grant their certificate to incompetent men. He was told the other day that carpenters' work was becoming a thing of the past. He did not agree with that, and he did not think that steel work was going to oust the carpenter. The craft of carpentering was the oldest in the world, and he thought it could still maintain its position as a great craft. He hoped that future legislation would permit wooden houses to be put up in rural districts. That would be a great boon to the rural population, for farm labourers and others would be better housed if in timber counties wooden buildings were allowed to be erected, and these buildings could be made warm and comfortable and picturesque; they knew this was so, judging from some of the old wooden buildings which existed in most towns in the country, but which, alas! scarcely exist in London. He hoped that in the wisdom of Parliament and the various local authorities, permission would be granted to erect wooden houses in country and comparatively isolated districts.

Mr. G. Ayres, hon. secretary, then proposed the toast of "The Worshipful Company of Carpenters," and in doing so he said that the Institute was a very young body, being instituted in 1890, whereas the Carpenters' Company dated back to the beginning of the XIVth century. Anyone who had studied the history of the Company and other companies would find that the object with which they were started was mutual improvement, and he might say that was the object with which the Institute met from month to month. The Carpenters' Company had been well to the front in doing the work for which it was originally founded, and, judging from the men connected with it, they would, no doubt, do all they could for the craft. The examinations of the Company were second to none in importance to their trade in the United Kingdom, and they embraced almost every subject in the craft of carpentry and joinery. He did not believe much in examinations as examinations, but the amount of work a candidate got through in the preparation for the examination was of great value to him; he might add that all those present that evening had passed the examination of the Company. It was a pity that the certificates granted by the Company were not more generally recognised. The employers of labour did not understand what the certificate meant, for, if they did, they would appreciate it more, and also the men who had gone to the trouble of obtaining it. As to the exhibition of woodwork and joinery now being held by the Company at Carpenters' Hall, its object was to improve the craftsmanship of the present day, and it was another good work the Company was doing. It was said that the craftsmanship of the present day was inferior to that of the XVIIth and XVIIIth centuries, but he did not agree with that, for there were as fine craftsmen now as then; but, unfortunately, they were not appreciated now as they were then. A man who now did a job for a builder generally had to turn out the work in the quickest time, and he was compelled against his wish to do inferior work. What was wanted was an improvement in public taste, and especially that public bodies should insist on good craftsmanship; they insisted on good drains, but they did not insist on the same standard of excellence for carpenters' and joiners' work. A well-finished architrave or door might not be necessary for health, but he hoped we had sufficient aesthetic feeling to desire that our houses should be artistic as well as healthy, and he hoped the Company would not, in the course of their other work, lose sight of this side of the question—*i.e.*, that public taste needs educating as much as did the craftsman. Craftsmen could do as good work now as in the past if they had the opportunity of doing so. As to the exhibition to which he had referred, he desired to say a word about the granting of medals by the Company. Prizes and medals were given to young craftsmen who had done small pieces of work without any originality—ordinary centre or kingpost or queenpost roof trusses, such as had been made for a hundred years. Any amateur could turn out some of the pieces of work for which prizes had been awarded at the exhibition, and he did not think the work was a test of craftsmanship. There was a great difference



between making a tenon  $\frac{1}{2}$  in. long and  $\frac{1}{2}$  in. thick to making it 7 in. or 8 in. long and  $\frac{1}{2}$  in. thick. Young men were not helped by giving them medals for this sort of work; it would be better to give money or books. The Institute was much indebted to the Company, especially for allowing them to meet from time to time in their beautiful hall. But for the Company they would not be in existence, nor could they exist without their help. With the toast he coupled the name of the Chairman, a past Master of the Carpenters' Company.

The Chairman said that for the greater part of their existence they were a comparatively poor Company, and it was not until quite recently that they had come into anything like a substantial income. Since that time they had endeavoured to foster the trade of carpentry and kindred trades. They were educating a large number of apprentices and workmen at their training school in Great Titchfield-street, and he believed they were doing a good and useful work there, and also by their examinations in carpentry and joinery and in sanitary construction. The value attaching to the certificate was rather more than some of them thought. Only the other day a carpenter and joiner came from Scotland expressly to try and obtain the certificate, and if a man did that there must be some value attaching to the examination.

Within the last two or three years a candidate came from Hong Kong for the purpose, and there were a good many other examples of this kind, and he could not help thinking that considerable advantage attached to the possession of the certificate. As to the exhibition now being held at Carpenters' Hall, the Company were not the judges. The judges included men like Mr. John Belcher, A.R.A., one of the best of present-day architects, and Mr. Belcher did not seem to think that the exhibits were insignificant; on the contrary, he expressed great admiration for them. Though the exhibits were small, there were some excellent specimens of workmanship there, especially hammer-beam roofs, which were a credit to any joiner, medalist or not. The Company placed themselves in the hands of the judges, and these judges said whether a medal or prize was to be given or not. The judges included such men as Mr. Frampton and Mr. Goscombe John, who greatly admired the carving. The Company were pursuing their work in connexion with carpentry and the building trade in their earnest desire to do what they can for the trade. The Company also helped those members of the craft who had fallen into decay, and they had a long list of pensioners. In conclusion, the Chairman said he had a pleasing duty to perform, and that was to present, as a mark of good-fellowship and esteem, a purse to their late secretary, Mr. Cutter, who, after four years of good service on their behalf, retired, to the great regret of every member of the Institute. It was largely in consequence of Mr. Cutter's exertions that a charter of incorporation was obtained. An address would also be presented to Mr. Cutter on another occasion.

Mr. Cutter briefly replied, and thanked them for their gift. A great deal that had been done on behalf of the Institute was the work of the treasurer, the honorary members, and others.

The concluding toasts were "The Honorary Members," proposed by Mr. J. D. Macnair, and acknowledged by Mr. J. Hutton Freeman, and "The Chairman," proposed by Mr. W. J. Collins.

**PAINT MANUFACTURE.**—A report by Dr. T. M. Lewis, Medical Inspector of Factories, on the subject of the manufacture of paints and colours containing lead, as affecting the health of the operatives employed, just issued by the Home Office, states that existing special rules for processes in the manufacture of paints and colours have been in operation since 1892, and are in need of revision. By far the greater number of cases of plumbism arise in occupations in which dust is raised in the mixing and grinding of white lead. This source of danger, the existing rules do little to remove or diminish. The chief centres of the paint and colour industry are East and South London, Liverpool, Glasgow, Hull, 1, 1899, and June 30, 1904, the number of attacks reported was 252 males, 17 females, these cases occurring in 70 out of a total of 323 works. Dr. Legge gives tables showing that of the total cases 749 per cent. are due to the absorption of lead in the form of dust (mainly of white lead).

#### THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of the Association of Municipal and County Engineers was opened in the Technical Institute, Norwich, on Thursday, June 22. The retiring President (Mr. A. T. Davis, County Surveyor of Shropshire) presided at the opening proceedings, and among those present were:—Mr. A. E. Collins (City Engineer of Norwich), President-elect; C. Jones (Ealing), J. F. Barber (Islington), I. W. A. Hayward (Battersea), J. Lemon (Southampton), J. T. Eayrs (Birmingham), J. S. Pickering (Cheltenham), J. Folland (Westminster), J. P. Norrington (London), J. P. Spencer (Newcastle-on-Tyne), J. Loble (Hanley), G. W. Stacey (Oswestry), A. D. Greatorex (West Bromwich), W. F. Loveday (Stoke Newington), C. Chambers Smith (Sutton), H. Richardson (Handsworth), W. Weaver (Kensington), O. Winter (Hampstead), and others. The Mayor heartily welcomed the Association to their ancient and historic city, and said of the many Associations which had visited the city none had been more welcome than the Municipal Engineers, who represented science, skill, and modern conditions of progressive England.

#### Rural By-laws.

Mr. T. Cole, Secretary, read the annual report of the Council, which stated that the total membership was 1,143. During the year the special Committee appointed to consider building by-laws had held twenty-two meetings, and had presented an exhaustive report to the Council recommending various amendments to the model by-laws for urban and rural districts issued by the Local Government Board. In considering this question, the Committee had particularly in view the desirability of removing certain restrictions in the by-laws in order to allow of the cheaper construction of buildings, particularly with regard to dwellings for the working classes both in urban and rural districts, and in suggesting such amendments they had carefully kept in mind the necessary stability security against fire and the sanitary arrangements of the buildings. The report was adopted, and the Honorary District Secretaries re-elected. Messrs. Hayward (Battersea), Winter (Hampstead), Shaw (Ilford), and Harris (Tonbridge) were elected Scrutineers; and Messrs. MacBrair (Lincoln) and Stallard (Oxford), Auditors.

#### President's Address.

Mr. A. E. Collins, having been installed as President, delivered his inaugural address. He said his connexion with municipal engineering was co-equal with the life of that Association. In his third of a century of service he had seen great changes in public work. The growing town in which he served his articles had a population of some 60,000, yet the professional work of the Borough Engineer's office was done by the Borough Engineer and three pupils, there being no paid assistants. Probably this was representative of the small volume of work passing through most municipal offices in those days—quiet days never likely to recur for municipal engineers. Since those days constant additions to the statutes they had to administer, the gradual abolition of the contractor, and continuous growing demands by the public for greater convenience, healthiness, and beauty in connexion with all public works had enormously increased their duties, and to-day their volume and variety was so great that a town of 60,000 inhabitants, to ensure the proper prosecution of its public works, must provide its engineer with a considerable and varied expert staff. Their work was of such a wearing, anxious, and absorbing character that more than any class of officers they should be relieved by the public they served from as much anxiety as possible, and it was for the public advantage, at least, as much as their own, that such should be the case. Borough and County Engineers, and engineers holding similar appointments under local authorities generally, were more liable to earn dislike in properly carrying out their duties than any other officers of such authorities, and cases often occurred where enmities made by the performance of duty had caused the driving from office of

some of the best members of their profession. A man whose position was endangered by enmities caused by the proper performance of work and duties was not so free to serve the public properly as he would be were he efficiently protected. The Local Government Board, the central authority to which so much of their work was subject, had not given the position of municipal engineers the consideration it required and deserved. It appeared, in fact, that they were purposely placed in an unfair position by the Board whenever it was possible to do so. For instance, many consents of the Board to local authorities to raise loans for works designed and carried out by municipal engineers had been conditional upon these engineers receiving no payment from the loan. At the same time, payments were authorised to town clerks whose work relative to the matters in question was not a tithe that of the engineers. Further, it was not prohibited to make loans to engineers in private practice. Municipal engineering was a living, growing profession, having to do, consequently, with ever-changing practice. For a municipal engineer to keep pace with his profession, and to give the best service to his authority, he must constantly inspect and study the newest developments, and their Association arranged visits of inspection to municipal works of all sorts to aid its members in this; yet the Local Government Board required its auditors to surcharge payments by local authorities of expenses to their members in attending their meetings. This action of the Board, more than anything else in his knowledge, showed the necessity for their Association to make most careful and searching survey of its position relatively to municipal engineers. It is necessary to local authorities for their engineers to have the fullest knowledge of the progress of municipal engineering. At the same time, it was unfair and unjust for their engineers, mostly an underpaid class, to be out of pocket in obtaining such knowledge for the benefit of their authorities. Again, the Local Government Board, when appointing inspecting engineers, whose chief duties were to hold inquiries and report on work done by municipal engineers, should endeavour to fill vacancies from the ranks of municipal engineers. It was rarely, however, that such was done. He believed it would be to the advantage of the public generally if municipal engineers of ability and experience were appointed to such positions, and if they could look forward to occupying such positions as the reward of good service. The Local Government Board could greatly help local authorities, the public, and municipal engineers by obtaining authority from Parliament for, and requiring that none of their appointments be held by other than competent, properly-paid men, and by protecting such men when appointed from improper dismissal. Further, the Local Government Board should itself promote legislation ensuring superannuation to engineers, town clerks, and other officials of local authorities now omitted from superannuation schemes. The Association of Municipal and County Engineers had done great preparatory work towards enabling the Local Government Board to insist on none but competent persons being appointed as municipal engineers. One of the most important matters for their discussion was that of new streets and building by-laws—a subject which had for a long period been under the very serious attention of their Council, aided by the able and painstaking Sub-Committee to whom this subject was referred. Whilst he would not anticipate the paper and discussion on this subject, he desired to express the hope that, as the result thereof, they might greatly help toward showing how pleasant, comfortable, sanitary, safe, and durable houses might be erected at less cost than was possible under the by-laws now generally in force.

Mr. Barber (Islington), in moving a vote of thanks to the President for his address, complimented him upon the courage he had shown in speaking out so boldly, and expressed the hope that the Local Government Board would give some consideration to the views Mr. Collins had expressed.

Mr. A. D. Greatorex (West Bromwich) seconded the vote of thanks, which was unanimously passed.



*Building By-laws.*

Mr. A. D. Greateux, Assoc. M. Inst. C.E. (Borough Engineer and Surveyor, West Bromwich), read a paper entitled "Suggested Amendments to the Model-Building By-laws for New Streets and Buildings." He said for the past eighteen months a special Committee appointed by the Council had been considering this important subject. As a result of their labours, a report was submitted, together with certain amendments and suggestions, to the Local Government Board's Code. This report was considered and approved at a special meeting of the Council, and had been submitted to the Board, who were giving the subject their attention, and it was to be hoped that the labours of the Committee would not have been in vain. The author, having carried out the duties of Hon. Secretary, it naturally followed that many of the suggestions contained in this paper were the opinions of the Committee, and, in placing them before the members, he did so with the sanction of his colleagues.

In considering this question the Committee had particularly in mind the following objects:—

1. To ascertain whether the existing by-laws could be modified so as to lessen the restrictions which were said to exist in such a way as not to affect the stability and safety of buildings both in urban and rural districts, at the same time securing that the laws of public health might be adhered to.

2. Whether such modifications would make it possible to reduce the cost of the erection of buildings, more especially for the artisan class.

3. If any, and which, by-laws could be altered with advantage to the general public.

The By-law Committee, after careful consideration, had come to the conclusion that modification could be made without in any way endangering any of the above principles, and had offered to the Local Government Board many suggestions on these lines for their consideration.

The author suggested various additions and amendments to the existing model-building by-laws for both urban and rural districts. At the present time most by-laws required buildings to be of brick, stone, or other incombustible material.

In order to allow of buildings being constructed of other suitable materials than brick or stone, under certain conditions, a by-law providing for the external walls being constructed of suitable material of adequate strength to secure proper stability, and constructed to be weather-proof should be included. This would, to a very large degree, remove, especially in rural districts the present outcry against the cost of building, and would allow of half-timbered buildings, buildings of wood and corrugated iron, reinforced concrete, and other forms of construction. After careful consideration the Committee adopted the following recommendations:—

That the minimum width of streets for urban districts should be as follows:—(a) 40 ft. for side streets, (b) 50 ft. for more important streets, (c) 60 ft. for streets that are main lines of communication or in continuation with same. In rural districts no street should be less in width than 36 ft., and all main lines of communication should be 25 ft. from the centre of the road to the forecourt wall.

Narrow roads, whether in urban or rural districts, were a mistake, a great inconvenience, and a source of danger to the public, especially under the present conditions of traffic.

By-law 22.—As to the thickness of walls of domestic buildings. The principle appeared to be that walls of domestic buildings less than 25 ft. high and 30 ft. long must be 9 in. thick throughout; that if either the height or length was increased, the thickness of the walls must accordingly be increased as set forth.

As general rules, the provisions of the by-laws did not appear to be unreasonable, but in practice the application to cottage property sometimes presented difficulties in respect to party and gable walls as regarded height and length as fixing the thickness.

The difficulties experienced might be very much reduced if the by-law was amended so

as to allow of domestic buildings being erected up to 30 ft. in height and 30 ft. length, with 9-in. walls; this would allow of three-story buildings.

There was also the question whether some concession might not safely be made in respect to permitting the external walls of sculleries, wash-houses, closets, tool-houses, or ash-places appurtenant to a domestic building, to be erected only 4½ in. thick instead of 9 in. as required by this by-law, provided these walls were built with cement mortar, and subject to certain restrictions, such as the size of such buildings, etc., and provided that the foundations and party walls were constructed of 9-in. brickwork. This amendment would, in the opinion of the author, be a concession of some value in the erection of cottage property.

With respect to the sufficiency of space about buildings to secure a circulation of air and with respect to ventilation of buildings, By-law 53 should be improved by the addition of the following proviso:—

"Provided that where a scullery, not exceeding 10 ft. 6 in. in height, measured from the floor of such scullery to halfway up the roof, is erected at the back of such dwelling-house, he may cause the distance across open space between such scullery and the said boundary to be one-fifth less than the distance as prescribed, if thereby no diminution of the minimum aggregate extent of 150 sq. ft. is involved. Provided, also, that any scullery to be so erected shall not be allowed to extend across the back of such building to an extent of more than three-fifths the width of any habitable room to which such scullery is attached, and provided, also, that such scullery shall leave sufficient light and ventilation for any habitation."

By-law 67.—The word "earth-closet" should be left out, same as in rural by-laws, and the clause amended, so that water-closets should not open directly into any room wholly or partly used for human habitation, or as a place of habitual employment for any person in any manufacture, trade, or business.

After an extensive examination of the many papers which have been written on the subject, the author suggested that the present building by-laws should be remodelled or a universal Building Act adopted, which should be compulsory, and power should be given to each district, subject to the sanction of the Local Government Board, to frame regulations as to the minimum size and strength of material to be used in the construction of buildings, drainage, and other particulars.

They should be concise, deal consecutively with the various subjects, follow the same order in which they usually had to be dealt with in building operations, be provided with a full index, marginal notes, explanatory illustrations, and diagrams.

In framing these regulations greater latitude should be given to each district, making them vary, according to the requirements of each particular district. They would not then be so cumbersome and unnecessarily lengthy.

At the same time, definite rules should be laid down, as it would be dangerous to make them too elastic, or they would not be properly enforced.

It would, no doubt, be necessary, in order to provide for some of the by-laws both for urban and rural districts, for the Local Government Board to obtain further powers.

Power might also be given to charge fees for the supervision of all buildings on the same lines as was done in London under the Buildings Acts and several other towns under private Acts.

In the recent discussions that had taken place it had been suggested that the Institute of British Architects and the Surveyors' Institution could frame such a code of by-laws as would be acceptable to the Local Government Board, the architects, building owners, and the general public.

The author was of opinion that, in the event of experts being asked for further suggestions for the proposed Building Act or amended by-laws, the members of that Association should be consulted in a matter in which they were so deeply interested.

[Our report of the proceedings of the Association will be concluded next week.]

## FIRE PROTECTION IN LONDON.

On Thursday last week Capt. Hamilton concluded his evidence before the Committee of the House of Commons which has under consideration the London Building Act Amendment Bill and the Bill promoted by the City Corporation.

In the course of his re-examination Capt. Hamilton said that he considered the provisions of the Bill to be most important, and visions of the Bill to be most important, and was of opinion that their operation should not be deferred.

Capt. Hemphill, Chairman of the Fire Brigade Committee of the London County Council, was then called. He said that the Bill had received due consideration at the hands of his Committee. He repudiated the suggestion that the London County Council had ever tried to starve the Fire Brigade. In a cross-examination witness said that he would be prepared to allow the exemption of buildings from the provisions of the Bill where the buildings were not occupied by more than two families. He would also exempt banks where not more than a fourth of the building was used for residential purposes. Further, he would extend the height clause to 30 ft., if it was thought desirable.

On Friday, witness having concluded his evidence, Mr. W. E. Riley, the Architect to the London County Council, was re-called, and cross-examined at some length as to two buildings in the City—at Redcross-street and Moor-lane—where, it was alleged, alterations in the means of escape from fire of a far less costly character than those originally stipulated by the London County Council were allowed on appeal. Witness admitted that the cost of the alterations had been reduced.

On Monday Mr. Pembroke Stephens, K.C., addressed the Committee on behalf of the opposition of the Royal Institute of British Architects. He said that the Council of that Institute felt that they were acting under a certain responsibility in opposing the measure, as the Legislature had placed upon them the appointment of one of the members of the Tribunal of Appeal, to which any case under the Building Act was referred. The Bill, he contended, was really a Bill of one character, of one idea. Its provisions had been framed with no regard for any special kinds of buildings, but had simply been framed and applied to the whole of London. There was no proposal to have any departmental control, or even any judicial control, except so far as arbitration was concerned. One great difficulty had been to understand what the Bill meant, and he thought that it was evident that the Council did not intend that it should be understood. There was no limitation in the Bill as to the amount of the expenditure which the Council could order a property owner to make. Everything was left to the discretion of the Council. Were the Council skilled experts in building? He admitted the ability of Capt. Hemphill, but he was only a member of the Committee. The Council were really "high-class amateurs," and it was not enough for them to say "we require that certain alterations shall be carried out." The Bill was supposed to deal with the question of saving life from fire, but it really only dealt with the question of construction. Counsel went on to argue that what was wanted was an improvement in the Fire Brigade in the direction of better ladders and escapes. The first duty of a fire brigade was to save life, and for that purpose they should have very much longer ladders than those possessed by the London Fire Brigade. The Council had long ladders, 70-ft. ladders, but they were used for fire-fighting purposes. His contention was that if one of those 70-ft. ladders was strong enough to hold several men and a hose charged with water, it was strong enough to allow of its use for life-saving purposes. He considered that the reason why the London County Council did not have longer ladders, better and larger engines, and more modern apparatus was want of money. He thought that there should be no finality when it came to the question of expenditure on a fire brigade, and the fact that in London and its suburbs 4,500 new houses and 16 miles of streets were added every year made it all the more necessary for the London brigade to be as efficient as possible. He asked the Committee to reject the preamble of the Bill.

Mr. Castle, K.C., on behalf of the District Surveyors' Association, then called Mr.



Thomas Henry Watson, F.R.I.B.A., District Surveyor of St. George's, Hanover-square, President of the District Surveyors' Association, who said that Association had about fifty members, and explained the manner in which district surveyors dealt with irregularities under the Building Act. He considered that the provisions of the Bill before the Committee were "vague and uncertain," and that the independence of the district surveyors should be maintained.

On Wednesday Mr. Bernard J. Dicksee, District Surveyor for Stoke Newington, gave evidence on behalf of the District Surveyors' Association, and expressed the opinion that, quite apart from the fact of district surveyors being ousted from the jurisdiction they now enjoyed, the very mode of procedure contemplated by the Bill could only be productive of very serious delays. It was desirable that definite rules and by-laws should be issued by the County Council for the guidance alike of district surveyors and architects, for then every person before he commenced to build would know precisely what he had to comply with. He saw no reason why the duties which the district surveyors were now called upon to fulfil should be taken away and handed over to clerical officers in the employ of the County Council.

In cross-examination witness said that if the preamble of the Bill was passed his Association would be willing to assist in making the Bill a workable measure.

Mr. Castle addressed the Committee on behalf of the District Surveyors' Association, and asked the Committee to determine before passing the preamble whether or not the suggestions made by the Home Secretary ought to be embodied either in by-laws or in rules.

Mr. Baggallay, K.C., on behalf of the City companies, addressed the Committee with reference to the Corporation Bill for Protection from Fire. He suggested that there was no urgency for dealing with the question of fire apart from the whole subject of the building laws of the Metropolis. The companies considered that legislation should be uniform.

Mr. Moon, K.C., opened the case for the Surveyors' Institution, and remarked that his clients were ready to assist both the Committee and the County Council. What they wished was to have an effective piece of legislation passed, but they were of opinion that the preamble ought not to pass now. His clients considered that the matter should be deferred and further considered, so that a workable measure might be put forward. The Bill of the County Council as now before the Committee simply dealt with the elimination of the risks of fire, but he contended that all matters connected with the building laws should be dealt with together. The three considerations which he submitted the Committee had to bear in mind in arriving at a conclusion were, firstly, the necessity; secondly, the extent of interference; and, thirdly, the cost, and in connexion with the last matter he directed attention to the fact that Capt. Hemphill, the Chairman of the London County Council Building Act Committee, had stated that his Committee had not gone into the matter at all. He suggested that the Committee should throw out both of the Bills this session, and that next session the matter might be considered by a Select Committee, and a good and practical Bill might be the outcome.

Mr. A. R. Stenning, architect and surveyor, gave evidence on behalf of the Surveyors' Institution, and said that he was strongly of opinion that the question of fire prevention and escape ought not to be dealt with separately, but should be included in the general Bill which the County Council proposed to introduce in the future to deal with the whole subject of the building law of London. The Council of his Institution was quite willing to co-operate with the County Council in the framing of such a Bill, and, in fact, they considered it their duty to do so. All they wanted was to see the matter dealt with in a practical manner.

Mr. J. G. Talbot addressed the Committee on behalf of the Improved Industrial Dwellings Co., and contended that experience had shown that these buildings were exceptionally safe from fire risks.

A number of witnesses were called, including Mr. W. E. Wallis, Architect and Surveyor to the Peabody Trust, who said that under the Bill the Trust would be called upon

to make a large and altogether unnecessary outlay on alterations. He considered that buildings of this description should be exempt altogether from the operations of the Act.

#### ARCHITECTURAL SOCIETIES.

DURHAM AND NORTHUMBRELAND ARCHITECTURAL AND ARCHAEOLOGICAL SOCIETY.—The Architectural and Archaeological Society of Durham and Northumberland visited Ford and Etal recently. The party assembled at Beal Station, and drove by way of Lowick to the village of Ford, where they were met by the Rev. H. M. Neville, who conducted the party over the school, where the frescoes by Lady Waterford were inspected. The party next proceeded to the castle, which, by permission of the present tenant, Mr. J. Fletcher Mossop, they were privileged to view. The rector, in the course of a short sketch, traced the descent of the property, and continued:—Of the very ancient history of Ford Castle little is known. It was, no doubt, the residence of the De Ford family and its early Heron owners as a manor house. In the time of the second Heron, Sir William (in 1338), it became a castle and fortress for the defence of the English border. Probably all the building that has come down from that time is the large square tower to the north-west, and the small detached tower called the Cow Tower rising from the western wall of the court, and having an outside gallery round its upper story. The original entrance to the castle was between this small tower and the one which is now called the King's Tower. The western entrance was called "the common passage into the castle," and distinct traces of the ancient road leading to this entrance may now be seen in a deep depression extending westward in the direction of the river Till, which passes through the lower part of Ford village, and the only vestige of which is a disused well, still known to many as the "Smiddy Well." A few years before Flodden (in 1509) the castle was supposed to be capable of keeping a garrison of forty horsemen. The large tower at the north-west angle is by tradition connected with the name of James IV. of Scotland, probably because it is the largest part of the remains of the early English building, and from the fact that he took possession of the castle and made a short stay of a few days there. The castle was repaired in 1541, but again burnt in 1549 by the Scots. It was bravely defended by Thomas Carr, of Wark, who afterwards married Elizabeth Heron, heiress of Ford. The Carrs retained the property till about 1685. The Delavays made important changes to the castle, but the general shape of the south front was much the same as at present. Lord Delaval died in 1803, and his widow resided at the castle until her death in 1822, when it passed to the Waterford family, its present owners. The greatest alteration of the castle, and that which was a nearer approach to restoration, was the work of Louisa Ann, widow of the third Marquess of Waterford. She left it as it now appears. Proceeding to the church, the rector gave an account of the building. Of the origin of Ford Church, he said, there seems to be no written record. There are, however, stones found in and about the church with Norman cutting, which make it probable that there was a church here in Norman times. The ancient portions of the building are early English, and consist of the western end, with its peculiar tower and belfry and south-western buttress, and the whole of the foundation of the nave and chancel, except the north aisle, which was added when the church was restored some sixty years ago. There is a XIVth century buttress at the south-east corner of the south aisle, with deep niches. Before the restoration of the church the principal entrance was through a porch in the west end, south of the tower. The belfry is pierced in two stories, with lancet arches—in the lower story these arches open north and south as well as east and west. It is evident that the arches were intended to contain three bells, as remains of the stone corbels may still be seen just within the arches from the east side. There is a curious narrow lancet window at the west end, and much splayed within. The pillars and arcades on the south are ancient. There

seem to have been two chantries in the church, one dedicated to the Blessed Virgin Mary, and founded by a member of the De Ford family, and the other dedicated to St. Margaret, probably Margaret Queen of Scotland, and wife of Malcolm Canmore, whose influence as a saint prevailed widely over this part of the country. On the east of the wall of the south aisle is a piscina, which probably indicates the position of one of these chantries. Among the carved stones found in and about the church are two coped grave covers with tile ornamentation. One of these was for a long time lying outside the church; the other, in two pieces, had been used as building stone low down in the foundation of the chancel, built in endways. He remembered that under those grave covers when removed from the wall were found several oyster shells, which it seems difficult to account for. The carving on one side of the stones is very clear and fine, but on the other much worn, apparently by the weather, so that it would seem that those Norman stones were very old before they were built into the foundations. The church is long, and rises with seven steps from the nave to the altar. Before the restoration the entrance into it was very small, but he had been unable to ascertain what sort of arch it had. There was a priest's door about the middle of the south wall of the chancel. To the north-west of the church there is the ruin of a massive tower, 35 ft. square, which was the pre-Reformation dwelling of the rector of Ford.—The ruins of Etal Castle, one of the castles destroyed by James IV. of Scotland, were afterwards visited, as well as a small pele tower at Duddo. The members then drove to Berwick, where they dined together, and subsequently dispersed.

#### ARCHAEOLOGICAL SOCIETIES.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—The concluding meeting of the session was held on Wednesday, the 21st ult. Mr. C. H. Compton, Vice-President, in the chair. Mr. Patrick, hon. secretary, communicated a discovery of much interest recently made by Don Enrique Salas in excavating on land belonging to him in the province of Murcia, in Spain. The discovery consists of thirty-one objects, in red and black clay, of the Celtiberian period. A careful drawing of one of the subjects on a cinerary urn, in red colour, was submitted as a specimen of the nature of the find. This represented two warriors, one on foot with shield and dart, the other on horseback with a dart, while a third is lying on the ground pierced, seemingly, with a dart. Dr. Birch remarked at some length upon the interesting nature of the discovery, and Dr. H. J. D. Astley considered the illustration showed evidence of Mycenaean civilisation. These interesting objects have been deposited, temporarily, by the owner in the National Archaeological Museum of Madrid. A paper was read by the Rev. Dr. Astley on the 9th Iter of Antoninus, with special reference to the sites of Sitomagus and Venta Iconorum. This was a carefully reasoned argument in favour of the views of the older antiquaries, as Camden and Sir Thomas Browne, that Caister and Thetford are the true sites of Venta Iconorum and Sitomagus, in opposition to modern theories, which assign to Norwich and Dunwich that identification. Although the latter theory is ably supported by the learned antiquary, Dr. Haven, with great skill and labour, he, the author, contended that it was improbable and untenable with reference to the Itinerary of Antoninus and the Tabula Peutingeriana. The Tabula Peutingeriana is a copy made in the XIIIth century of the only Roman map of the Imperial epoch that has come down to us. It derives its name from Conrad Peutinger, of Augsburg, who possessed it in the XVIIth century, and it is now preserved in the Imperial Library of Vienna. On the original map of the Roman Empire the British section is, unfortunately, imperfect, the section to the west and north of Ad Tann being missing, and Venta Iconorum does not appear. We must, therefore, look for Venta Iconorum, the chief centre and emporium of trade, the market of the Iceni in Roman times, in a locality where everything will prove its importance during the period of the Roman



occupation, and nowhere is there a more fitting situation than that of Caistor, with its mighty camp and remains of Roman residences in its neighbourhood. In like manner Thetford also provides just the site that the Romans would fix upon for a station, and, taking the data of the Itinerary and the Tabula together, the conclusion appears to be irresistible that Thetford is the true site of Sitomagus. Mr. Emanuel Green, Mr. Gould, Dr. Birch, the Chairman, and others joined in the discussion following the paper. Mr. Gould drew attention to the newspaper reports of Mr. Edward Wooler's discovery of an early camp or defensive inclosure in the county of Durham, and said that he was especially glad to do so, as the discovery was the result of a suggestion he had made to Mr. Wooler that a work would be found on the spot. Mr. Gould had noticed an embankment, shown on Macaulay's survey of the Watling Street, published in the middle of the last century, and judged that it, probably, extended across a promontory otherwise naturally defended by streams. This surmise was found to be correct, and there is little doubt that an early fortress or stronghold of the promontory type existed. Mr. Wooler's investigations show that probably at some late period the southern portion of the great area was further defended by banks, thus forming a complete inclosure. The site is at the extreme west of the parish of Brancepeth. Mr. S. W. Kershaw drew attention to an exhibition which is to be held at St. Albans from June 27 to July 15, at which lectures will be given and precious MSS. and rare objects of great interest will be on view in illustration of the history of the Church in the British Isles from the earliest times.

## Correspondence.

### TREATMENT OF SEWAGE.

SIR.—In comparing the way of disposing of sewage by the "septic tank" process with the simple way that nature teaches us as to dealing with excrement and any foul matter—vegetable or animal—we may learn a lesson.

1. The first part of the "septic" process is to separate the rough refuse and to collect the sewage into a tank till it has undergone a certain measure of putrefactive change, so reducing the organic matter into a liquid state fit to be oxidised. This first change is effected by pathogenic organisms, known as anaerobic, cultivated in the tank, which is necessary for the second part of the process—the purifying or oxidising—brought about by another class of organisms, known as aerobic in coke or clinker filters, thereby effecting nitrification and rendering it fit to be discharged as a harmless effluent into a stream, river, or into the sea, and so getting rid of it altogether.

This process puts the anaerobic before the aerobic action. It is called natural or biological. It is, however, only the old cesspool system brought out with an addition and a new name. The filtering of the overflow of the cesspit is never attempted. It is often in some way utilised in its crude state on the face of the ground by sewage cart irrigation, or left to soak away. That from the septic tank is in measure purified, and usually is got rid of as waste water into some river.

2. The order of nature is to deposit all filth or foul matter in the earth at once to be oxidised by a different order of organisms to those in the septic tank, and in this way at once it is assimilated, in order to supply other vegetable organisms for the use of man, and so purification and utilisation are very simply effected. The process then for dealing with sewage that can effect this, according to natural law, by straining, settling, and filtering where we find the aerobic organisms thrive—providing them a suitable bed for growth and increase—must be the right mode of treatment, at any rate for large houses and mansions in the country. From smaller houses it can be returned into the garden at once without any special provision for collection and purification, which should be with a minimum of labour in collection with dry earth, without smell, and without the aid of mechanism or chemicals. The liquid discharged is a pure effluent, passing through aerobic and anaerobic beds—the latter chiefly mechanical for clarifying and removing all inorganic deposit.

In this way of nature the aerobic microbe with oxygen is the chief factor. The anaerobic is little engaged, and few of these micro-organisms are found below a foot or two from the surface in ordinary earth. A few inches of soil are enough to cover the solids. No putrefactive change, either of solid, liquid, or gaseous elements, can take place when covered with earth. All mineral or hard rubbish is otherwise disposed of.

Any sewage is in its proper place if deposited in the ground. The spade and plough will do all that is required besides. The manual gain is most important for ferro-culture of every kind, wherever man's habitation is, except in cities and towns where nature's ways are set at naught and this invaluable provision of no worth. I quote a few remarks by a chemical author on artificial gardens or farms where the only living thing grown consists of minute organisms, which, like cells in general, while in a state of growth or division, require oxygen, in order that an increase in their substance may take place. In country districts it would be more economical to dispose of sewage in soil where these aerobic organisms are, and by growing plants which may be used as food for man and beast, than by growing those minute organisms which are only indirectly beneficial to either.

It is strange how slowly this perfect way of nature is apprehended and acted upon. We conserve strongly what has been handed down to us. Septic tanks are now taking the place of the old deadly ashpits—being a change without a difference, except that they are watertight and continuously and automatically discharging—in measure guided—into running water. Consumptive hospitals in the country are having these septic tanks constructed, where the bacillus tuberculosis and other pathogenic organisms are cultivated, when they profess they are "stamping them out." Is it not healing with one hand and courting disease with the other? These tanks are not airtight, and who can be sure where these deadly germs are carried? There is no occasion for such a dangerous and wasteful process in the country. The putrefactive gases in them are explosive and must be dangerous with such elements as sulphur, phosphorus, and nitrogenous compounds.

The simple way of dealing with sewage is more economical in the first cost, as well as in the working of the installation. It is more effective, and is free from anything hazardous or odorous. In fact, it pays itself, as I lately calculated for a large college, that the manure gained by the process would pay 10 per cent. on the outlay, and many have proved this who have adopted it. Yet they preferred the septic waste process. We seem so bound to go with the stream that we are willing often to spend large sums on what we afterwards find to be a mistake, which is constantly done.

ALFRED S. GOODRIDGE, A.R.I.B.A.

### WESLEYAN HALL COMPETITION.

SIR.—Whilst thanking you for the kind way in which you refer to our design in last week's issue of the *Builder*, we should like to reply on one or two points.

We did not send alternative plans, as you will see by the supplementary report (enclosed). The drawings marked A 1 were modifications and improvements on the original design in the first competition. The drawings marked A 2 illustrate a scheme based on exactly the same principle in which the large hall is placed on the first floor. This was done to meet the wish of the trustees, as explained in the conditions of the final competition. In both cases seating accommodation was provided for over 2,500 people. (You will find this clearly explained on sections.)

We provided a central cloak-room on the ground floor (we agree with you it should be there) immediately facing the main entrance and between the two main staircases. The lavatories (for public) were placed in a mezzanine below.

We can also say that no part of the plan was sacrificed for architectural effect, as all the scheduled sizes of the various rooms and offices were given as approximately required, and many of them in excess.

C. E. MALLOWES.

A. W. S. CROSS.

\*.\* We looked carefully at the sections in combination with the plans, in regard to the amount of seating; we could not make out that number; however, as Messrs. Mallows & Cross say they are there, we have no doubt they are.—ED.

SIR.—I should be much obliged if you would correct an error made in the criticism of my plans for the above.

The tea-meeting halls in basement have each domed top lights 27 ft. diameter, and the borrowed lights, which are stated "as looking through the ladies' cloak-rooms" are high up near the ceiling. The statements are a little misleading.

JAMES A. SWAN.

\*.\* We did not overlook the domed top lights, but they are in one corner of each large room and would not give much light to the further portion of the room. Borrowed lights are always a doubtful subterfuge in planning.—ED.

MEMORIAL TO DR. TEMPLE, RUGBY.—A tablet portrait in marble and alabaster of the Archbishop of Canterbury was recently unveiled at Rugby School. The memorial was executed by Mr. Thomas Brock, R.A.

## Illustrations.

### MONUMENT TO ARMAND SILVESTRE.

THIS monument, which is the work of the eminent French sculptor M. Mercié, was perhaps the most poetic and original piece of sculpture in the Paris Salon of this year.

One may suppose that the design, in which graceful figures in relief circulate round a broken column, was intended to symbolise the character of Silvestre's poetry—a succession of gracefully expressed fancies, but usually with a background of melancholy.

### COMPETITION DESIGN FOR WESLEYAN HALL, WESTMINSTER.

The illustration shows the joint design of Mr. C. E. Mallows and Mr. A. W. S. Cross, submitted in the second Wesleyan Hall competition.

The design is a variation from that in the original design, in order to meet what we now understand is the wish of the Trustees, that the large hall should be on the first floor. It is in our opinion the best position for it, but nothing was said of such a wish in the Instructions for the Sketch Competition, which merely emphasised the wish that the hall should be "easily accessible from the street."

The authors have adopted as their dominant idea that the great hall should be on the geometrical centre of the site. The small hall, library, and reading-room are very well and effectively grouped en suite on the east side of the ground floor. The second floor contains twelve departmental offices and an orchestra-room, and cloakroom accommodation for both offices and orchestra. On the third floor there are nineteen offices for letting, and on the fourth floor fifteen, the remainder of the latter floor being utilised for residential accommodation for the secretary and caretaker. The large tea-rooms required in the scheme are of course in the basement.

Ventilation was proposed to be on the plenum system, with filtered warm air admitted to the various rooms at about 7 ft. above the floor level, and the foul air extracted at the floor level.

The authors' own estimate of the cost of the design as now worked out, with the great hall on the first floor, is 146,412.

The exterior design, as shown in the very fine perspective drawing, speaks for itself.

### ILLUSTRATIONS OF BAALBEK.

THE photographs of the circular temple at Baalbek, as existing, and of the *dissecta membra* of part of the Temple of Jupiter, are from photographs lent by Mr. Spiers, and are given in connexion with his article in the present issue. The second-named one should however have been more correctly entitled fragments of the cornice of the cella.

The drawing of the restoration of the circular temple, otherwise called the Temple of Venus, shows Mr. Spiers's restoration of the building, and is explained in his article.

PUBLIC SCHOOL, ABERDEEN.—A new public school is being erected in Victoria-road, Aberdeen. The main access to the building runs north and south, the two front entrances from Victoria-road leading into a central corridor, 14 ft. wide and 116 ft. long. The building is two stories high. Alongside the corridor, which runs along the centre of both floors, there are arranged three classrooms on each of both floors, with a cookery and laundry room in addition, library, teachers' rooms, and pupils' cloakrooms. The woodwork will be chiefly of yellow pine, stained and varnished. The corridors and staircases will be floored, of granolithic. The frontage will be of hammer-bashed and squared slater work, with picked dressings. The building will be lit by electricity and heated by steam from a Cornish boiler. Accommodation is provided for 714 children. The cost will be about 8,700. The contractors for the work are as follows:—Mason work, Messrs. Alexander Milne & Sons; carpenter work, Messrs. Hendry & Keith; slater work, Mr. J. M. Donald; plasterer work and granolithic stairs, Messrs. Sellar & Co.; plumber work, Messrs. Thom & Strachan; painter and glazier work, Messrs. George Donald & Sons; and steam boiler, Messrs. W. McKinnon & Co., all of Aberdeen. The school was designed by Mr. J. A. O. Allan, Architect to the Aberdeen School Board, and the work is being carried out under the supervision of the architectural department.



## COMPETITIONS.

**ISLINGTON CENTRAL LIBRARY.**—Islington Borough Council has accepted the design of Mr. H. T. Hare for the Central Public Library to be erected in Holloway-road. Eight designs were submitted, which the assessor, Mr. J. Belcher, A.R.A., described as excellent. The problem for the competitors was a difficult one, he reported, owing to the irregular nature of the site and the accommodation required. The various solutions shown by the plans received were admirable, but, after a most careful examination of each, he had no hesitation in placing first the design marked No. 6 (Mr. Hare's). This design provided, in a simple and effective manner a scheme which, he believed, would be found satisfactory in practice. The elevations also represent a building suitable to its purpose. The departments are well arranged, and the whole building well lighted. Mr. Hare (whose design some time ago for the North Islington Branch Library was accepted) thus describes his design for the Central Library:—"The principal considerations kept in view have been easy and direct supervision in all parts, adequate lighting, and economy. The entrance, staircase, and corridors have been concentrated as much as possible, but are, nevertheless, adequate for free and perfect circulation. The author feels strongly that the setting back of the frontage to Holloway-road behind the line of the adjoining buildings is unfortunate, and will greatly detract from the effect of the building. The frontages are proposed to be faced entirely with Portland stone, and the roofs covered with green slates; the whole of the construction, including the roofs, to be fire-proof. The walls of the entrance hall, etc., to be lined with Hopton wood stone; general reading-room to have a dado of Hopton wood, and the upper part to be lined with a light marble; the juvenile-room to have a tiled dado; the floors of the reading and juvenile rooms to be covered with cork linoleum, wax polished, and of the lecture-room and reference library of wainscot in narrow widths, secret nailed. The whole of the joinery to be wainscot, slightly wax polished. The heating is proposed to be effected by low-pressure hot water, with ventilating radiators fixed in the various rooms and corridors. Extraction is provided from the principal rooms by a trunk over the entrance corridor connected to an electric fan fixed in a chamber over the main staircase. With this is also connected the reference library and large lecture-room."

**SCHOOLS, HIGH WYCOMBE.**—Sixteen sets of designs were received in competition for secondary education schools, and the design finally selected was under the motto "Sunshine." "Lux" was placed second, and "Progress" third. The following are the names and addresses:—"Sunshine," Mr. Arthur T. Greenwood, "Highfield," Gorton, Manchester; "Lux," Mr. C. Harold Norton, 14, Bedford-row, London, W.C.; "Progress," Mr. Frank W. Mee, F.R.I.B.A., 32, Victoria-street, Manchester.

**THE HARBOROUGH INFIRMARY.**—For an extension of the Harborough Infirmary twelve local architects sent in designs to meet the requirements. Mr. George Bertram Bulmer, F.R.I.B.A., of Leeds, the assessor appointed by the committee, has sent in his adjudication to the committee, and has awarded the first premium to Messrs H. E. and A. Bown, of Harrogate; second, Messrs. Bolshaw & Steevens, Harrogate; third, Mr. T. E. Marshall, Harrogate. The committee awarded premiums of 25*l.*, 15*l.*, and 10*l.* for the best designs. The Building Committee have approved of the assessor's award. With the exception of two slight additions, the work will be carried out on the north side of the existing building, and will be in keeping with the present structure. The principal features of the extension will be the provision of a large waiting-room, 40 ft. by 22 ft.; a new operating theatre, with an anaesthetic-room attached, with stores and lavatories, etc., and isolated from the main portion of the building. There will also be a ward on the first floor, 58 ft. by 26 ft. In addition, the number of beds in the Infirmary will be increased from forty to fifty-eight, and a number of additional staff bedrooms will be provided near the operating theatre, and on the same floor level as the

existing staff bedroom. The cost of the proposed extension will be between 4,000*l.* and 5,000*l.*

**CHURCH, TREFRIW.**—In a limited competition for a new Welsh C.M. Church at Tre-friw, North Wales, the committee have selected the design submitted by Mr. G. Dickens-Lewis, architect, Shrewsbury. The work, which is estimated to cost 3,500*l.*, is to be proceeded with immediately.

**HOUSING SCHEME, GUILDFORD.**—At the meeting of the Guildford Town Council held on the 20th ult., it was decided to award Mr. T. J. Capp the first premium of 20*l.* for his plans in connexion with this competition. The other competitors were Mr. A. J. Sturges and Messrs. Clemence and Moon.

## Books.

*The Rock Tombs of El Amarna.* By N. DE G. DAVIES. London: Egypt Exploration Fund. *Ehnasya.* By W. M. FLINDERS PETRIE. London: Egypt Exploration Fund.

*Roman Ehnasya.* By W. M. FLINDERS PETRIE. London: Egypt Exploration Fund.

The latest volumes issued by the Egypt Exploration Fund are of exceptional interest. Mr. Davies, working for the Archaeological Survey, has continued his work of describing and copying the rock-cut tombs of El Amarna, the town built by Akhenaten (Amenophis IV.) of the XVIIIth Dynasty to form the centre of the Monotheistic worship of the Sun's disc, or *Aten*. The ruins are almost entirely of one period, as at the death of the King the country reverted to its national religion and returned to Thebes as the capital. El Amarna was deserted, but appears after many centuries to have become a resort of the Copts, who found comfortable homes in its tombs and places of refuge in its inaccessible cliffs. The group of tombs described by Mr. Davies are those cut in the cliff at the north of the town. Many of these are unfinished and uninscribed. The architects and artists of the period would be quite unable to satisfy the demands of the courtiers owing to the immense amount of building and decoration that was carried out in the few years of Akhenaten's reign, and only a few great officials were fortunate enough to have the designs for their tombs carried out with any completeness. The unfinished condition of the tombs renders it easy to see how the work of excavation was accomplished. In one case wide vertical grooves were cut, and the intervening mass broken away. Another shaft has a deep circular trench cut in the floor, to be treated in the same manner.

Two large and elaborate tombs are described in detail—those of Panehesy and Meryra, high officials of Akhenaten. That of Panehesy consists of three chambers—a square hall, intended for the use of the family and friends of the deceased; a second chamber with a stairway leading down to the place of burial; and beyond that a smaller room or shrine, intended for the private apartment of the deceased, which originally contained his statue. The hall had two rows of two columns each. These columns represent eight bundles of papyrus worked out in complicated detail and brilliantly coloured. The capitals are of papyrus-bud form. The excavated columns are of bulky proportions, and differ considerably in this respect from those built by the Egyptians. The walls and ceilings were elaborately painted and inscribed. The burial chamber is of almost the same size as the hall, and contains four columns, but the walls are left plain.

The tomb of Meryra also consists of three chambers. The first is smaller than the hall of Panehesy, and contains only two columns, which, happily, remain intact, and which support architraves running parallel to the axis of the tomb. The ceiling between them is slightly arched and higher than at the sides. The inner chamber is of a narrow corridor type, running transversely to the entrance hall; the shrine beyond is left entirely rough and unfinished. Both these tombs have suffered greatly in recent years from wilful damage, and also from colonies of bats, which have almost obliterated the sculptures of the upper parts of the walls. Panehesy's entrance hall was utilised by the Copts as a Christian church. They cut an apse and otherwise enlarged the hall, but contented themselves for the most part with merely painting Christian symbols over the pagan representations; they have,

however, left an unwelcome legacy of grey plaster on one wall.

The inscriptions in the tombs include praises of Queen Nefertiti and hymns and prayers to the *Aten*. The pictured scenes show the peculiar style of the reign of Akhenaten. Unable to throw off all the traditions of Egyptian art, the artist has yet managed to do so to a great extent. Of these scenes some depict Akhenaten and Queen Nefertiti with their family and court worshipping the *Aten*, presenting food offerings, or burning incense, and attended in some instances by female dwarfs. Others show the King rewarding his faithful servant Panehesy, and there is a very lively representation of the royal family driving out in chariots with a numerous escort. There is a visit of the Royal family to the temple, which is shown in such detail that Mr. Davies has been able to reconstruct from it the plan of the building, aided by very similar representations in other tombs and by the actual ruins remaining at El Amarna, and to realise the use for which the various courts were intended. Another important scene shows the King receiving tribute from foreigners, among which are Ethiopians bringing gold in profusion, and Asiatics, Amorites, and Hittites, who also bring precious metals and, among other objects, vases of the now well known Cretan form.

The details of these scenes afford subjects for study in many directions. The redundant ornamentation, such as sashes with flapping ends round the columns, is irritating. The carved work on the buildings depicted is so elaborate that the originals must probably have been of wood, of which no specimen has survived.

Mr. Davies devotes a chapter to the general conditions of the site, the traces of roads made by Akhenaten, and the occupation of the place by the Copts, but the main interest of the book undoubtedly lies in the new details he has acquired with regard to the very remarkable plans of the building depicted in the tombs, which he has been able to identify with the Temple of Akhenaten. This new material Mr. Davies has worked out with great care, in order to arrive at the disposition of the building; and this he has accomplished with the same success with which in his previous volume, "*El Amarna I.*," he identified and worked out the details of the palace.

Turning from El Amarna to Ehnasya, we find ourselves on ground which has been occupied from the earliest historical times. Heracleopolis Magna, now the Arab village of Ehnasyeh (Ahnas), was in ancient times the head of a nome and chief seat of the worship of Hershef, a ram-headed god. It is now a mass of mounds covering ruins and the remains of a temple of the XIXth Dynasty, which was excavated a few years ago and found to contain some traces of earlier work. In this somewhat unpromising site Professor Petrie settled down for the winter of 1903-4. By digging below the known ruins and examining both floor and foundation levels, he succeeded in finding remains of two distinct temples earlier than that of Rameses II. of the XIXth Dynasty, and also to some extent in reconstructing their plans. Although there is no doubt that there was a temple at Ahnas as early as the first dynasty, there is now no trace of it. At the lowest level examined Dr. Petrie found private houses built of brick of the Xith Dynasty, among which were some burials. Here also were scarabs of importance for dating the kings of that very doubtful period. The houses were abandoned apparently, and the site taken over by the Pharaohs of the XIIIth Dynasty for their temple, a compact block of buildings with a large forecourt. The massive foundations still remain, and also several blocks of red granite, inscribed with the name of the King. Some fine palm-leaf columns in granite, usurped by Rameses II. and inscribed with his name are also probably of this date. There have been carefully photographed, and can be seen in detail. During the XVIIIth Dynasty a later temple rose on this site very much on the old plan, but larger. Finally, Rameses II. rebuilt the whole, appropriating, as we have seen, the fine work and materials of his predecessors. His foundations are very unstable, and do not compare with those of the Middle Kingdom. The large court in front of the temple owed much to him. He set up colossi, and also, in red granite a triad of himself between the gods Ptah and Hershef. This triad, 95 in. in height, is now at the Cairo Museum.



There are signs in the temple of two periods of rebuilding after the time of Ramesses, and probably additions were added as late as the reign of Antoninus. A remarkable feature of this rebuilding was the placing of drums of white quartzite sandstone under the monolith columns of the portico. The most sensational find of the season was the discovery of a beautifully-worked statuette in gold of the god Hershef, dedicated by King *Pejd du Bast* of the XXIIth Dynasty.

The mass of mounds surrounding the temple contain ruins of Roman, Coptic, and Arab houses. The Roman houses were turned over by Dr. Petrie, who gives plans of them. Here, with other things, he found an immense number of Roman lamps. These he has worked through and divided into types; in Roman Ehnasya seventeen photographic plates are devoted to them.

Among the mass of facts and deductions brought forward by Dr. Petrie, he remarks on the close resemblance between the treatment of foliage on capitals of the Roman period found at Ehnasya and those at Ravenna. He also traces the form of the lock of Horus in the crook-like appendage at the top of the cross that appears on the capitals of Theodoris's palace. It is difficult to accept this identification without further proof, but from it Dr. Petrie argues the influence of Egypt on the sculpture of Ravenna.

These volumes are illustrated by a large number of plates, which render the plans and details of the buildings perfectly clear.

**Building Materials: Their Nature, Properties, and Manufacture.** A Text-book for Students and others. By G. A. T. MIDDLETON, A.R.I.B.A. London: B. T. Batsford, 1905.

Among the subjects entering into the curriculum of architectural students, none is more necessary than that embodied in the latest text-book by Mr. Middleton. Recognising the premier position occupied by mineral products, such as stone, concrete, and brick, the author lays a sound basis for the addition of further knowledge by two introductory chapters, one on the geological formation in which building materials occur, and the other on the elements of chemistry and physics. By the aid of these the student may be enabled to follow the classification and distinctive properties of various building stones, but his study of geology, chemistry, and physics should be carried far beyond the limits of the elementary precepts here communicated.

Building stones of various classes are considered at some length in seven succeeding chapters, which contain some very complete tables, giving full particulars relative to the chief quarries of the British Isles, and deserve recognition as a series of records compiled with great care and general accuracy. We notice, however, that the author does not appear to be quite as *concurrent* with the most recent developments of stone-working machinery. As an instance of this, we may point out the suggestion on p. 64 that "Straight mouldings, if started by hand, as shown in Fig. 24, can be cut by machine on a travelling table under narrow plane irons, but on curves they have to be worked laboriously by chisel and mallet, as must all carving and sculpture." Now, as a matter of fact, it happens that more than one machine is on the market perfectly capable of starting and finishing any straight moulding, without preliminary hand treatment, on the hardest stones obtainable; also that circular discs can be moulded by machine; and, again, that automatic carving and sculpturing machines have been in operation for some time. One other omission is that no mention whatever is made of Welsh jasper, a very fine stone recently made available for building purposes by the development of modern stone-working machinery. Chapter X. is entitled "Bitumen and Asphalt," which seems to imply a difference between these materials, and in the body of the chapter Trinidad asphalt is mentioned in one place as "bitumen" and another as "pitch." For the sake of perspicuity, it would be better if the author had made it clear that while bitumen and asphalt are synonymous terms, the latter is customarily applied as a courtesy title to the natural compound of limestone and bitumen, or asphalt, found in Switzerland, France, and other countries. Another point with regard to this chapter is that asphalt, although a building material, is not a primary essential to pure construction, and for this reason ought not to

have been placed between stone on one hand and concrete and brick on the other. A more appropriate place would be towards the end of the volume, where miscellaneous substances are discussed. The same criticism applies to the notes on whitewash and putty in the succeeding chapter. The former of these useful compounds clearly belongs to the same category as the distemper, which is dealt with at the end of the book, and the latter to Chapter XLV., "Sundry Materials of Lesser Importance." In this connection we observe that, in spite of the prominence given to putty as a building material, the author has not included it in the index. Cements, lime, mortar, plaster, concrete, and artificial stone are the subjects of a series of consecutive chapters which leave little to be desired. The next four chapters describe the principal varieties of brick and tile and the methods adopted in modern brick manufacture, the letterpress being illustrated with a number of excellent drawings. A short chapter on "Artificial Bricks and Miscellaneous Walling Substances" does not completely cover the subject indicated. The first part of the title involves the suggestion that some bricks are not artificial, and is really intended to describe special types, such as concrete, slag, glass, and other special bricks. Concrete bricks are mentioned, but not the hollow concrete blocks now so extensively used in the United States and elsewhere. As partition slabs are made in great variety by numerous firms, the selection of two individual examples for illustration seems to be a little invidious.

Considering the large field covered by the book, no one will expect to find in it an exhaustive treatment of every subject discussed, but it is certainly the fact that an immense amount of most useful knowledge is conveyed in a manner that will render the work of great assistance to all students of building construction.

**Twenty-six Graduated Exercises in Graphic Statics, with an Essay on Graphical Statics.** By T. ALEXANDER, M.Inst.C.E.I., and A. W. THOMSON, D.Sc., C.E. London: Macmillan & Co. 1905.

We feel sure that students who possess the standard work on "Elementary Applied Mechanics," by Messrs. Alexander & Thomson, will generally appreciate the series of exercises contained in the book now published by the same authors. Produced in pamphlet form, on sheets measuring nearly 19 in. by 14½ in., this essay is less suitable for the bookcase than for the drawing-table, where the ample dimensions of its accompanying diagrams will be found of great assistance to those who desire to follow the methods set forth. The essay on graphical statics, occupying the first two and the last three leaves, takes the form of a running commentary on the exercises, and is based upon various chapters in "Elementary Applied Mechanics," and the illustrations are printed from the blocks used for that work. Several of the graphic exercises include diagrams and explanatory matter, also taken from the treatise mentioned, but most of the examples are elucidated by diagrams drawn to a fairly large scale, and full directions are printed on the plates side by side with the diagrams. The graduated course demonstrates the application of graphic statics to various types of work—such as roofs, girders, retaining walls, masonry arches, and steel arches—which are of direct interest to architects and structural engineers, and the inclusion of illustrations and explanatory matter already printed in "Elementary Applied Mechanics," has the advantage of rendering this pamphlet a self-contained work, which may be studied independently of, or in conjunction with, the main treatise, as may be most convenient.

**Structural Designers' Handbook: Giving Diagrams and Tables for the Design of Beams, Girders, and Columns, with Calculations Based on the New York City Building Code.** By WILLIAM FRY SCOTT. New York: The Engineering News Publishing Co. 1904.

The general idea of this book is excellent, but being largely based upon American building regulations and sections of structural steel produced in the United States, its contents are only of limited value to British architects. The work is not a treatise, as the term is generally understood, and consists very largely of numerous diagrams by the aid of which beams and columns may be selected for various spans and conditions of loading without the necessity

for tedious calculations. The employment of diagrammatic information in this way is all very well if the user is quite satisfied upon three essentials:—(1) That the bases of computation are in accordance with recognised practice; (2) that the diagrams have been correctly computed and accurately drawn; and (3) that the sections for which results are given correspond in all essentials with those to be adopted. For reasons stated above, it will be seen that the diagrams published by Mr. Scott are not entirely suitable for employment in this country. In other respects, however, we believe them to be quite as trustworthy as they are ingenious. Considering the heavy responsibility resting upon the architect or engineer who undertakes the design and erection of a building or other structure, we hold that every detail should be finally settled either by direct calculation, or by reference to tabular or diagrammatic results prepared and verified under the direction of the designer, unless tables or diagrams of authoritative character be available. Nevertheless, a book of the kind now under notice is an invaluable aid in approximate determinations, in preliminary estimates, and in preparing alternative schemes for the purpose of comparison. If used in this way, Mr. Scott's work may be adopted with advantage by British architects and engineers, for its convenience as a "ready-reckoner" is beyond dispute.

#### BOOKS RECEIVED.

THE ANNUAL OF THE BRITISH SCHOOL AT ATHENS: Session 1903-4. (Macmillan & Co. 17s.)

ENGLISH GOLDSMITHS AND THEIR MARKS. By G. J. JACKSON, F.S.A. (Macmillan & Co. 2s. 2s.)

THE GARDENS OF ITALY. By Charles Latham, with descriptions by E. March Phillips. (Offices of Country Life. 3s. 3s.)

#### TRADE CATALOGUES.

MESSRS. MARK FAWCETT & Co. send us a circular illustrating the most recent improvements in their well-known floor system. The "lintel" is made of porous terra-cotta in place of closely compacted tile, the form of cross-section being approximately that of a triangle with curved sides and a straight base. A central stiffening web divides the interior cavity into two spaces; the exterior sides are ribbed, and the base is moulded with dove-tailed grooves to afford a key for plaster. Owing to the additional strength provided by the central web, the lintels can now be made 2 ft. 6 in. long, and by reason of its porosity the terra-cotta increases fire-resistance and minimises the transmission of sound. Rolled steel joists of special section are now employed, the dimensions of the compression flange being much smaller than the tension flange. The reason for this is that the concrete deposited around the joists and partly around the lintels is capable of taking a very considerable proportion of the compressive stress, and renders unnecessary the wide flange formerly used, thereby reducing weight and cost. It should also be noted that the concrete is entirely self-supporting although moulded upon and between the terra-cotta lintels and thoroughly connected with them by means of the ribs along each side of the lintels. The effect of the modifications here described is to bring the design of the "Fawcett" floor more closely into accord with the principles of concrete-steel construction without departing from the original idea of the system.

Messrs. Hartley & Sugden, of Halifax, send us their catalogue of heating appliances, including radiators, hot-water and steam boilers and water heaters. The radiators, here illustrated, are of good design, and we are pleased to observe that no attempt has been made to spoil their appearance by the introduction of florid decoration. The lines of the radiators are simple, and the only ornamentation is to be found in the form of fluting, which is not likely to be out of keeping with any building. One double-column radiator is supplied with strips of metal fitted between the sections so that air admitted from the back may be delivered only from the upper part of the heating surface. In cases where air is admitted through the floor strips are also fitted at the back of the radiator. Among other boilers illustrated are three patterns of cast-iron sectional boilers for low-pressure hot-water heating. Although cast-iron is somewhat liable to crack under certain



conditions, this material is now very largely used for hot-water boilers and apparently with satisfactory results. One great convenience offered by the sectional construction illustrated in this catalogue is that any individual section can be readily replaced, and another is that the size of any boiler can be increased at pleasure by attaching additional sections. Wrought-iron boilers of various types—both independent and for brick-setting—are fully described and illustrated, as also are low-pressure and high-pressure steam boilers for heating and power plants. Two patterns of steam water heaters are shown, one of these being a new design vertical type heater occupying very little floor space in proportion to heating capacity.

Mr. Joseph Jackson sends us his catalogue of constructional steelwork and concrete-steel floors. The first sixteen pages contain tables of beams, stanchions, and columns of various kinds, including an ingenious type of composite stanchion designed so as to utilise the high tensile resistance of mild steel and the great compressive resistance of cast-iron. Some results obtained by Messrs. D. Kirkaldy from tests of these stanchions appear to confirm the claim of the maker that they will carry a greater load and give a higher factor of safety than mild steel stanchions of equal sectional area. In the next two or three pages we find illustrations of genuine steel cage construction, one of these showing the part section of a Thames-side warehouse from foundations to roof. Concrete-steel floors are represented by five different systems, but this form of construction is only applied to the panels between parallel rolled steel joists, which are no longer necessary. Indeed, from the point of view of fire-protection the lower flanges of heavy girders involve greater risk than the small bars constituting the reinforcement of concrete-steel beams. Among other representative examples of work illustrated in this interesting little catalogue we may mention steel roof trusses, fireproof roofs of steel encased with concrete, steel truss buildings for factories and storehouses, bridge work, basement lighting, steel staircases, window sashes, and tanks.

Messrs. Summerscales & Sons (Keighley) send us a large and fully illustrated catalogue of their laundry machinery and cooking apparatus. Among the objects illustrated and described are various rotary washing machines, mostly made entirely of metal, though there are some smaller ones with wooden drums; various forms of wringing machines and Hydro extractors; gas irons and fittings; coppers, linen presses, clothes waggons, and drying closets of various design. We take from the catalogue the following description of the principle and action of their "Overhead Drying Horses":—

"The general principle is based upon the natural capacity of air to hold water in suspension, therefore efficient drying. It is obvious that the air should not be allowed to approach the point of saturation, but pass freely and rapidly through the drying chamber. To attain this object we employ a specially constructed exhaust fan, which draws pure air through a heater (for economy of space fixed on the roof of the drying chamber), composed of encased steel tubes heated by live steam, or the exhaust steam from engine, and forcing the heated air into the drying chamber, where it is equally distributed by a trunk pipe through graduated slots, arranged so that the temperature and point of admission are completely under control, and all parts of the chamber filled with heated air under a slight pressure. As the fresh heated air is being constantly forced through the articles to be dried, taking up a small amount of moisture in saturation, and then forced again into the open air, carrying any vitiated matter with it, it is replaced by a fresh and constant volume of pure heated air."

The catalogue contains, in the general remarks, some useful practical information; and there is a whole series of code words for simplifying arrangements by telegram.

Messrs. Twyford (Hanley) have sent us a circular, in which they draw attention to the special ware in which their principal water-closet basins are now made. Ordinary earthenware and freiclay, in their unglazed state, are more or less porous, and Messrs. Twyford claim that they have succeeded in producing two new wares which, even when unglazed, are "absolutely non-porous." "Vitrina" is the name given to the substitute for earthenware, and "Vitrina Ironstone" that of the substitute for freiclay. The tests by Messrs. David Kirkaldy & Sons show that the unglazed "Vitrina" has an absorption of only  $\frac{1}{4}$  per cent. after seven days' immersion, and the unglazed "Vitrina Ironstone" of  $\frac{1}{8}$  per cent. We need scarcely say that for water-

closets the two wares are always glazed, so that even better results are obtained.

From the British Luxfer Prism Syndicate we have received a catalogue of 168 pages, containing descriptions and illustrations of their various kinds of glazing. The catalogue is divided into five sections, the first of which deals with the simpler applications of "Luxfer" prismatic glass. This glass is flat outside, but corrugated inside, so that the section resembles a saw; the corrugations are of various pitches to suit different conditions of lighting and the degrees of refraction required. In its original form, the glazing was formed with 4-in. squares of white crystal glass united in various way in a brass frame, but rolled prismatic sheets of large size are now made, as well as "Luxfer Prism Plate-Glass," the latter being manufactured in sizes up to 50 in. by 55 in., and supplied either polished or unpolished. The second section deals with pavement and other lights, the third with electro-glazed fire-resisting "Luxfer" window-glass, and the fourth with ornamental forms of "Luxfer" glazing (plain and coloured) with cameos of lead as in ordinary leaded lights, or of coppered lead, or of copper (electro-glazed). The designs in this section are worthy of particular mention, and include examples of glazing suitable for buildings in the various English styles, from the XIIIth to the XVIIIth century, and many others of a modern type. In the fifth section various forms of the "Luxfer" patent roof-glazing without putty are shown in a number of folding plates. Different sections of steel bars are adopted, and the bars are galvanised or lead-encased, while the glass is secured by lead, zinc, or copper capping; asbestos packing is used with some of the sections, and the glass is either plain or prismatic. This is a good catalogue, and will be of great assistance to architects.

We have received from Messrs. Young & Marten a copy of their new quarto catalogue of 460 pages, entitled "Tariff of Requisites for Building Construction." It contains illustrations and prices of nearly everything required in ordinary buildings, including drain-pipes, traps, and manhole-covers, bricks and tiles, English and Swedish doors, wood and iron sashes and casements, leaded lights and other glazing, sinks, baths, lavatories and water-closets, gas and water pipes, kitcheners and fire-grates, mantelpieces, plumbers' metal-work, crank and electric bell fittings, gas and electric light fittings, builders' plant, workmen's tools, hammers, ladders, and other hardware; heating apparatus, ventilators, paints and varnishes, and many other requisites, large and small. It is certainly a most comprehensive catalogue, and, although architects will look elsewhere for fittings of a special character, they cannot fail to find this volume useful, and to the builder it will be a still greater boon.

Messrs. Heathman & Co. send us a catalogue of their useful patent extension ladders, and another of their hand fire-extinguishing pumps and grenades and of their various forms of fire-escapes for keeping in private houses, etc. Their fire hose for attachment to house taps is a very useful and not expensive article, which would be much more efficient in extinguishing an incipient fire than buckets or jugs, and the water could be better and more directly applied.

PARISH CHURCH, MARTON.—Messrs. Harold Bailey & Wood, of Newark and London, are appointed architects for the reparation, at a computed cost of about 800*l.*, of the parish church of Marton, in the parts of Lindsey, Lincolnshire. The church, dedicated to St. Margaret, and built of stone, consists of a chancel, nave and aisles, and has an embattled west tower. The tower, we may observe, is scheduled in Professor Baldwin Brown's "List of churches in England that exhibit traces of Saxon building," which was printed in our columns of May 2, 1903, and Professor Brown is of opinion that the tower belongs most probably to the middle of the XIIth century, though, as he remarks, there are in the East Anglian region several survivals of Saxon forms in post-Conquest buildings. The interior of the church presents features of the Norman and later periods, with vestiges of pre-Conquest carving and other work. At a restoration carried out in 1838 the north chancel arch, which had been bricked up, was opened out, and the west gallery was taken down. Marton is traversed by a Roman road known as Tilbridge-gate, and the river Trent separates the parish from Nottinghamshire.

## The Student's Column.

### STEAM BOILERS AND PIPES.—I. INTRODUCTION.—STEAM BOILERS.—BOILER TYPES.



OUR primary object in the ensuing articles is to set down some of the most essential points for attention by architects who are called upon to install plant for the generation and distribution of steam in hospitals, asylums, workhouses, infirmaries, schools, hotels, industrial works, and other buildings.

The first part of the title chosen might easily be made to cover an immense field. A full discussion of steam boilers would make it necessary to consider the laws of heat, radiation, and conduction, the calorific value of fuels, the laws of combustion and evaporation, the physical properties of materials employed in the construction of boilers, the design and manufacture of boilers, furnaces, and smoke-prevention apparatus, and other subjects directly connected with steam-boiler practice.

Therefore, we think it desirable to explain at the outset that, in the treatment of steam boilers and auxiliary plant, no attempt will be made to deal with matters belonging more particularly to the province of the mechanical engineer. Those of our readers who desire to study such details will be able to find all information required in the various text-books published on steam-boiler construction. We merely propose to present some notes on aspects of the subject which must come before every architect who is required to make provision in his specifications for steam-producing plant, who has to design buildings suitable for its accommodation, and who is responsible to his client for the efficiency and safety of the installation.

Similarly, with regard to the kindred subject of steam pipes, the interests of the pipe-maker and pipe-fitter will give place to those of the architect, who is concerned more with the principles of design than with the details of execution. But essential details will not be neglected, for, upon the proper recognition and observance of these by the designer, the satisfactory character of a complete pipe system very largely depends.

As no system of boilers and pipes is complete unless it includes auxiliary apparatus of various kinds, as well as valves and fittings, sufficient mention will be made of all appliances that form integral parts of an installation.

#### STEAM BOILERS.

**Boiler Types.**—Before discussing the question of boiler selection, it may be useful to present a brief summary of the principal boiler types available, together with some notes upon the distinguishing characteristics of each.

(1) With the exception of the plain cylindrical boiler, now virtually obsolete for steam-raising purposes, no boiler is more simple than the Cornish type (Fig. 1). This is durable, costs little for maintenance, and burns fuel of inferior quality with comparative economy. One advantage it possesses is that sludge deposited from unpurified feed water settles chiefly at the bottom, where it is away from the region of maximum heat and can be removed in great part by blowing off. Finally, the interior of a Cornish boiler is very accessible for cleaning.

It is usually made in sizes from 7 ft. long by 3 ft. 3 in. diameter to 30 ft. long by 6 ft. diameter, with effective heating surfaces ranging from about 70 sq. ft. to 700 sq. ft., and for working pressures of 40 lb. to 100 lb. per sq. in. For diameters above 6 ft. the Lancashire type is preferable.

(2) The Lancashire boiler (Fig. 2) is another simple, durable, and economical type, requiring few repairs, and providing a large evaporating surface.

In consequence of the confined space between the flues, the Lancashire boiler is not so easy to clean as the Cornish type, especially in the smaller sizes.

For instance, in a boiler of 6 ft. diameter, with two 2-ft. 3-in. diameter flues, only 1 ft. 6 in. is left for the three spaces, one between and one on each side of the tubes. Hence, the only means of access to the bottom of the boiler is at the back, where the tubes are reduced in diameter to permit the



attachment of the end plate by an internal angle ring.

The Lancashire boiler is commonly made in sizes from 16 ft. long by 6 ft. diameter to 30 ft. long by 8 ft. diameter, with effective heating surfaces ranging from about 350 sq. ft. to 1,030 sq. ft., and for working pressures of 50 lb. to 150 lb. per sq. in.

Some firms make Lancashire boilers with a diameter as small as 5 ft. 6 in., but, for the reasons stated above, this type should never be of less than 6 ft. diameter.

(3) The three-flued boiler is a modification of the Lancashire type, and, as shown in Fig. 3, has two furnace tubes of equal diameter and one tube about 25 per cent. less in diameter, placed near the bottom. Owing to the transverse area occupied by the three flues, this type is not made in diameters of less than 8 ft.

The advantages claimed for it are:—That a large volume of more or less dead water is displaced by the additional flue; that more vigorous circulation is insured; and that, by reason of the more uniform temperature resulting, the strains due to unequal expansion and contraction are considerably reduced.

(4) The Galloway boiler is another modification of the Lancashire type. It has two furnace tubes extending as far as the bridges at the back of the fire grates, but beyond these the tubes are united to form a special form of flue pierced by circulation tubes and having recesses or pockets in the side walls. The circulation tubes and pockets have the effect of breaking up the furnace gases and of absorbing considerable quantities of heat which are communicated to the water. The mixture of the gases behind the fire bridges assists the process of combustion, and tends to economise fuel and to reduce smoke production.

This type of boiler presents further complications in respect of cleaning, but, so far as steam raising is concerned, it is very efficient owing to the rapid circulation and the complete combustion obtained. It is made in sizes very similar to those of ordinary Lancashire boilers, but has a larger output than these in proportion to actual dimensions.

(5) The externally-fired multitubular boiler, in its most simple form, is fired externally. Like the Cornish type, it may be regarded as a development of the plain cylindrical boiler, only that the additional means of imparting heat to the water take the form of small

internal smoke tubes running from front to back, instead of being constituted by a large internal furnace tube.

The general construction of this boiler is sufficiently illustrated by Fig. 4. It is by no means a self-contained apparatus, as the fire grate has to be set in the enclosing brickwork.

The multitubular boiler is an efficient steam producer, but has the disadvantage that sludge deposited from impure feed water accumulates at the bottom where the heat is at a maximum. Consequently, overheating and burning of the plates is almost inevitable unless purified feed water be employed.

Internally-fired multitubular boilers of various patterns have been introduced for the purpose of avoiding the defects of the externally-fired variety. Most of these modifications combine the essential features of the Cornish or Lancashire type.

(6) Fig. 5 represents a multitubular boiler having a circular flue making it a combination of the Cornish and multitubular types. This form of boiler presents the advantage that it can be erected very cheaply for a temporary installation without side or bottom brick flues, or, if desired, by simply placing the boiler on cast-iron cradles and providing a wrought-iron chimney. For permanent work, however, it should be seated similarly to a Cornish boiler.

The boiler is made in sizes ranging from 10 ft. long by 4 ft. diameter to 18 ft. long by 6 ft. diameter, with effective heating surfaces from about 170 sq. ft. up to 500 sq. ft., and for the usual pressures. It is also made as a combined Lancashire and multitubular boiler in sizes from 18 ft. long by 6 ft. 6 in. diameter to 20 ft. long by 7 ft. diameter, the effective heating surfaces for these being from about 600 sq. ft. to 850 sq. ft.

A combined Lancashire and multitubular boiler is also made, in which the furnace tubes extend for a greater length and terminate in a cylindrical combustion chamber, into the back plate of which the smoke tubes are expanded.

Another variety consists of two separate boilers, one being a short Lancashire boiler and the other a short multitubular boiler. The two portions are fixed tandem fashion 4 ft. apart longitudinally. The intervening space is enclosed by brickwork, and constitutes a combustion chamber. Connexion

is established between the water and steam spaces by a water pipe of large diameter at the bottom and a steam drum on the top. One convenient feature of this design is that transport is facilitated by the separation of the boiler into two parts.

(7) Fig. 6 is a longitudinal section and an end elevation of a multitubular boiler, with two internal flues, and may be described as a Lancashire tubular boiler. This design was introduced nearly forty years ago by Mr. J. N. Paxman, M.Inst.C.E., for the special purpose of obtaining a large output of steam from a boiler occupying a minimum amount of floor space.

The boiler is also made with one flue, thereby constituting a combination of the multitubular boiler with the Cornish type, or a Cornish tubular boiler.

When the furnace gases emerge at the back from the flue or flues they enter a combustion chamber of brick, or iron lined with fire-brick, and return through the small tubes to a smoke-box in front, whence they proceed through brick flues along the sides of the boiler to the chimney, or may be taken direct to the chimney.

This is a very efficient and economical form of steam generator, and is particularly useful in places where space is limited. It is made in stock sizes ranging from 6 ft. 5 in. long by 4 ft. 9 in. diameter to 12 ft. 6 in. long by 6 ft. 6 in. diameter, with one flue, and from 12 ft. 6 in. long by 7 ft. diameter to 14 ft. 12 in. long by 8 ft. diameter, with two flues, the working pressures being the same as those usually adopted for Cornish and Lancashire boilers.

(8) Another form of multitubular boiler with internal furnaces is the Marine return-tube type, which is used in some towns and cities where space has to be economised. The floor space required is very much less than that necessary for a Lancashire boiler, and, if not overworked, it is a very economical steam raiser.

The Marine return-tube boiler is made for land service in sizes ranging from 4 ft. 6 in. by 4 ft. diameter to 9 ft. long by 11 ft. diameter, the latter dimensions representing the largest boiler that can be forwarded by railway. The smaller sizes have one flue, like a Cornish boiler, and the larger sizes two flues, like a Lancashire boiler. The effective heating surfaces range from about 100 sq. ft. up to 1,000 sq. ft., and the pressures from



- FIG. 1. -



- FIG. 2. -



- FIG. 3. -



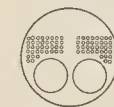
- FIG. 4. -



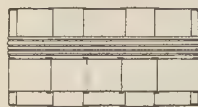
- FIG. 5. -



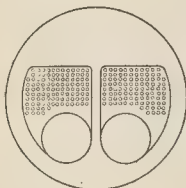
- FIG. 6. -



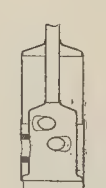
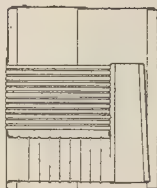
- FIG. 7. -



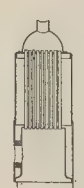
- FIG. 8. -



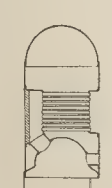
- FIG. 9. -



- FIG. 10. -



- FIG. 11. -



- FIG. 12. -



100 lb. per sq. in. upwards. The dry-back return-tube boiler is similar in shape to the Marine boiler, the chief difference being the absence of an internal combustion chamber.

(9) The Locomotive boiler (Fig. 8) is of the multitubular type, with an extension containing the fire-box. When of well-proportioned design it is an economical and efficient steam generator, and is particularly adapted for temporary works, because the cost of installation is exceedingly small.

Boilers of this type are generally made in sizes from 10 ft. long by 2 ft. 9 in. wide to 17 ft. 6 in. long by 5 ft. 6 in. wide over all dimensions, with effective heating surfaces of from 200 sq. ft. to 1,000 sq. ft., and suitable for pressures of 100 lb. per sq. in. and upwards.

(10) Watertube boilers are made in so many different forms that it would be impossible to mention all of them in the present summary, and invidious to mention one or two while ignoring the remainder.

The distinguishing characteristic of the watertube boiler is that the water and steam are contained in tubes the outer surfaces of which are exposed to the fire. The tubes are connected with steam and water drums arranged in different ways, but in every case the fire is outside the tubes and drums. The tubes are always in tension, instead of in compression, as happens in all other boilers, and the steam drums are very much smaller than the shells of cylindrical boilers.

(11) The vertical boiler is made in two main styles, the first with from one to four or more cross-tubes of comparatively large diameter, as shown in Fig. 9, and the second with from about five to thirty vertical tubes of small diameter, as in Fig. 10.

Ordinary boilers of this type are very wasteful of fuel, especially the cross-tube variety. Their chief recommendations are:—Maximum steam production on minimum floor space, extreme adaptability for temporary or emergency work, low cost of installation, and suitability for small supplies of steam.

Fig. 11 is a section showing the arrangement of a vertical boiler in which small tubes are fixed horizontally, and the efficiency is increased by a lengthened path for the furnace gases.

Special patterns of vertical boilers produced by several well-known makers are much more economical than the ordinary varieties, and are distinctly worth consideration by prospective users.

#### METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of the Managers of the Metropolitan Asylums District was held on Saturday last week at the offices of the Board, Victoria Embankment.

**Leavesden Asylum.**—Among the correspondence received from the Local Government Board was a letter sanctioning the plans of the proposed conversion of two blocks at this asylum into infirmaries. The cost is estimated at 1,160*l*. On the recommendation of the Finance Committee it was agreed to apply to the Local Government Board for sanction to the expenditure of 3,000*l*. on irrigation works on land recently acquired at the asylum.

**Bolton Asylum.**—The Local Government Board wrote sanctioning the proposal of the Managers to invite tenders from six selected firms for the provision of (a) laundry machinery and fittings; and (b) heating arrangements and additions to the boiler-house at this asylum, without in the first instance advertising for tenders.

**Lozels.**—On the recommendation of the Finance Committee it was agreed that That application be made to the London County Council for the loan of the undermentioned sums amounting to 100,978*l*. to be repaid within the periods named at a rate of interest not exceeding 3*l*. 6s. 6d. per cent. per annum, upon the balance for the time being outstanding—

	Years.	£.
Southern Hospital.—Erection of	30	40,000
Leavesden Asylum.—Cottages for married attendants	30	1,100
Training Ship <i>Exmouth</i> .—Providing and fitting up new ship	30	1,350
South-Eastern Hospital.—Reconstruction of	20	50,000
Eastern Hospital.—Laundry alterations	15	380
High Wood School.—Erecting and fitting up	15	1,800
Belmont Asylum.—Alterations and additions	10	1,780
Belmont Asylum.—Installation of electric light, etc.	10	4,000
Long Reach Hospital.—New pontoon and landing stage	10	488
Fountain Asylum.—Furnishing works	5	750
		£100,978

**Darent Asylum.**—Messrs. Taperell & Haase were appointed to take out the quantities for the annual cleaning and painting works at this asylum. The cost is estimated by the Engineer-in-Chief to be 2,600*l*.

**North-Eastern Hospital.**—The Board approved of the plans submitted by the Engineer-in-Chief for the erection of new boiler-house, coal stores, and workshops at this hospital. The cost is estimated at 16,000*l*.

#### COURT OF COMMON COUNCIL.

The usual fortnightly meeting of the Court of Common Council was held on Thursday last week at the Guildhall, the Lord Mayor presiding.

**The Trans over Blackfriars Bridge.**—Considerable discussion took place on a report by the Special Committee appointed to consider this matter. The Committee recommended the Court to assent to the bringing of the tramways over a widened bridge at Blackfriars, subject to a satisfactory arrangement being arrived at with the London County Council as to cost, management, control, and maintenance. Mr. H. D. Kimber moved an amendment to this to the effect that before committing itself to any particular scheme the Corporation should be afforded an opportunity of considering its feasibility and all details involved. This was rejected on a division by 101 votes to 30, and the Committee's recommendation, with the following alterations, was carried—“*Assent to the bringing of the tramways over a widened bridge at Blackfriars, or new bridge adjoining, subject to a satisfactory arrangement being previously arrived at.*” etc.

**Iron and Glass Shelter at the Royal Hotel.**—On the recommendation of the Streets Committee it was agreed to permit the proprietors of De Keyser's Royal Hotel, Ltd., to erect an iron and glass shelter over the footway at the entrance to the hotel on the Victoria Embankment.

Having transacted other business, the Court adjourned.

#### OBITUARY.

MR. C. A. WALKER.—Mr. Charles Aloysius Walker, a Preston contractor, died on the 27th ult. He was fifty years of age, and leaves a widow and eight children. He was President of the Master Builders' Association.

#### GENERAL BUILDING NEWS.

**ST. MARY'S CHURCH, ABERDEEN.**—A commencement has now been made to the building operations in connexion with the new vestry and church room for St. Mary's, Garden-place, the foundation-stone of which was laid on Saturday. The site of the new buildings is on the south side of the church on ground fronting Albert-terrace. The church room, which is planned to seat about 120, will measure 26 ft. by 30 ft. It will be lighted by nine Gothic lancet-shaped windows. Externally, the new building, which is being erected from plans by Mr. Arthur Clyne, architect, Aberdeen, has been designed in harmony with the architectural style of the church.

**R.C. CHURCH, BLANTYRE.**—On the 18th ult. the new church at Blantyre for St. Joseph's R.C. congregation was opened. The new church is situated at the junction of Glasgow-road and Stonefield-road, and is 142 ft. in length, exclusive of the baptistry, which projects another 15 ft. to the front. The width of the building is 62 ft., and the height 60 ft. from the ground to the point of the cross. It consists of chancel, nave, side chapels, aisles, baptistry, sacristies, confessional, and choir gallery, etc. The nave is 96 ft. long and 30 ft. wide, and is divided into six bays. The chancel is apsidal in form, and is divided from the nave by an extra main cupola filled in with tracery. The chancel wall over the altar is pierced with a large rose window, 12 ft. in diameter. In the facade, which is the principal feature of the structure, are placed three doorways, which are deeply arched and recessed to receive the doors. The facade gable is strongly buttressed both at the sides and in the centre. In the centre buttress is placed a niche of St. Joseph, the patron of the church. The church is built with red stone. The whole has been executed by Messrs. Pugin & Pugin, and the total cost of the church is about 9,000*l*.

**WESLEYAN CHURCH, HUDDERSFIELD.**—The memorial-stones of a new Wesleyan Church for the Coalbrookdale district of Huddersfield were laid recently. Messrs. W. J. Morley & Son, of Bradford and London, are the architects. The building is in the decorated Gothic style, and will consist of nave, transepts, organ and choir recesses, galleries, and four vestries. The seating accommodation is for a congregation of 605.

**WESLEYAN CHURCH, SEVERGROVE HAVES.**—The foundation-stones were laid on the 22nd ult. of the new Wesleyan Church for Stockton Heath, a Warrington suburb. Mr. Percy Silcock is the architect. The cost is estimated at about 1,500*l*. When completed the church will accommodate some 270 persons and the school 200.

**CHANCEL, PITTINGTOWN PARISH CHURCH.**—The Assistant Bishop of Durham recently dedicated the chancel of Pittingtoun Church, which has been raised and restored to its former length by an addition of 13 ft. The new chancel is in Early English style and of the same proportions as the old Early English chancel which was destroyed in 1847. It has three long lancet windows at the east end, four similar windows on the south side, and two on the north. At the same time a new organ in memory of the late Queen Victoria and other memorial offerings were dedicated. It was erected by Messrs. Harrison, of Durham. The work was carried out from the plans of the late W. S. Hicks.

**BAPTIST CHURCH AND SCHOOL, DOUGLAS, ISLE OF MAN.**—The new church at Douglas, Isle of Man, was opened on June 11. It has been built to take the place of the former temporary wood structure. The main body of the church approaches a square in plan, with a chancel extending at the north end, having the choir seats at each side, with pulpit at the front west corner of chancel. The baptistry, with a special view to its convenience on baptismal occasions, is placed longitudinally in the centre of the chancel, with steps at each end, so that participants pass into the water at the entrance of the chancel in view of the whole congregation, and, passing out at the far end, almost immediately enter the vestries to right and left respectively. The organ chamber is on one side of the chancel, with choir vestry below and minister's vestry on opposite side. The schoolroom occupies about half the area under the church, and on this level are also the minister's chamber, kitchen, and ladies' and gentlemen's conveniences. A staircase communicates between church vestibule and school vestibule. The accommodation of the church is for about 400 sittings and the school about 230 scholars. The internal fittings are of pitch-pine, the roof timbers being left unpainted. The front facade, including the chancel, is in the Early English style, with dressings to doors and windows of Bath stone. The tower is at present only carried to the square of building, but an octagonal spire is intended to complete the front. The cost, exclusive of land, is about 2,600*l*. The work has been carried out from the designs and under the superintendence of Mr. Francis P. Halsall, Chapel-street, Southport. Mr. M. Carnie, of Douglas, being the builder. The seating contract was carried out by Mr. G. Preston, also of Douglas; heating and ventilating by Mr. Lewis Hill, Edge Hill, Liverpool.

**BAPTIST CHURCH, CONSETT.**—The trustees of the Baptist Society have accepted the designs of Mr. Baynes, architect, of London, for the erection of a new church and Sunday school in Front-street, Consett. The total cost will be 3,350*l*.

**CHURCH RESTORATION, SEBERGHAM, CUMBERLAND.**—The ancient parish church at Sebergham was reopened on the 7th ult., after having undergone thorough restoration and improvement at a cost of over 800*l*. Mr. Martindale, Carlisle, was the architect, and Mr. Grienshaw, Penrith, the contractor.

**CHURCH TOWER, ST. ANNES-ON-THA-SEA, LANCASHIRE.**—A tower is shortly to be added to St. Thomas's Church at St. Annes. The work will be carried out under designs prepared by Messrs. Austin & Paley, the architects for the main buildings.

**CATHOLIC CHAPEL, WOLVERHAMPTON.**—The foundation-stones of a new Catholic chapel and vestries in connexion with Christ Church, Wolverhampton, were laid a short time ago. The new buildings consist of a chapel 20 ft. long and 14 ft. wide, at the east end of the north aisle, with apsidal end. The walls will be paneled oak inside for a height of 12 ft., and the top part faced with stone, and the open timbered roof covered with slates. At the rear and side of the chancel will be three vestries, having a separate side entrance. The walls and ceiling will be lined with pine matched boarding, and the flat roof covered with lead; a flat roof being adopted so as not to hide the present building. Externally the stone walls are finished similar to the present church. The builders are Messrs. Wilkes & Co., of Wolverhampton, and the architects Messrs. Fleming & Son, of the same town. The cost will be about 1,500*l*.

**WESLEYAN CHAPEL AND SCHOOLS, ST. IVES.**—A new Wesleyan chapel and schools were recently opened at St. Ives. The new buildings are in the Gothic style. The main entrance doors open on a narthex, the walls of which are faced with red Hawesay brick. The chapel itself is 55 ft. long and 40 ft. wide, with a shallow western transept and a larger eastern one, which gives access to the minister's vestry and the school premises. The aisles, which are floored with wood blocks, are 4 ft. wide, and a gallery roofed in the narthex. There are three five-light mullion-traceried windows on either side of the church, with a six-light window in the western transept and a two-light window in the south wall of the eastern transept. The woodwork throughout is of pitch-pine. The front elevation of the building has a main central entrance, with buttresses on either side, finished with octagon ornaments.



Plinths, mouldings, bands, dressings, and copings are in Monk's Park stone, the base and angles in Snettisham Carr stone, and the fillings finished in Random rubble. The side elevation is faced with red Bawsey bricks. The school premises consist of vestibule, spacious corridor, vestry, classroom, church parlour, infant room, a main hall (36 ft. by 24 ft.), with three classrooms in curtained alcoves, and also a kitchen, lavatory, and heating-chamber, and the premises are approached along the eastern side of the church. The building is warmed throughout by low-pressure hot-water pipes on the radiator principle. The architect is Mr. F. Sidney Webber, of London, and the builder Mr. F. Giddings, of St. Ives.

**THEOLOGICAL COLLEGE, LLANDAFF.**—On the 20th ult. the foundation-stone of the new home of St. Michael and All Angels Theological College was laid at Llandaff. The plans for the work have been prepared by Mr. F. R. Kempson, architect, and the builder is Mr. James Allan. The estimated cost is 20,000.

**SCHOOL-CHURCH, CATHAYS, CARDIFF.**—Under the auspices of Tredegarville Baptist Mission, the foundation-stones of a new school-chapel were laid recently. The plans of Mr. W. Boddoe Rees, architect, were accepted for the erection of a new school-chapel at Cathays capable of seating about 450, the builders being E. R. Evans Brothers, Cathays. The cost is estimated at about 1,300.

**PRIMITIVE METHODIST CHURCH, CHESTER-LE-STREET.**—On the 21st ult. the foundation-stones of a new Primitive Methodist church were laid at Chester-le-Street. The site of the new building is in Clifford-terrace, and the church, when completed, will provide seating accommodation for between 400 and 600. It will comprise a nave, three vestries, gallery, and organ gallery. The main entrance will be situated in Clifford-terrace, while the entrance to the gallery will be in the tower. The building will be in the Gothic style, and will be executed in red brick with stone dressings. Subsequently it is intended to extend the building by the erection of a Sunday-school, which will contain six classrooms. It is expected that the chapel will be completed within nine months, and will cost about 2,200. The building is being erected by Mr. C. Groves, of Chester-le-Street, from plans prepared by Messrs. Boyd & Groves, architects, Newcastle.

**NEW SCHOOL, CROSSNACREEVY.**—The memorial stones have just been laid of the "O'Neill Memorial School" at Crossnacreevy, County Down. The new building will comprise a schoolroom and two classrooms, also a vestibule and cloakroom, together with lavatories and latrines and yards for the recreation of boys and girls enclosed all round by a wall. The partition between one of the classrooms will be moveable, so that it can be thrown into the schoolroom and form a large hall for public meetings, concerts, etc. The buildings will be constructed of compressed bricks from the Laganvale works, with moulded brick strings and labels, also moulded stone eills, and half-timbered gables. Mr. James Kidd, builder, Belfast, is the contractor for the works, and Mr. Kierke, C.E., Assistant Surveyor, Board of Works, the architect.

**LEEDS GRAMMAR SCHOOL EXTENSION.**—Extensions have been made to the Leeds Grammar School at a cost of 20,000. The Governors asked for designs for the reconstruction of the old buildings at the corner of Woodhouse Moor, and those submitted by Messrs. Austin & Paley, architects, of Lancaster, were accepted. The complete scheme included the erection of two long rows of classrooms, and a large central hall, the area of the extension being considerably larger than that of the old premises. A large part of the project is now nearly completed, and though the central hall, which is to be 100 ft. by 40 ft., has not been erected, the longer row of classrooms, comprising a dozen apartments looking to the south, have been finished, and are already being made use of. In addition, a new lecture hall has been provided, together with a set of chemical and physical laboratories. The extension is two stories high, and is built of stone.

**BRANCH LIBRARY, KIRKDALE, LIVERPOOL.**—The new Kirkdale Branch Library is now nearing completion, and will shortly be opened. The exterior is of Runcom red stone, with selected grey brick dressings, the whole being treated in the classic style. On the right on entering is the general reading-room, 73 ft. by 30 ft., and on the left is a room of almost similar dimensions, one-half of which is appropriated for a ladies' reading-room, and the other half for boys and girls. The lending library is in the centre of the building, with a mezzanine floor at its end for the storage of books. The public rooms and vestibule are surrounded by a dado of rich glazed tiles, and the fittings and tables are of American oak. The building has been erected by Messrs. W. Hall & Son, Limited, from designs prepared under the direction of the Corporation Surveyor, Mr. T. Sheldermine.

**PUBLIC LIBRARY, TINSLEY.**—The newly-built library at Tinsley was opened a short time ago. The building is in the Renaissance style, and is faced with local pressed bricks and Greeniside stone dressing. The architects are Messrs.

Holmes & Watson, and the contract was let to Messrs. T. Grey & Sons.

**HALL, ALLENDALE.**—On White Monday afternoon the foundation-stones of a hall for Allendale Town were laid. Messrs. Badenoch & Bruce, of Newcastle, are the architects, Mr. F. W. Charlton, Allendale, has given the contract for the masonry work, and Messrs. Lowe & Hetherington, also of Allendale, are all the other trades. The hall will be 50 ft. long by 29 ft. wide, and will accommodate about 300 of a mixed audience. There are a committee-room capable of seating from forty to fifty, a kitchen for tea meetings, with lavatory and other conveniences; heating chamber and meter-house for the generator, as the hall is to be lighted by acetylene gas, and the heating will be by low pressure hot water. The buildings are of local stone with Prudham dressings. The hall is designed with open timber roof, having curved principals.

**ROMAN CATHOLIC PRESBYTERY, NEWPORT, MON.**—The foundation-stone of St. Mary's new Catholic Presbytery, adjoining St. Mary's Church, on Slow Hill, Newport, has just been laid. Mr. F. R. Bates is the architect, and Mr. Charles H. Reed the contractor. The new building will cost about 2,500.

**LIBRARY, LIVERPOOL.**—A new public library has been erected at a cost of 15,700, on a site containing 5,731 sq. yds. of land at the corner of Green-lane and Lister-drive, West Derby. Besides the main entrance for the general public, there is a separate entrance for ladies in Lister-drive, and another for heavy goods in Green-lane. The building is raised on a terrace on three sides. The materials used on the exterior are white Portland stone and Runcom red pressed brick, with common brick at the rear of the building, and green Westmorland slates. The principal feature of the building is the tower over the main entrance, which is surmounted by a dome covered with copper. Five of the eaves sides of the tower contain a window each, and between them is a buttress which runs down to the ground. The entrance-hall, octagonal in shape, has the floor laid with red tiles, and admission is here gained to the general reading-room, the boys' reading-room, and the lending department. The entrance porch is supported by four Ionic columns. An entablature runs round three sides of the building, about two-thirds of the way up, this entablature being supported by classic pilasters raised on stone tiers. The general reading-room, which is 47 ft. by 28 ft., exclusive of bays, is oblong in shape, having a rectangular bay window at one end and projecting 8 ft., while on the right-hand side is a large square bay window in which a seat is fixed. Fourteen tables are provided, as well as two newspaper stands, two magazine racks, and one catalogue table. On the left-hand side are two counters, which communicate with the lending department. The floor is laid with pitch-pine wood blocks, and the walls are covered with glazed tiling. The boys' reading-room is 35 ft. by 28 ft., exclusive of bays, and the ladies' reading-room is 24 ft. by 20 ft. The lending department is 45 ft. by 28 ft., and opening into the lending department is the librarian's room, 14 ft. by 13 ft. This is the only room in the building in which there is a fireplace, the rest of the library being heated on the low pressure system by means of a vertical boiler, hot water pipes, and radiators. The building is lighted by electric light, all the interior walls, with the exception of the floor blocks, is of oak. The library has been erected by Messrs. Brown & Backhouse from designs prepared under the direction of the Corporation Surveyor, Mr. T. Sheldermine.

**COLLEGE BUILDINGS, BRISTOL.**—On the 20th ult. the foundation-stone of the new Western College was laid, the site being directly opposite Highbury Chapel, at the junction of Cotham and Hampton roads. Here for some time past the students have been pursuing their studies in the buildings formerly used as a boarding school, and the decision to expend the sum of 12,000, on an entirely new college was arrived at at the last annual meeting. Originally a residential college was proposed, but for various reasons this was abandoned, and it is now determined to erect a building providing the necessary accommodation for lectures, a library, and for the dining together of the students in the hall. On the ground-floor, besides the entrance-hall, will be the inner or staircase hall, common room for students, library, and the large dining and assembly hall, which will be carried up the height of two floors and surrounded by a gallery. At the rear of the hall will be the buttery, kitchens, pantries, and rooms for the housekeeper. A committee-room will also be provided, and the necessary cloakroom and lavatory accommodation. The staircase leading to the first floor is in oak, and on this floor are two large lecture-rooms and one smaller one, the gallery of the hall being also reached from this level. Adjoining the college and communicating with it will be the residence of the principal, which will face and be approached from Cotham-road by Mr. H. Dare Cryer, is the architect. Bath stone in random courses will be used for facings, with Gloucestershire stone slates for

the roof, the stone mullioned windows being glazed with lead lattice panes. The interior will have floors of wood block, many of the rooms being finished with oak panelling. The buildings, in addition to open fireplaces, the principal rooms, will be heated on the low-pressure hot-water system. The total cost of the new college will be 15,000, Messrs Long & Sons, of Bath, are the builders.

**PROPOSED NEW HOTEL, GUERNSEY.**—A syndicate has been formed to acquire Castle Carey, the residence of Colonel Carey, with the object of transforming it into a hotel. Castle Carey stands nearly 200 ft. above the sea-level on a foundation of about four acres, and is built in fine grounds of granite and gravel. The existing architectural plan is remarkable and undecorated, from being shaped and windowed to make the best of the various and extensive views over the sea, the harbour, and the adjacent islands of Jersey, Herm, Jethou, Sark, and Alderney. Its internal fittings are unusual. The main staircase is of oak; all doors on the principal floor are of mahogany; there is elaborate carving in oak, and rich decoration in the hall. The chief want is of a sufficient room. The chief want will be supplied by adding bedrooms, which will be left practicable stories. These dispositions leave it practicable to add hereafter, on the western side, Turkish, small swimming, and Aix massage baths, now much recommended by physicians. Both on east and west sides additional sleeping accommodation can be provided at any time without disturbance to the hotel during progress. The present proposal will leave the building complete in itself. The plans of the proposed enlargement have been prepared by Mr. E. R. Robson, of Westminster.

**INFIRMARY, FULHAM.**—The Board of Guardians have decided to replace the infirmary heating apparatus by a low-pressure system, in which exhaust steam will be utilised. Messrs. F. H. Medhurst & Lloyd have been appointed to prepare the necessary specifications for the work, the cost of which is estimated at about 4,000.

**WORKMEN'S CLUB PREMISES, CAERARU, WALES.**—The new workmen's institute and library at Caeraru have just been opened. They are built of native stone with red pressed brick facings and Portland stone dressings to road elevations. The entrance is placed at the intersection of the two main roads, the site having roads on three sides, and is carried up to form a tower about 60 ft. high. Above the entrance is a Portland stone pediment supported on corbels. On the ground floor there is a billiard-room, a smoke-room, and a hall to accommodate 250. On the first floor is a reading-room, a boys' room, and a librarian's office. The heating is by gas-heated steam radiators. The premises were designed by Messrs. E. W. Burnett & Sons, architects, Tondur and Maesteg, and the work was carried out under the superintendence of Mr. Ernest Whitfield Burnett, the contractor being Mr. John Nicholas, Port Talbot. The total cost was 2,400.

**FEVER HOSPITAL, MIRCHELL LATHES.**—The Joint Infectious Hospital, which has been built at Mitchell Lathes by the authorities of Dewsbury, Heckmondwike, Ravensthorpe, Southill Upper, and Southill Nether, is now completed. It consists of an entrance-lobby, and administrative block (including one as an isolation block), with laundry, boiler, and engine-house, containing a disinfecting plant, stable, and ambulance-shed. The buildings are of pitched wall stones from the Morley quarries. Cavity walls have been made, and the whole of the buildings—six in number—are fireproof, and the interior of the hospital walls are plastered with cement, and painted with enamel. The two large blocks each contain thirty beds, and in the isolation block eight are arranged for. These figures include twenty beds for children. Each block is divided into two wards for male and female patients. The buildings are heated by steam from the boiler-house, which is carried through pipes; each block containing two calorifiers, one for warming purposes, and the other for supplying hot water. Grates are fixed under the beds and windows, and radiators will warm the air during winter. Mr. G. A. Fox has had the architectural supervision of the work. The buildings are lighted throughout with electricity, for which plant has been laid down. The furnishing has been carried out by Messrs. Bickers & Co., Messrs. Threadgill & Co., Mr. H. Senior, and Messrs. Senior & McCann; Messrs. Hood being responsible for the electrical arrangements. The various contractors were as follows:—Mason's work, Mr. John Pickersick, Chichenley Heath; joinery, Messrs. E. Chadwick & Sons, Stancliffe; slater's work, Mr. G. Hargreaves; plumbing and glazing, Mr. F. Newsome; plastering and concrete, Messrs. J. & S. Wheeler, Leeds; iron work, Mr. R. E. Firth. The total outlay is expected to amount to about 80,000.

**INSTITUTE PREMISES, YNISHIR, WALES.**—The memorial-stones of the Ynisher Hall and Institute were laid on the 14th ult. The premises will cost altogether about 8,000, the contract price for the building itself being over 6,000. The hall will provide seating accommodation for upwards of 1,200 people. In addition to this,



there will be a reading-room, billiard-room, games-room, ladies'-room, gymnasium, library, and caretaker's house. The institute is built of native stone, with Forest stone dressings. The contractor is Mr. D. Richards, Yniskir, and the architect Mr. B. Williams, Cardiff.

**PIER, PAVILION, CLETHORPES.**—A new pavilion has been erected on the pier at Clethorpes in place of the one that was destroyed by fire in June, 1903. Accommodation is provided for 1,200 people, and the stage measures 30 ft. by 25 ft. Mr. St. George Moore, of Westminster, drew the designs to which the new structure has been built.

**FIRE STATION, ISLE OF DOGS.**—Mr. Lewen Sharp, the Chairman of the Fire Brigade Committee of the London County Council, recently opened the new Isle of Dogs fire station at the junction of East and West Ferry roads. Mr. W. B. Riley, Architect to the London County Council, was the superintending architect. The cost of the building was 11,300.

**OFFICES OF THE WEIR COMMISSION, SUNDERLAND.**—A new board-room and offices are being erected for the River Weir Commissioners at the corner of St. Thomas and John streets, Sunderland. The architects for the work are Messrs. Henderson & Hall.

**PAROCHIAL HALL, NEWCASTLE.**—The new parochial hall which has been erected in Heaton Park-road, Newcastle, in connexion with St. Silas's Church, was opened recently. The hall has cost 2,500, and will accommodate 900 people. Mr. A. B. Plummer was the architect, and the contractor was Mr. J. L. Miller.

**PUBLIC LIBRARY, RAMMARSH.**—On a site adjacent to the council hall at Rammarsh, a new public library has been built. Mr. J. Platts was the architect, and Mr. W. H. Trahern the contractor for the work.

**PARK LODGE, NEWCASTLE.**—The new lodge at Nuns' Moor, which has been erected for the accommodation of the head-gardener, was recently opened. It is placed at the corner of Lightfoot-grove and Stoddley-terrace, and was designed by Mr. Holford, the City Surveyor, the work being carried out under the supervision of the Corporation property department, by Mr. John Craven, contractor, of Newcastle.

**WESLEYAN CHAPEL, HEMSSELL, LINCOLN-SHIRE.**—On Whit Monday the foundation-stones were laid of a new Wesleyan chapel at Hemsell. The building is to be of brick and stone, and is to cost about 1,000. Mr. W. Eyre, Gainsborough, is the architect, and Mr. Elms, Gainsborough, the builder.

**CO-OPERATIVE PREMISES, HIRST, NORTH-UMBRIA.**—New branch premises have been opened by the Hirst Co-operative Society at Hirst. The building is faced with red pressed bricks, and has North Sea stone dressings, is lighted by electricity, and is heated throughout by hot-water apparatus. The contractors were Messrs. J. & G. Douglas, of Hepscott, the heating and ventilation by Messrs. Emley, of Newcastle, and the electric lighting by Mr. John Mills. The work has been carried out from the designs and under the supervision of Messrs. Liddle & Browne, architects, Newcastle.

**OFFICES, MANCHESTER.**—On Tuesday the new offices of the Lancashire and Cheshire Bank of Hope and Co. in Union in Deansgate were formally opened. The building is of red brick and buff terra-cotta, and is in the Georgian style. In the basement is a restaurant, while the Society occupies a large shop on the ground floor for the sale of its publications. A private staircase connects this shop with the Society's offices on the first floor, amongst which are a board-room and a reading-room for country visitors. The remainder of the first and all the second floors are set apart as offices for letting, whilst the whole of the third floor is covered by a large meeting-hall, decorated with faience work, in connexion with the Society. The builders were Messrs. Wilson & Telfs, of Manchester, and the architects were Messrs. Chas. Heathcote & Sons, of Manchester and London, whose designs were selected after competition.

#### STAINED GLASS AND DECORATION.

**ST. JAMES' CHURCH, MORPETH.**—The screen in St. James' Church, Morpeth, was designed by the late Mr. Wm. S. Hicks, of Newcastle, on simple lines, with a view to its further adornment. A scheme for its enrichment was prepared by Mr. Wm. Hicks (of Messrs. Hicks & Charleswood), a son of the original architect, which has been carried out by a class numbering fifteen, from the Grammar School Technical Education classes, under the supervision of Mr. Appleby, and has been erected by two of the carvers, Messrs. Stafford and Oram.

**MEMORIAL WINDOW, CHICHESTER.**—The new east window in Chichester Cathedral, which has been erected by public subscription to the memory of the late Duke of Richmond and Gordon, K.G., was recently unveiled. The window is immediately above the entrance to the Lady Chapel, beneath the floor of which is the ducal vault. It was designed by Mr. C. E. Kemp, and the subject depicted is the Fall and the Redemption.

#### SANITARY AND ENGINEERING NEWS.

**PIER, FELIXSTOWE.**—The new pier at Felixstowe, which is being built to the order of the Coast Development Company, is now nearing completion. The length of the structure is 903 yds. from the gangways to the sea wall; the width is 26 ft. clear, and is wider out at the far end to 46 ft., where there is also an extra width of 5 ft. on either side for inclined gangways from the pier head, making a total width of 66 ft. On this portion will be erected shelters, waiting-rooms, pier-master's office, parcels office, and lavatories. The T-head of the pier is 4 ft. below the level of the other portion, and at the sides there are inclined ways for the two streams of passengers who are either leaving the boat or about to embark. On the north side an electric tramway of 3 ft. 6 in. gauge is being fenced off. Mr. A. E. Carey is the company's engineer; Messrs. Tassie & Son, the contractors; and Mr. A. Wheeler, the resident engineer.

**THE ROYAL SANITARY INSTITUTE.**—At an examination in sanitary science as applied to buildings and public works, held in Manchester, June 23 and 24, 1905, seven candidates presented themselves, and the following three candidates were granted certificates:—J. Caffrey (Belfast); W. J. Dunning (Colwyn Bay); J. G. Findlay (Glasgow).

#### FOREIGN.

**BUILDING REVIVAL IN ROME.**—Reporting on the trade of Central Italy for the year 1904, Mr. C. C. Morgan, the British Consul, remarks that the improved economic conditions of Italy have helped Rome considerably in its revival after a critical period. Traces are everywhere visible of the altered state of affairs. Large buildings all over the town, and in the immediate neighbourhood, which had been left in an unfinished state for want of capital, have now been rendered habitable. The works connected with the municipal "Piano Regolatore," its general building improvement of the town, are in a very advanced state, greatly to the improvement of the local sanitary conditions and to the convenience of traffic. The embankments, bridges, public buildings and gardens, sewerage, etc., forming part of the said "Piano Regolatore," have been constructed, and on the whole Rome now presents quite a different appearance. There is a growing public feeling that, as far as possible, the district should be emancipated from its traditional dependence on the influx of foreign visitors and rendered self-supporting, as in the case of the chief capitals of the world. The presence of visitors is subservient to so many contingencies and the season during which their stay is limited to so short a period that the policy of giving the utmost economic independence to the city cannot but be encouraged. Visitors will continue to be drawn by the peculiar attractions of old Rome, and the money spent by them during their stay—a considerable sum—will, if anything, help to foster the industrial revival of the district. Several years ago Rome was affected by a building crisis which involved considerable loss of money, and put a sudden stop to the building mania. Consequently a great many houses in course of construction were left unfinished. Of late, however, owing to the stimulation for the sake of modern sanitary improvements of a great number of houses, the need has been felt of new buildings to meet the requirements of the increasing population. In order to encourage the construction of houses in Rome the municipality have recently enacted certain regulations dealing with the matter. Among the facilities granted to would-be landlords one of the most important is the exemption from taxes for a period of ten years on new buildings fit for habitation. Houses intended to be used as hotels or pensions, as well as those which are totally or partly inhabited by landlords, are excepted, and will not enjoy the privilege of exemption. That benefit will be extended to those buildings which were left unfinished at the time of the crisis, provided steps for their completion be resumed within three years, and carried out previous to the expiration of double that period from the date of the regulations in question. The privilege of exemption from payment of the tax is limited to houses let to private individuals, provided that the yearly rent payable for each flat or apartment does not exceed 480.

**GERMANY.**—The new residence for the Minister of Commerce, in the Leipzigerplatz, Berlin, was designed by the architects Herr P. Kieschke and Herr E. Fürstenau. The Town Hall at Eberswalde, designed by the architects Kahler & Franz, is completed. The new building which has been added to the Law Courts in Munich, designed by Professor Friedrich von Thiersch, is completed; the building cost 1,600,000 marks. In the competition for designs for the artistic decoration of the "Kaiser Wilhelm" bridge at Breslau the first premium (2,000 marks) was awarded to Herr Martin and Dr. Weyrauch, the second (1,500 marks) to Herr Wilhelm Härter, the third (1,000 marks) to Herr

Albert Biehnert, and the fourth (500 marks) to the architects Wedemann and Distel. The ancient Town Hall at Alsfeld is to be restored to its original form. In the building of the Law Courts at Schweinfurt the newly-discovered "red green" Bavarian marble was employed for the first time; this marble is totally different to the foreign marbles that have hitherto been imported at considerable expense, and should prove a valuable aid in the decorative treatment of buildings in Bavaria. Professor Billing has undertaken the work of rebuilding the Town Hall at Kiel.

**SOUTH AFRICA.**—Tenders have been invited for the erection of (a) a club-house in Fox-street, Johannesburg, for the Johannesburg Club; (b) a new school building at Jagersfontein, Orange River Colony; (c) a post-office at Rooopoot, and (d) certain internal structural alterations at the Port Elizabeth Public Offices. In Johannesburg, during the fortnight ended May 15, 147 plans of proposed buildings were approved. The estimated cost of the buildings is 1,09,900, of which amount 580, is for drainage work. Among the plans is one for a new building for Messrs. Abbott & Co., to be erected in Kerik and Von Wellig streets, at an estimated cost of 18,000. The new Harbour Board Offices in Port Elizabeth were lately inaugurated with some ceremony. The Mayor proposed the health of the architects (Messrs. Jones & McWilliams) and the builders (Messrs. J. Kohler & Sons). Mr. Victor T. Jones and Mr. C. Kohler suitably responded.

**CEMENT MANUFACTURE ABROAD.**—Of the numerous reports from His Majesty's consuls abroad which have reached the Foreign Office within the last fortnight, several contain more or less interesting references to the cement trade. Subjoined are summaries of some of these references:—

**Warsaw.**—The sale of cement was considerably smaller in 1904 than in the previous year, having fallen from 1,000,000 barrels to about 700,000 barrels. The reasons why the cement industry did so badly in 1904 were that large Government orders were cancelled when the Russo-Japanese war broke out, and partly that the execution of the different building enterprises proposed by the Municipality of Warsaw were postponed. In consequence some cement works were obliged to close completely, and the others worked only for a few months in the year.

**Stettin.**—The year 1904 was not a very successful one for the cement industry. The very low prices ruling caused a considerable increase in the sales, but, although the demand remained good, prices did not revive owing to over-production in certain parts of Germany. The total export of cement from Stettin by sea in 1904 was 88,869 tons, as compared with 89,955 tons in 1903. The quantity shipped to the United Kingdom was 171 tons in 1903, and 135 tons in 1904. The small decrease in the exports is said to be due to the improvement in the cement produced in other countries, which are now in a better position to supply their own demand. The export to the United States of America is also handicapped by the high import duty levied on cement. The following are the cement factories in this district:—"Kraft" Portland-Cement-Fabrik (Eisenwerk Kraft), Stettin; Kratzwiesch; "Commerzische Portland-Cement-Fabrik 'Quistorf'" Stettin; Portland-Cement-Fabrik "Stern," Stettin; Stettin-Bredow Portland-Cement-Fabrik, Stettin-Bredow; Stettiner Portland-Cement-Fabrik, Stettin-Zillchow; Stettiner Portland-Cement and Thonwaren-Fabrik "Merkur," Stettin. The cement produced at the Kraft Ironworks is composed of slag and previously freed from manganese and other impurities; it is then mixed with lime, formed into bricks, burnt like "Portland" cement, and finally ground. The slag cement fetches the same price as "Portland," which it equals in quality.

**Bilbao.**—At one time Portland cement was the only kind known and employed in these parts, but it has now almost disappeared from the market, being only in demand for works requiring special strength and consistency. It has been replaced by the French, Belgian, and German productions, owing to their lesser cost; the difference in price compensating for the better quality of the British article. The Bilbao harbour and sanitary works, which made use of considerable quantities of Portland cement, also supplied their wants from Boulogne, owing chiefly to the contractors being of French nationality, and engineers found it to be of sufficiently good quality for their purposes. Various consumers bring to the port Portland cement *en vrac* from Marseilles from Pavin de la Farge for the paving of entrance halls and stairways, and for enamelling baths, etc., but the largest quantity comes in from Belgium, and is said to be sent in barrels, not alone imitating the size and weight of the British article, but bearing also British labels, and costing 3 to



4 pesetas less. Great use is now made of hydraulic lime manufactured in this province for works not requiring special care or duration, and it is sold at 2 pesetas 15 c. (1s. 3d.) per bag of 69 kilos (152 lb. English). One of the firms making hydraulic lime now produce Portland cement which is said to be of a fair quality, and it sells its total output—about 15,000 tons a year. The production of hydraulic cement in Guipuzcoa by the ten existing works varies from 85,000 to 90,000 tons per annum; the amount brought into Bilbao in 1904 reached 9,126 tons. The only other places in Spain producing hydraulic cement are Barcelona and the Balearic Islands. Bilbao architects are introducing "Ciment Armé" for building purposes, and a French company is in existence here solely engaged in this business. The quantities of Portland cement imported from France and Belgium in 1904 were, respectively, 2,279 and 5,662 tons.

Iceland.—Cement has been imported to Iceland as follows:—

	From Denmark.	From United Kingdom.
Year.	Barrels.	Barrels.
1899	1,002	285
1900	722	197
1901	1,476	155
1902	1,942	158

The figures for 1903-4 have not yet been ascertained.

### MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Arthur Stratton, architect, has removed his offices from 2, Vernon-place to 16, Hart-street, Bloomsbury-square, W.C.—Mr. John C. Stockdale, architect, has removed his offices from 2, Vernon-place to 16, Hart-street, Bloomsbury-square, W.C.—Mr. Geoffrey Lucas, architect, has changed his London address from 2, Vernon-place to 16, Hart-street, Bloomsbury-square, W.C.; and also has an office at 23, Bram-street, Hitchin (Herts).—Mr. Howard Ince, architect, has removed his offices from 35, Lincoln's-inn-fields, Bedford-street, W.

PORTLAND CEMENT WORKS IN CATANIA.—Mr. Elford, British Vice-Consul at Catania, writes:—A company has been formed (capital 6,000*l.*) for the manufacture of Portland cement, there being an abundance of the necessary materials—viz., limestone and clay—in the neighbourhood. The kilns are on the Dietrich system. The mills, which are of the most modern description, are from Germany, and the motive power, consisting of two gas engines, each of 80 h.p., using anthracite gas, are of Italian manufacture. The production will be about 30 tons a day, which can be increased if necessary.

WESTERN OPHTHALMIC HOSPITAL, MARYLEBONE-ROAD, AND LILLESTON MANOR.—The Committee of the hospital have appointed Mr. W. Harvey to prepare plans and designs for the rebuilding of the hospital in Marylebone-road at the corner west of Circus-street. The hospital was established there, in what was then the New-road, in 1856. The existing building consists of an old house which by one account had been the later manor-house of Lilliston, corrupted into Lissan. Lilliston, covering five hides in Ossulton hundred, is cited in the Domesday Survey. Lilliston to the Knights Hospitaller of St. John of Jerusalem; in 1512 Prior Docwra granted a lease, which did not include Lissan-green, for fifty years to John and Johan Blennerhasset of a farm—"parcel of the manor of Lilestone"—270 acres in extent, which their executors sold in 1832 in reversion to Lord Chief Justice Sir William Portman, Bart., who afterwards acquired the fee-simple of the land, which now forms the estate in Marylebone parish of Lord Portman. The place-names enumerated in Prior Docwra's lease are well worthy of the notice of students of London topography. The Order of St. John having been suppressed, the greater part of the manor was granted in 1548 to Lord Willoughby and Thomas Heneage, from whom it eventually passed to Capt. Lloyd, who sold the property in several lots in 1792. In June, 1891, the Borough Council proposed to take a site of 28,000 ft. superficial between Circus and Wyndham streets, Marylebone-road, for a county hall.

PHENIX PARK, DUBLIN.—It is stated that the Commissioners of Woods and Forests have purchased a tract of land which extends over a distance of about 14 miles along the river Liffey, and abuts upon Phoenix Park. The purchase will preserve the view of the river from the park, and will form a considerable addition to the latter.

FOREIGN PATENT SPECIFICATIONS.—The Patent Office has issued a second edition of the Key to the Patent Specifications of France, Germany, Austria, Norway, Denmark, Sweden, and Switzerland, which are in the library of the Patent Office. It is published at the Patent Office, 25, Southampton-buildings, W.C.

INCORPORATED CEMENT BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday, the 22nd ult., at 7, Dean's-yard, Westminster, Lieut.-Colonel the Hon. G. H. W.

Windsor Clive in the chair. Grants of money were made in aid of the following objects, viz.: The Building new churches at Borough Green, Kent, 75*l.*; Good Shepherd, near Wrotham, Kent, 75*l.*; and Port Tennant, St. Stephen, near Swansea, 170*l.* for the first portion; towards rebuilding the Abbey Church of S. Mary the Virgin, Nuneston, Warwickshire, 120*l.*; and Nevins, S. David, Carnarvon, 80*l.* in lieu of a former grant of 60*l.*, and towards enlarging or otherwise improving the accommodation in the churches of Felling-on-Tyne, Christ Church, Co. Durham, 40*l.*; Great Ellingham, S. James, near Atleborough, Norfolk, 25*l.*; and Little Ilford, S. Michael and All Angels, Essex, 120*l.*, making in all 370*l.* Grants were also made from the Special Mission Buildings Fund towards building mission churches at Obesterton, S. Andrew, near Cambridge, 15*l.*; Chelsfield, Kent, 25*l.*; and Tudhoe Grange, The Venerable Bede, Co. Durham, 30*l.* The following grants were also paid for works completed, 1904: Barton Mills, S. Mary, Suffolk, 30*l.*; Poulridge, S. Michael and All Angels, Norfolk, 100*l.*; Barton Mills, S. Mary, Suffolk, 30*l.*; Poulridge, S. David, Pembro, 25*l.*; Puse Cause, S. Peter, near Sherborne, 10*l.*; and Brondesbury, S. Anne, Middlesex, 22*l.* In addition to this the sum of 204*l.* was paid towards the repairs of eleven churches from trust funds held by the society.

ÉCHAILLON STONE AND MARBLE.—Mr. Lewis, British Vice-Consul at Grenoble, France, writes:—An important and growing business is being done here in Échailion marble and stone. The quarries have supplied lately several important contracts for hotels and other buildings in London. The quality is very fine and durable. This material has been used for the decoration of the Paris Opera House and for a considerable number of statues throughout France, as well as public buildings. The industry is likely to grow in importance.

LIBRARY, YORK MINSTER.—On June 19 was reopened the old library which had latterly served as the singers' school and for the storage of muniments appertaining to the Cathedral and the Consistory Court. Fifty years ago the books were housed in a chapel of the old palace; the school having been recently removed, the singing-room was repaired and refitted for the reception of the valuable collection of Bibles owned by the Dean and Chapter. The building will henceforth be known as the Bible Library, to which access will be afforded to students.

CAUSE HISTORICAL SOCIETY, ST. ALBANS.—For the exhibition at St. Albans some interesting exhibits have been classified and arranged by Mr. St. John Hopa, comprising the silver-gilt paten, a very early specimen, lent by the Dean and Chapter of Worcester, and the fragments of Saxon crosses. The Reverend F. W. Galpin lends his collection of old musical instruments at one time used in parish churches; the crozier-head, chalice, and ring found in the tomb of Bishop Richard de Carew, of St. David's, some absolute crosses from the Bury St. Edmund's Museum, and the Sceptre Astion and Chipping Charnock crosses, with the Dunstable pall, are also contributed.

YORKSHIRE FEDERATION OF MASTER BUILDERS.—The Yorkshire Federation of Master Builders met at Sheffield on the 23rd ult., under the presidency of Mr. A. Moulson, of Bradford. Other members present were:—Aldermen Judge (Walsley), Councillor Dawson (Huddersfield), Councillor England (Barnsley), and Messrs. P. Rhodes, W. T. Ledgard, J. Atkinson, G. W. Wilson, and J. Davidson (Leeds), with representatives from Halifax, Dewsbury, Huddersfield, and Sheffield. Mr. J. Bignin (Sheffield) was presented with a gold snuff-box, a carved oak timepiece, and an illuminated address, to mark appreciation of services rendered to the Federation. About ninety members of the Federation journeyed to Grindleford, via Froggatt Edge, tea being provided at the Maynard Arms Hotel.

PROPOSED MUNICIPAL BUILDINGS, SMETHWICK.—On the 16th ult., Mr. W. A. Ducat, on behalf of the Local Government Board, held an inquiry at the Public Buildings, Smethwick, into the application of the town council to borrow 15,000*l.* for the erection of the new municipal buildings on a site adjoining the Victoria Park, at Bearwood Hill. The Town Clerk (Mr. W. Shakespeare) explained that the present council chamber was small, and abutted upon the main road, so that the business of the borough had to be conducted in a room too small for the purpose. The estimated cost of the new building was 17,000*l.* The details of the scheme were explained by Mr. F. J. Gill, the architect.

ELECTRICITY UNDERTAKING, SOUTH SHIELDS.—An application by the South Shields Corporation for sanction to borrow 14,625*l.* for the purpose of carrying out certain extensions to the electricity works at Holborn, to meet the requirements of the electric tramway service, was the subject of a Local Government Board inquiry, conducted by Mr. M. K. North, M.Inst.C.E., on the 20th ult., at the Town Hall, South Shields. The Town Clerk (Mr. J. Moore Hayton) said that the object was to place additional plant in the existing power station, so that it might be available for the supply of electric energy for the

purposes of the tramways which the Corporation were constructing. The estimated cost of the work in the electrical engineers' department was 14,425*l.*, and there would be, in addition, a little architectural work, to cost, it was estimated, 1,200*l.*, mainly for the foundations, the engine, dynamo, the construction of the switchboard, etc. Mr. James Albert Cawston, Barrister-at-Law, gave a detailed explanation of the work which had been carried on, the progress which had been made since the commencement of the electricity undertaking, and the additional it was proposed to make. The inquiry was afterwards adjourned.

PULPIT, EAST BUDLEIGH, DEVONSHIRE.—East Budleigh Church, dedicated to All Saints, and of XVth century foundation, contains a pulpit which was designed by Mr. G. H. Fellowes-Pryne, architect, of London, in 1894, and was placed there in that year as a memorial to the late Mr. R. H. Lipscombe, of that parish. It was made by Messrs. Harry Hems & Sons, of Exeter, who have just completed an additional group for the pulpit, under the direction of Mr. Pryne. It is modelled and carved in high relief, and is a representation of St. Dunstan, the Bishop, preaching in the Wildernesse. The same firm have also made two angels, each in an attitude of adoration. These additions were put in place on the Vigil of the Feast of Nativity of St. John the Baptist.

CARPENTERS' COMPANY.—At an examination in carpentry and joinery, held at the Carpenters' Hall on June 14 to 17, *Silver Medals* were awarded to the following candidates: Caleb S. Hill and Wm. Ambrose; *Bronze Medals* were awarded to Wm. E. Saunders, Frank Leeks, J. Edw. Jones, Wm. F. Grove, and Sydney Foley; *First-Class Certificates* to Hy. Parnell, C. H. Hancock, John McEwen, W. T. Smith, E. J. Girdler, Walter Harvey, E. G. Clayton, C. Shaver, Chas. A. Brown, E. Kerridge, E. Eustace, and Alf. John; *Second-Class Certificates* to Jas. C. Finch, L. P. Roberts, E. Spark, F. K. Martin, E. E. Syms, A. P. Tribe, C. H. Simons, A. J. Smith, J. E. Sudde, J. R. J. Savage, J. H. Thomas, John Cordiner, J. H. Wood, A. H. Smith, J. F. Fox, H. G. Packer, A. Waddington, Pyle, H. A. Fox, J. Fox, F. W. Barnacott, H. G. Pritchard, and Jas. Raymond.

THE NEW TECHNICAL DICTIONARY.—In the compilation of the "Technolexicon" of the Society of German Engineers, a universal technical dictionary in German and French, commenced in 1901, about 2,000 names and individual collaborators at home and abroad are assisting at present. Up to now 2,700,000 word-cards have been collected. To these will be added the hundred thousands of cards that will result from the working-out of the original contributions not yet taken in hand. The contributions have been called in since Easter, 1904, and most of them have already come in. The Editor-in-Chief will be pleased to give any further information wanted. Address: "Technolexicon," Dr. Hubert Jansen, Berlin (NW. 7), Dorotheenstrasse 49.

CEMENT IN SWEDEN.—According to Mr. Consul Macgregor's annual report, there are in Sweden five cement factories which during 1904 sold altogether 753,000 barrels, each weighing about 374 lbs. net. Of this amount about 126,000 barrels were exported, some of it to South Africa. There is one other cement factory in addition, respecting which no particulars are forthcoming. The import during 1904 was 59,000 barrels, and this material is now used about twice as much as it was only ten years ago. Water power is much used in Sweden, and cement is employed for dams and turbine houses, which formerly were built of granite. During recent years almost all such work has been constructed of concrete. It has well withstood the influence of frost even in the colder districts of the country, but parts of such buildings as are exposed to shocks from floating ice blocks are still faced with granite.

### CAPITAL AND LABOUR.

THE EDINBURGH JOINERS' STRIKE.—The strike of the Edinburgh joiners, which has lasted for over fourteen weeks, has been brought to an end. This result is largely due to the efforts of Lord Provost Sir Robert Cranston, whose proposals have been accepted by the parties. In accordance with previous arrangement, the conference between delegates of the employers and the strikers—which was adjourned to admit of delegates consulting those whom they represented—was resumed on the 27th ult., in the Council Chambers—the Lord Provost presiding. As formerly, the proceedings were conducted in private. It is understood that after a few minutes' talk, both masters and employees heartily agreed to accept the proposals made by the Lord Provost. This brings the strike to an end. The differences which existed were in the first instance as regards wages, and in the second as regards the period of the agreement between masters and operatives. The agreement is for four years, expiring on April 16. The employers thought this an unfair time for them, and they further desired to reduce the wages to 8*d.* per



hour. The proposals of the Lord Provost were that wages should remain at the present rate of 9d., and that the date of the by-laws be altered from April 15 to June 1; further, that this arrangement should be binding for two years, in order that a fair trial might be given to it by both sides. The following is the text of the agreement signed by the Lord Provost on behalf of the parties:—"The following gentlemen as representing the Edinburgh, Leith, and District Building Employers and Allied Trades Association, viz.:—Messrs. Knox, Kennedy, Calder, Robb, Montgomery, Watson, and Lowrie, and the following gentlemen, representing the Edinburgh and Leith District Joiners' United Trades Committee, viz.:—Messrs. Lawson, Gall, Mowat, Patullo, Yorston, Pringle, and Clazie, met, and the following agreement was come to:—That the time notice be altered from April 15 to June 1 (this notice as stated in Rule 7 of the existing by-laws), and that the wage be fixed at 9d. per hour, this agreement being binding on both parties from now till January 1, 1907."—*Scotsman*.

## Legal.

### ACTION BY A BRICKLAYER.

THE case of Jackson v. Waterhouse came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Mathew, on the 28th ult., on the application of the defendant, for judgment or new trial, and after some verbal judgment at trial before Mr. Justice Walton, without a jury, at the Manchester Assizes.

The plaintiff, a bricklayer, of Chisworth, sued the defendant, Mr. Joseph Waterhouse, of the Shuttloworth Bleach Works, near Manchester, to recover damages in respect of personal injuries caused through the alleged negligence of the defendant and his servants. It appeared that in January, 1904, the defendant was known to erect at his works certain apparatus known as "Green's Economisers," and he entered into a contract with the plaintiff whereby the latter agreed to do all the necessary bricklayer's work.

The plaintiff alleged that on February 15, while assisting the defendant to lift an iron plate, weighing between 8 and 10 cwt., by means of tackle supplied by the defendant, a part of the tackle broke, and plaintiff's hand was crushed by the falling iron. As a result the plaintiff lost the use of his hand, and had been unable to follow his occupation as a bricklayer. At the trial the jury found that under the contract it was the duty of the defendant to supply the tackle; that the eye-bolt—the part of the tackle which broke—was unfit for the purpose for which it was to be used; that the defendant could have known this had he made a reasonable careful examination of the bolt; and that the defendant's son told the plaintiff that the bolt was fit for use for the purpose of lifting the iron plate. The jury assessed the damages at £176, and on their findings his lordship entered judgment for the plaintiff for that amount. The defendant now appealed on the ground that there was no evidence to support the finding of the jury.

In the result their lordships, without calling upon counsel for the respondent, dismissed the appeal with costs.

Mr. J. Oswald Evans appeared for the appellant; and Mr. Taylor, K.C., and Mr. Ambrose Jones for the respondent on the appeal.

### PATENTS OF THE WEEK.

#### APPLICATIONS PUBLISHED.\*

12,325 of 1904.—R. M. RYAN: Domestic Fire-grate.

This invention consists of a round metal grate, with a single or double axle, which revolves in friction wheels or ball bearings, or both. The axle is supported by a vertical plate behind the grate, or on a stand with legs projecting in front sufficiently far to steady the grate.

12,849 of 1904.—D. M. NESBIT: Ventilators.

This invention relates to ventilators of the type wherein an air duct leads from the exterior of a building, through the wall thereof, to the interior, the outer end or entrance to the duct being covered by protecting grating and the inner end or exit of the duct being covered by a louvre grating by which the air current may be regulated. The invention consists in providing the inner end of the duct with a removable panel which is preferably combined with a pan so that when the panel is removed the duct can be cleaned out and the pan carries away the accumulated rubbish. In carrying out the invention according to one modification the inner end of the duct is partly covered with the usual louvre grating, and partly with a cast-iron panel. The latter is disposed below the former and made removable. The iron framing is preferably formed with an angled flange lip, or is grooved so as to receive and retain the upper edge of the panel when the

latter is slipped in place. It can then be readily removed to facilitate cleaning of the duct by simply tilting it slightly so as to allow the upper edge to clear the lip.

14,502 of 1904.—G. P. WALLIS and J. R. BROADLEY: Brick-making Machinery.

This invention relates more especially to what is usually termed a combination brick-making machine where three processes are combined in one, such as pugging the clay, moulding the clots, and finally pressing the moulded clots into bricks. According to the invention the pistons in the cylinder moulds are placed in such a way that before the piston is allowed to move, the cylinder mould is directly opposite the pugmill opening. The clay consequently flows evenly in a continuous column into the cylinder mould, and thus prevents any curling or lamination. The method of fixing the piston in the proper position in the cylinder may be by means of two arms projecting at each end of the piston. These arms may be held in position by segments fixed to the frame-sides of the machine or to any suitable part of the machine. As the cylinder revolves and the proper position is reached, the projecting arms of the piston slide on the segments in such a way as to keep the top of the piston in line with the periphery of the cylinder, no mould being formed until the piston is allowed to move. At the completion of the movement of the cylinder, the segments keeping the piston in its place are terminated, allowing the piston free movement.

1,297 of 1905.—A. A. FERRIER: Window and like Sashes or Frames.

A support for the glass of greenhouses or other sashes, windows, doors, and the like, consisting of a bar or bars of T or C-cross section, made of ordinary or armoured glass, porcelain, or like inoxidising translucent or non-translucent material, adapted to be supported from the outside, say, for instance, by clamps engaging with beads on the support, whereby the exposed surface, on one side, consists solely of glass, porcelain or like inoxidising and readily cleansing material.

3,073 of 1905.—B. E. BECHTEL: Brick, Block, or Tile Cutter.

A brick, block, or tile cutter, consisting in the combination of a travelling-table comprising loosely-joined sections, each section having reel operating means adjacent its rear portion, and a cutting reel having cutting wires, and engaged and rotated by said means, whereby each wire performs its cut over an intermediate portion in the length of a section, preferably so that each brick rests on two sections and bridges the point between the same, in such wise that each brick projects forwardly on to the section in front for a distance less than one-half the length of the brick.

6,290 of 1905.—A. LILLIDGE: Stays such as are used with Casements, Fanlights, and the like.

A stay such as used with a casement, fanlight, or the like, of which the tongue of the connecting-piece which is pivotally connected with the stay bar or of which the tongue of the stay bar which is pivotally connected with a jaw of the connecting-piece, as the case may be, is strengthened by a portion of the connecting-piece or of the bar which is of a greater width than the tongue, and which passes from the body of the connecting-piece or bar partially round the tongue and the forward edge of which is utilised as the rest for the bar, or otherwise to stop the downward movement of the bar below a predetermined point.

15,957 of 1904.—A. BAYAN: Floor Tiles for Bacteria Beds, Filter Beds, and analogous purposes.

A floor tile or drainage conduit section for sewage bacteria beds, filter beds and the like, consisting of an arched top (with or without end spacing studs or projections) combined with an integral or attached bottom or floor slab, which is extended beyond one or both ends of the top part so as to provide a continuous bottom, channel, or gutter, and for drainage slots or clearances between the tops of the sections when a series of them are laid together and to end.

314 of 1905.—E. B. JARVIS: Reinforced Concrete.

A class for concrete structure comprising a plurality of bars of different lengths located one above the other and having obliquely set ends, the shortest of said bars being located in the middle of the other bars in combination with slotted plates through which the different bars extend, located in proximity to the obliquely set ends, the slotted plates having a comparatively deep portion extending underneath the lowermost bar.

476 of 1905.—B. SINGER: Composition of Matter for Laying and Absorbing Dust.

This invention relates to a substance adapted to be placed upon the floors of rooms and other surfaces for laying and collecting or absorbing the dust thereon preparatory to and during sweeping. The invention consists of a composition of matter containing a suitable oil or

oily substance whose office is to absorb or collect the particles of dust, a vehicle or carrier for absorbing the oil, and for which the oil will have a greater affinity than it has for the floor or surface with which it comes into contact, and which carrier will therefore retain the oil and prevent it from damaging such surfaces, a non-freezing absorbent whose office is to collect the oil absorbent into small or minute bodies and at the same time prevent the entire mass from freezing at ordinary atmospheric temperatures as well as itself serving as an absorbent for the oil. Such principal ingredients of the composition are improved by the addition of clean sand, preferably white silica, about 60 per cent. of which is employed, and which serves to cut the mass or break it up and prevent the small bodies from adhering together, and is still further improved by the addition of sawdust, which intermingles with the other particles and gives body to the mass, reducing its specific gravity or weight and better adapting it to be swept across the floor.

1,824 of 1905.—J. W. HOWORTH (BUILDER BROS.) Edge Runners and Moulding Presses.

A machine comprising an edge runner mill and one or more moulding presses, the arrangement being such that the mould press is mounted under a collecting-plate secured on the vertical shaft of the edge runner mill, and has a common horizontal main shaft which transmits its motion both to the edge runner mill and to the mould press by means of gearing interposed between the main shaft and the vertical shaft, as well as between the latter and mould press, or between the main shaft on the one hand and the edge runner mill or mould press respectively on the other hand, and an arrangement so that the gears for transmitting the motion of the main shaft to the edge runner mill or mould press respectively are arranged so that they can be put out of engagement in order to be able to drive each machine separately.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum (42 numbers) FREE BY POST. To all parts of Europe, America, Australia, New Zealand, India, China, Japan, etc., 20s. per annum. Remittances payable to J. MORRIS, should be addressed to the Publisher of "THE BUILDER," Outhwaite-street, W.C.

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### SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

June 15.—By DEERWALT & WATSON (at Reading).	
Speen, Berks.—"Woodspen Farm," 168 a. 0 r. 34 p. f., y.r. 130s. ....	£4,000
June 15.—By MADDOCK, MIDDS & CO. (at Kessingland).	
Kessingland, Suffolk.—Freehold farmhouse and 17 a. 0 r. 22 p. f. ....	440
"Calves Pightle," 2 a. 1 r. 18 p. f. ....	118
By T. E. AYRE & Co. (at Dulverton).	
Moorbath, Devon.—"Sharp Close," 10 a. 8 r. 10 p. f. ....	430
"Whitehall Farm," 70 a. 1 r. 11 p. f. ....	2,340
"Yackhill Enclosures," 33 a. 8 r. 15 p. f. ....	1,170
"Gilbert's Cottage" and 1 a. 0 r. 19 p. f. ....	150
"Hawkridge Farm," 44 a. 1 r. 22 p. f. ....	425
June 16.—By STEVENSON & ALEXANDER (at Exeter).	
Tiverton, Devon.—The Cheviethorne Barton Estate, 893 a. 1 r. 85 p. f. ....	21,000
By N. EASTON & SON (at Hull).	
Elloughton, Yorks.—"Elloughton Lodge" and 5 acres, f. ....	2,100
Cottingham, Yorks.—A freehold close, 11 acres f. ....	760
By J. & W. HEATHCOTE (at Derby).	
Breadsall, Derby.—"Priory Farm" and 62 a. 1 r. 13 p. f. ....	5,000
June 17.—By WHITE, BERRY, & TAYLOR with FRY & CO. (at Colchester).	
Little Clacton, Essex.—"Cooke's Green Farm," 214 a. 2 r. 38 p. f. and c. y.r. 125s. ....	2,500
By J. & W. HEATHCOTE (at Ashbourne).	
Ballidon, Derby.—"Ballidon Moor Farm," 273 a. 1 r. 11 p. f. (including timber)....	3,850
By J. & R. EYE (at Bedford).	
Wootton, Beds.—"Wootton Great Farm," 269 a. 1 r. 5 p. f. ....	4,000
"Acres Field," 27 a. 3 r. 14 p. f. ....	950
Marston, Beds.—Freehold cottage and 0 a. 1 r. 21 p. f. ....	140
June 19.—By JOHN BOTT & SONS.	
Herne Hill.—180, Kallton-rd., N.E. 61 yds., g.r. 6d., f. ....	325
By H. & R. L. COBB.	
West Thurrock, Essex.—"Davy Down Farm," 80 a. 2 r. 30 p. f., p. ....	2,000
Meopham, Kent.—"Davidson's Farm," also 100 a. 2 r. 30 p. f., p. ....	2,400
"Rose Mount," 113 a. 0 r. 24 p. f., p. ....	310
"Priesthood Farm," 7 a. 2 r. 15 p. f., p. ....	280
"Whiteleaf Enclosure," 10 acres, f., p. ....	7,000
Hoo St. Werburgh, Kent.—"Belmole Farm," 193 a. 3 r. 4 p. f. ....	2,600
"Tunbridge Hill Farm," 130 a. 1 r. 20 p. f. ....	
By E. J. GALE.	
Mayland, Essex.—"Nipsell's Farm," 616 a. 1 r. 15 p. f., p. ....	4,675
By GILBERT & HOW.	
Finabury Park.—140, Stroud Green-rd., N.E. 624 yds., g.r. 7d., c.r. 6d. ....	495

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



By NICHOLAS, DENYER, & CO. Balham—59, 59A, 61, and 61A, Dornton-rd., u.t. 92 yrs. f. p. 174, y.r. 140l.	By MADDISON, MILES, & MADDISON (at Yar- mouth). Potter Holgham, Norfolk—"The Hall Farm," 42 acres, f. p. 174, y.r. 140l.	61,825	840	8,000
By WREATHAM & GREEN. South Kensington—87, Thurloe-pk. (s.), f. y.r. 200l.	By J. BARNES & TROOME. June 22—1, 18, and 15, Milford-road, u.t. 84 yrs. g.r. 22, w.r. 142, 18s.	4,800	380	1,060
By WILKINSON, SOX, & WELCH (at Brighton). Brighton—87, Beaconsfield-villas, and 3 of an acre, f. p. 174, y.r. 140l.	By J. BARTON & CO. Old Ford—2, Kenilworth-rd., f. w.r. 40l. 6s. New Cross—86, Drakefield-rd., u.t. 59 yrs., g.r. 6l. 6s., g.r. 40l.	1,350	455	415
June 20—By BARONET & SON. Wallingham, Surrey—"Melrose" and a 1 of an acre, f. p. 174, y.r. 140l.	By H. J. BILLY & SON. Bethnal Green—198, 200, 204, and 206, Green-st. (s.), f. y.r. 132l. 10s.	900	1,935	450
Westhall-rd.—No. 478, u.t. 51 1/2 yrs. g.r. 75l.	Hackney—12, 12, 14, and 15, Watling- ton-gate, u.t. 61 yrs., g.r. 17l. 10s., w.r. 104l.	1,200	2,000	215
By DAVID BURNETT & CO. Hackney—62, Gore-rd., u.t. 48 1/2 yrs., g.r. 7l. 5, Speedbush-rd., u.t. 37 yrs., g.r. 5l. y.r. 32l.	Wallingham Cottages, f.g.r. 10l., reversion in 74 1/2 yrs.	760	380	2,105
Sydenham—11, 12, 13, 14, and 15, Watling- ton-gate, u.t. 61 yrs., g.r. 17l. 10s., w.r. 104l.	Kent House-rd., f.g.r. 10l., reversion in 74 1/2 yrs.	250	555	245
Watlingham Cottages, f.g.r. 10l., reversion in 74 1/2 yrs.	Caledonian-rd., f.g.r. 10l., reversion in 74 1/2 yrs.	245	460	825
By DIBDENHAM, TWEED, & CO. Cricklewood—6, 7, and 8, Ashford-rd., u.t. 90 1/2 yrs., g.r. 14l. 5s., y.r. 104l.	By WALTER EATON. Brondebury—82 to 88 (even), Hanover-rd. (carriages), u.t. 90 1/2 yrs., g.r. 28l.	800	1,150	340
By H. S. HAWLEY & CO. Begon's Park—3, Cumberland-gate, and 3, 3 Cumberland-mews, u.t. 20 yrs., g.r. 38l. a.r. 180l.	By G. HEAD & CO. Camden Town—79, James-st., u.t. 44 1/2 yrs., g.r. 10l., g.r. 32l.	1,150	340	180
By E. H. HENRY. Battersea—31, Mayrick-rd., u.t. 42 yrs., g.r. 4l. w.r. 15l.	By E. H. HENRY. 20, Knox-rd., u.t. 42 yrs., g.r. 4l. 10s., w.r. 31l. 4s.	165	645	900
By MABLEY & CO. Chiswick—127, High-rd. (s.), g.r. 36l.	By A. H. TIGHER & CO. Paddington—7, Bishop-rd. (s.), and 1, Shel- don-st. (s.), u.t. 33 1/2 yrs., g.r. 40l., y.r. 22l.	400	1,150	125
By ROBERT CHAPMAN, & THOMAS. Belgrave—55, Elizabeth-st. (s.), a profit rental of 91l. 8s. 4d. for 18 yrs.	By ROBERT CHAPMAN, & THOMAS. Chelsea—20, Sladburn-st., u.t. 49 yrs., g.r. 4l. 10s., w.r. 22l.	155	380	4,210
Chelsea—20, Sladburn-st., u.t. 49 yrs., g.r. 4l. 10s., w.r. 22l.	By STRAKER & SON (at Aberystwyth). Llanvihangel Crucorney, Mon.—"Pendyre Farm" and "Sun Meadows," 124 a. 0 r. 30 p. f.	400	1,150	3,000
By LANCORING & PARKMAN (at Ashford). Woodchurch, Kent—"Hendon" Farm, and "Belhurst" 165 a. 3 r. 26 p. f., y.r. 140l.	By LANCORING & PARKMAN (at Ashford). Woodchurch, Kent—"Hendon" Farm, and "Belhurst" 165 a. 3 r. 26 p. f., y.r. 140l.	780	4,000	1,367
By LANCORING & PARKMAN (at Ashford). Woodchurch, Kent—"Hendon" Farm, and "Belhurst" 165 a. 3 r. 26 p. f., y.r. 140l.	By LANCORING & PARKMAN (at Ashford). Woodchurch, Kent—"Hendon" Farm, and "Belhurst" 165 a. 3 r. 26 p. f., y.r. 140l.	3,350	275	380
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	380	875	280
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	280	190	500
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	415	5,000	705
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	480	1,800	525
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	1,130	1,800	525
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	4,000	15,000	970
By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	By J. C. PLATT (at Hammersmith). Barnes—15, Lillian-rd., f. w.r. 38l. 2s.	380	380	625

## MEETINGS.

SATURDAY, JULY 1.

Edinburgh Architectural Association.—Visit to

Inchcolm.

MONDAY, JULY 3.

Royal Institute of British Architects (Special General

Meeting requisitioned by Fellows and Associates).

By-law 60, on the requisition of Messrs. S. B. Russell,

Alfred H. Hart, T. Edwin Cooper, Herbert Wiggle-

worth, Alfred W. S. Cope, Wm. Blackett, J. E.

Lanchester, J. E. Newberry, Herbert W. Wills, and John

Anderson—to discuss the following amendments, pro-

posed by the architects' committees passed at the meeting

of June 5, viz. Clause 14 to read as follows:—"In all

works costing an estimated sum of 25,000l. and upwards

three assessors shall be appointed unless there are in-

surmountable objections. As stated above, the Presi-

dent of the Royal Institute of British Architects is

always ready to advise on this or other points." In the

case of works of considerable magnitude it is desirable

that three assessors should be appointed. As stated above,

the President of the Institute is always ready to advise

on this or other points." The clause as to scale of

charges in the original draft to be reinstated in the

following form:—"The usual R.I.B.A. scale of charges

for assessing competitors is at the minimum rate of

one guinea plus 5 per cent. upon the estimated cost

of the proposed building." 8 p.m.

WEDNESDAY, JULY 5.

Royal Archaeological Institute.—A Short Note on

Chaplow Parish Church, by Mr. Charles Lynam, F.R.S.

4 p.m.

Institute of Sanitary Engineers, Ltd.—Election Com-

mittee. 3.30 p.m. Organising Committee. 5 p.m.

FRIDAY, JULY 7.

Royal Institute of British Architects.—The President's

"At Home." Exhibition of Decorative Art. 3.30 to 11.

SATURDAY, JULY 8.

Northern Architectural Association.—Students' Sketch-

ing Club Excursion.

Edinburgh Architectural Association.—Annual Excur-

sion to (1) Dunkeld Cathedral, (2) Muriel Castle, and

(3) Stobhill.

## PRICES CURRENT OF MATERIALS.

\*.\* Our aim in this list is to give, as far as possible, the

average prices of materials, not necessarily the lowest.

quality and quantity of materials affect prices, and

which should be remembered by those who make use of

this information.

BECKES, &amp; Co.

# s. d.

Hard Stocks..... 1 0 0 per 1000 alongside, in river.

Rough Stocks..... 1 16 0 " " " "

Bricks..... 2 2 0 " " " "

Facing Stone..... 2 2 0 " " " "

Shippers..... 2 2 0 " " " "

Flintons..... 1 7 0 " " at railway depot.

Red Wire Cris..... 1 14 0 " " " "

Best Firebricks..... 3 12 0 " " " "

Best Red Pressed..... 5 0 0 " " " "

Rough Facing..... 5 0 0 " " " "

Best Blue Pressed..... 4 2 6 " " " "

Staffordshire..... 4 2 6 " " " "

Do. Bulnoss..... 4 7 6 " " " "

Best Stourbridge..... 4 0 0 " " " "

Fire Bricks..... 4 0 0 " " " "

GLAZED BRICKS.

Best White and..... 12 0 0 " " " "

Ivory Glazed..... 11 0 0 " " " "

Stretchers..... 12 0 0 " " " "

Headers..... 11 0 0 " " " "

Quoins, Bulnoss..... 15 0 0 " " " "

Quoins, Staffordshire..... 15 0 0 " " " "

Double Stretchers..... 16 0 0 " " " "

Double Headers..... 16 0 0 " " " "

One Side and two..... 19 0 0 " " " "

Ends..... 19 0 0 " " " "

Two Sides and..... 20 0 0 " " " "

One End..... 20 0 0 " " " "

Slays, Cham..... 14 0 0 " " " "

Turned, Squints..... 14 0 0 " " " "

Second Quality..... 15 0 0 " " " "

White and..... 15 0 0 " " " "

Dipped Salt..... 2 0 0 " " " "

Glazed..... 2 0 0 " " less than best.



## BRICKS, &amp;c. (continued).

Thames and Pit Sand.....	7 0	per yard, delivered.
Thames Ballast.....	5 9	" "
Best Portland Cement.....	27 0	per ton, " "
Best Ground Blue Lias Lime	20 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

## STONE.

BATH STONE—delivered on road wagons, Paddington Depot.....	1 6	per ft. cube.
Do. do. delivered on road wagons, Nine Elms Depot.....	1 8	" "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road wagons, Paddington depot, Nine Elms depot, or Fimlico Wharf.....	2 1	" "
White Basebed, delivered on road wagons, Paddington depot, Nine Elms depot, or Fimlico Wharf.....	2 2	" "

Ancaster in blocks.....	1 1	per ft. cube, deld. rly. depot.
Greenhill.....	1 10	" "
Darley Dale in blocks.....	2 4	" "
Red Corsehill.....	2 5	" "
Clochburn Red Freestone.....	2 0	" "
Red Mansfield.....	2 4	" "
YORK STONE—Robin Hood Quality.		
Scrapped random blocks 2 10		" "
6 in. sawn two sides		" "
landings to sizes (under 40 ft. super.)	2 3	per ft. super.
6 in. rubbed two sides		" "
ditto, ditto.....	2 6	" "
3 in. sawn two sides		" "
slabs (random sizes) 0 11		" "
2 in. to 2 1/2 in. sawn one side slabs (random sizes)	0 7	" "
1 1/2 in. to 2 in. ditto, ditto 0 6		" "

## HARD YORK—

Scrapped random blocks 3 0	per ft. cube.
6 in. sawn two sides	" "
landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides	" "
ditto.....	3 0
3 in. sawn two sides	" "
slabs (random sizes) 1 2	" "
2 in. self-faced random	" "
flags.....	0 5

Hopton Wood (Hard Bed) in blocks 2 0	per ft. cube, deld. rly. depot.
" " " 6 in. sawn both sides landings 2 7	per ft. super., deld. rly. depot.
" " " 3 in. sawn both sides landings 1 0	" "
" " " 2 in. do. 0 8	" "

## SLATES.

in. in. £ s. d.	
20 x 10 best blue Bangor	3 2
20 x 12 " "	3 7
20 x 10 " first quality "	3 0
20 x 12 " "	3 15
16 x 8 " "	7 5
20 x 10 best blue Fort-madoc	12 12
16 x 8 " "	6 12
20 x 10 best blue Eureka unfading green	15 17
20 x 12 " "	18 7
18 x 10 " "	13 5
16 x 8 " "	10 5
20 x 10 permanent green	11 8
18 x 10 " "	9 12
16 x 8 " "	6 12

## TILES.

Best plain red roofing tiles	42	0 per 1000 at rly. depot.
Hip and Valley tiles	50	7 per doz. " "
Best Broseley tiles	50	0 per 1000 " "
Do. Ornamental tiles	52	6 " "
Hip and Valley tiles	4	0 per doz. " "
Best Broken red, brown, or brindled do. (Edwards)	57	6 per 1000 " "
Do. Ornamental do.	60	0 " "
Hip tiles	4	0 per doz. " "
Valley tiles	3	0 " "
Best Red or Mottled Staffordshire do. (Peaken)	51	9 per 1000 " "
Do. Ornamental do.	54	8 " "
Hip tiles	4	1 per doz. " "
Valley tiles	3	8 " "
Best "Rosemary" brand plain tiles	48	0 per 1000 " "
Best Ornamental tiles	50	0 " "
Hip tiles	4	0 per doz. " "
Valley tiles	3	8 " "
Best "Hartshill" brand plain tiles, sand faced	50	0 per 1000 " "
Do. pressed.....	47	6 " "
Do. Ornamental do.	50	0 " "
Hip tiles	4	0 per doz. " "
Valley tiles	3	6 " "

## WOOD.

Deal: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10	0
Deal: best 3 in. by 9 in. and 4 in. by 7 in. and 11 in.	13 0	0
Battens: best 2 1/2 in. by 7 in. and 3 in. by 7 in. and 3 in. by 6 in.	11 0	0
Battens: best 2 1/2 in. by 6 in. and 3 in. by 6 in.	10 0	0
Deal: seconds	1 0	0
Battens: seconds	0 10	0
2 in. by 4 in. and 3 in. by 6 in.	9 0	0
2 in. by 4 in. and 3 in. by 5 in.	8 10	0
Foreign Sawn Boards	8 10	0
1 in. and 1 1/2 in. by 7 in.	0 10	0
3 in.	1 0	0

## WOOD (continued).

BUILDING WOOD (continued).		
Pit timber: best middling Danzig or Memel (average specification)	4 10	0
Seconds	4 0	0
Small timber (8 in. to 10 in.)	3 12	6
Small timber (6 in. to 8 in.)	3 0	0
Swedish larch	2 10	0
Pitch-pine timber (30 ft. average)	3 5	0

## JOISTERS' WOOD.

White Sea: first yellow deals, 3 in. by 11 in.	24 0	0
3 in. by 9 in.	22 0	0
Battens, 2 1/2 in. and 3 in. by 7 in.	16 10	0
Second yellow deals, 3 in. by 11 in.	18 10	0
3 in. by 9 in.	17 10	0
Battens, 2 1/2 in. and 3 in. by 7 in.	13 10	0
Third yellow deals, 3 in. by 11 in.	16 10	0
Battens, 2 1/2 in. and 3 in. by 7 in.	11 0	0

Petersburg: first yellow deals, 3 in. by 11 in.	21 0	0
Do. 3 in. by 9 in.	18 0	0
Battens	13 10	0
Second yellow deals, 3 in. by 11 in.	16 0	0
Do. 3 in. by 9 in.	14 0	0
Battens	11 0	0
Third yellow deals, 3 in. by 11 in.	13 0	0
Do. 3 in. by 9 in.	12 0	0
Battens	10 0	0

White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10	0
Do. 3 in. by 9 in.	12 10	0
Battens	11 0	0
Second white deals, 3 in. by 11 in.	13 10	0
Do. 3 in. by 9 in.	12 0	0
Battens	10 0	0

Pitch-pine: thick extra	0 10	0
Under 2 in. deals extra	0 10	0
Yellow Pine—First, regular sizes	44 0	0
Odmonds	32 0	0
Seconds, regular sizes	33 0	0
Yellow Pine odmonds	38 0	0
Kauri Pine—Planks, per cu. yd.	0 3	6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3	0
Small	0 2	6
Wainscot Oak Logs, per cu. yd.	0 5	0
Dry Wainscot Oak, per ft. sup. as inch	0 0	8

Dry Mahogany—Honduras, T. basco, per ft. sup. as inch	0 0	9
Selected, Figury, per ft. sup. as inch	0 1	6
Dry Walnut, American, per ft. sup. as inch	0 0	10
Teak, per load	17 0	0
American Whitewood Planks, per ft. cube	0 4	0

Prepared Flooring, etc.—		
1 in. by 7 in. yellow, planed and shot	0 13	6
1 in. by 7 in. yellow, planed and matched	0 14	0
1 in. by 7 in. yellow, planed and matched	0 16	0
1 in. by 7 in. white, planed and shot	0 12	0
1 in. by 7 in. white, planed and matched	0 12	6
1 1/2 in. by 7 in. white, planed and matched	0 15	0
3 in. by 7 in. yellow, planed and beaded or V-jointed trds.	0 11	0
1 in. by 7 in. do. do.	0 14	0
3 in. by 7 in. white do. do.	0 10	0
1 in. by 7 in. do. do.	0 12	6

6 in. at 6d. to 9d. per square less than 7 in.		
JOISTS, GIRDERS, &c.		
In London, or delivered		
Railway Vans, per ton.		
Roller Steel Joists, ordinary sections	6 0	0
Compound Girders, ordinary sections	7 10	0
Steel Compound Stanchions	9 2	6
Angles, Tees and Channels, ordinary sections	7 10	0
Pitch Plates	7 15	0
Cast Iron Columns and Stanchions including ordinary patterns	6 12	6

## METALS.

Per ton, in London.		
Common Bars	7 10	0
Staffordshire Crown Bars, good merchant quality	8 5	0
Staffordshire "Maxwell" Bars	8 5	0
Mild Steel Bars	8 5	0
Hoop Iron, basis price	8 15	0
"Galvanized	16 10	0
"And upwards, according to size and gauge."		
Sheet Iron, Black—		
Ordinary sizes to 20 g.	9 0	0
" 22 g.	10 0	0
" 24 g.	11 15	0
Sheet Iron, Galvanized, flat, ordinary quality—		
Ordinary sizes—6 ft. by 2 ft. to 2 1/2 ft. by 10 ft.	12 10	0
Ordinary sizes—6 ft. by 2 ft. to 2 1/2 ft. by 10 ft.	13 0	0
" 26 g.	14 0	0
Sheet Iron, Galvanized, flat, best quality—		
Ordinary sizes to 20 g.	15 10	0
" 22 g. and 24 g.	16 0	0
" 26 g.	17 10	0
Galvanized Corrugated Sheet—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 10	0
" 22 g. and 24 g.	13 0	0
Best Soft Steel Sheets, 22 g. by 24 g.	13 15	0
to 5 ft. by 20 g. and thicker	11 0	0
Best Soft Steel Sheets, 22 g. & 24 g.	12 0	0
to 5 ft. by 20 g.	13 0	0
Cut nails, 3 in. to 6 in.	9 0	0
(Under 3 in., usual trade extras.)		

## LEAD, &amp;c.

Per ton, in London.		
LEAD—Sheet, English, 3 lb. and up	15 5	0
Pipe in coils	15 5	0
Soil pipe	15 5	0
Compo pipe	15 5	0
Zinc—Sheet—		
Vieille Montagne	30 5	0
Silesian	30 0	0

## COPPER—

Strong Sheet.....per lb.	0 10	0
Thin	0 11	0
Copper nails	0 10	0
BRASS—		
Strong Sheet.....	0 0	2 1/2
Thin	0 1	4
TR—English Ingots	0 1	4
SOLDER—Plumbers'	0 0	2 1/2
Tinners'	0 0	8
Blowpipe.....	0 0	9

## ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	23d.	per ft. delivered.
fourths	24d.	" "
21 oz. thirds	23d.	" "
fourths	24d.	" "
26 oz. thirds	23d.	" "
fourths	24d.	" "
32 oz. thirds	23d.	" "
fourths	24d.	" "
Fluted Sheet, 15 oz.	24d.	" "
21 oz.	24d.	" "
Hartley's Bell Plate	24d.	" "
" " " "	24d.	" "
" " " "	24d.	" "

## OILS, &amp;c.

per gallon		
Raw Linseed Oil in pipes	£ s. d.	
" " in barrels	0 1	6
Bolled " in drums	0 1	11
" " in barrels	0 2	0
" " in drums	0 2	4
Turpentine, in barrels	0 4	6
" " in drums	0 4	6
Genuine Ground English White Lead	19 10	0
Red Lead, Dry	18 0	0
Best Linseed Oil Putty	0 6	6
Stockholm Tar	per barrel	1 12 0

## VARNISHES, &amp;c.

Per gallon.		
£ s. d.		
Fine Pale Oak Varnish	0 8	0
Pale Copal Oak	0 10	6
Superfine Pale Elastic Oak	0 12	6
Fine Extra Hard Church Oak	0 10	0
Superfine Hard-drying Oak, for seats of Churches	0 14	0
Fine Elastic Carriage	0 12	6
Superfine Pale Elastic Carriage	0 16	0
Fine Pale Maple	0 18	0
Finest Pale Durable Copal	0 9	0
Extra Pale French Oil	1 1	0
Eggshell Flattening Varnish	0 13	0
White Copal Enamel	0 12	0
Extra Pale Paper	0 12	0
Best Japan Gold Size	0 10	6
Best Black Japan	0 18	0
Oak and Mahogany Stain	0 9	0
Brunswick Black	0 8	6
Berlin Black	0 18	0
Shining Black	0 10	0
French and French Polish	0 10	0

## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (without more news items) which have been duplicated for other journals are NOT DESIRED.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted by the owner of the Tender is stated, nor any list in which the lowest Tender is under 100£, unless in some exceptional cases and for special reasons.)

\* Denotes accepted. † Denotes provisionally accepted.

BOURNEMOUTH.—For making-up Withernood and Osborn-road, for the Corporation. Mr. F. W. Lacey, Borough Engineer, Bournemouth.—  
F. Hoare & Sons.....£248 0 10  
J. Corbin.....820 16 3  
Newton.....£794 7 10

TENDERS.—Continued on page 27.



## CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tender to be Delivered
*Roadmaking and Paving Works	Heaton U.D.C.	Council's Engineer, Council Offices, Hendon, N.W.	July 3
Four Workmen's Dwellings, Bristol	New streets Committee	T. H. Yabbloom, City Engineer, Queen-square, Bristol	July 4
Paint, etc., Cottage Home, 18, Old, Waverley	Liverpool Select Vestry	H. J. Hagger, Parish Office, Growlaw Hill, Liverpool	do.
Re-sealing Wesleyan Chapel, Danby Wiske	Glasgow Corporation	Lazamb, 14, Danby Wiske, near Northallerton	do.
Cast-iron Pipes, etc., Gas Department	Willesden District Council	A. Wilson, Gas Engineer, 45, John-street, Glasgow	do.
*Erection of Cottage in Council's Store Yard	do.	O. Claude Robson, Dyne-road, Kilburn, N.W.	do.
*Roadmaking and Paving Works	Warrington Health Committee	T. Longdon, Borough Engineer, Warrington	July 5
Twenty Garden Seats	Ashton-in-Makerfield U.D.C.	T. Burgess, Surveyor, Council Office	do.
Street Improvement	Shrewsbury Sanitary Committee	W. C. Eddowes, Borough Surveyor, The Square, Shrewsbury	do.
Cemetery-road Sewer	Salford Corporation	Borough Engineer's Office, Salford	do.
Removing Bridge Plates, Springfield-lane	do.	do.	do.
3,600 sq. yds. of Hard Blue Floor Tiles	do.	do.	do.
Painting Four Bridges over the Irwell, etc.	do.	do.	do.
Cast-iron Pipes and Valves for Sewage Works	Esher U.D.C.	Engineer & Sur., Council Offices, Brabant Villa, Thames Ditton	do.
New Sewer, Claremont-lane, Esher	East India Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	do.
Pig Iron	Assam-Bengal Railway Co.	Offices of Company, 56, Bishopsgate-street, Within, E.C.	do.
Wheels for Carriages and Wagons	Nantyglo and Blaenau U.D.C.	W. J. Davies, Surveyor, Gomersal, near Leeds	do.
Limestone, Granite, and Chippings	Gomersal U.D.C.	Office of Public Works, 64, Cochrane-street, Glasgow	July 6
Granite Set Paving, Holme-lane, etc.	Glasgow Corporation	R. Higgins, Council Offices, Blaydon-on-Tyne	do.
Treating Decayed Stonework of Police Offices	Blaydon U.D.C.	G. Symon, Surveyor, Council Offices, Blaydon-on-Tyne	do.
Scavenging	Leeds Highways Department	City Engineer's Office, Municipal-buildings, Leeds	do.
Paving, etc., Murray-street and Ann-street	do.	do.	do.
Paving and Flagging Streets	Mr. J. Eadie	J. S. Thomson Factor, Keith, N.B.	do.
Flagging, etc., and Making Tar-Macadam Rd., Seton-av.	King's Lynn Guardians	Clerk to the Guardians, Guardians' Offices, Folley street, S.E.	July 7
Steading at Lelkoff	Bermonsey Guardians	Wardlow & Morrison, Solicitors, 39, Castle-street, Swansea	do.
Alterations at Workhouse	Swansea Town Council	G. Moxham, Architect, 99, Castle-street, Swansea	do.
*Alters to Lower-rd. Casual Wards, Rotherhithe, S.E.	Celbridge Guardians	T. J. A. Linfield, Clerk, Town Hall, Celbridge	July 8
Artificial Curling Rinks	Rhonda Baptist Chapel Trustees	T. G. Abercrombie, Architect, County-place, Paisley	do.
Repairs and Alterations to Swansea Market	Renfrew District Lunacy Board	J. R. Ranton, Surveyor, Council Offices, Wileham	do.
Meal Store	Whickham U.D.C.	H. C. Bishop, Borough Electrical Engineer, Town Hall, Newport	do.
Annual Contracts	Newport (Mon.) Electricity Com.	do.	do.
Asylum at Dykebar, Paisley	do.	do.	do.
Sewer, Long Edge, Salford	Birr (Ireland) Guardians	Moynan & Gill, Architects, Nenagh, Ireland	do.
Cast-iron Exhaust and Water Piping, etc.	Rotherham Tramways Department	S. M. Gladry, Linn Works, Shankill-road, Belfast	do.
Steel Water-cooling Tower	Danylan Building Club	Tramways Manager, Tram Depot, Rotherham	do.
Electrically-Driven Surface Condenser	Cardiff Guardians	Evans, Williams, & Evans, Architects, Pontypridd	do.
Medial Officer's Residence, etc., Ferbane	Rhonda Baptist Chapel Trustees	A. G. Harris, Union Offices, Queen's-chambers, Cardiff	do.
14 Houses, Riverview-st., Stranmillis-rd., Belfast	Penge U.D.C.	Evans, Williams, & Evans, Architects, Pontypridd	do.
Tramway Stores	Northamptonshire Education Com.	Surveyor Town Hall, Anesty, S.E.	do.
Fifty Houses at Pwllwern, Pontypridd	Brumby and Frodingham U.D.C.	R. G. Lobban, Carr-bridge, S.E.	do.
Two wrought-iron Water Tanks, etc., Cardiff Workho.	Radyr Golf Club	W. R. Atkinson, C.E., 1, Sheep-street, Northampton	do.
Enlarging Vestry at Hopkinstown, near Pontypridd	Duke of Roxburgh	R. Atkinson, C.E., 1, Sheep-street, Northampton	do.
Soft Wood Paving & Concrete Foundations, Croxson-rd.	Standing Joint Com., Co. of Brecon	W. H. Dashedwood, Architect, Church-st.-chambers, Cardiff	do.
Council Schools, Byfield	Sculwater Guardians	C. B. W. Chapman, Surveyor, Public Offices, Wembley	do.
Two Sets of Pumping Engines and Boilers	Teddington U.D.C.	W. R. Copland, C.E., 146, West Regent-street, Glasgow	do.
Alterations, etc., Golf Club House, Radyr	Boole Corporation	T. B. Atkinson, Architect, 11, Trinity House-lane, Hull	do.
Painting, etc., Primitive Methodist Chapel, Gt. Cliffe	Leamington Spa Corporation	R. J. Wolfenden, Borough Engineer, Town Hall, Bolton	do.
Water Supply, Floors, Cattle and Offices	Sculwater Guardians	Borough Engineer's Office, Town Hall, Bolton	do.
Alterations, etc., Brynmawr Police-Station	Rev. G. Heaton	Vaill & Sant, Architects, Cardiff	July 10
Painting 2 Wards, Worsh. Indr., Beverley-rd., Hull	Rev. H. G. Corner	Nicholson & Hartree, Architects, Hereford	do.
Private Street Works	Wembley U.D.C.	W. H. Dashedwood, Surveyor, Public Offices, Wembley	do.
Underground Conduits and Two Urinals	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.	do.
4,500 tons of Road Stone	Fulham Borough Council	Borough Surveyor, Town Hall, Fulham, S.W.	do.
Window, House at Cottage Homes, Heale	Leeds Corporation	C. G. Hazell, Waterworks Engineer, Municipal-buildings, Leeds	July 11
Infants Department, etc., Butte-ter, Schools, Cardiff	South Minns B.D.C.	W. B. Macbride, 40, High-street, Barnet	do.
Channel, Org. Cham. & Vestry, H. Trin. Ch. Herod	Hackney Borough Council	S. Hill, Architect, Green-lane, Redrith	do.
Alters, etc., to Rectory Hse., Llangatook-juxta-Usk	Edinburgh and Dist. Water Trustees	Norman Scorgie, Borough Engineer, Town Hall, Hackney, N.E.	do.
Making-up Turf and Elapheth roads	The Harbour Board	W. A. Tait, C.E., 72A George-street, Edinburgh	do.
*Cleaning and Painting Works, Footing, S.W.	Metropolitan Borough of Lambeth	Offices of the Board, Town Quay, Southampton	do.
*Making-up Carriage-way of Okehead-street	Surrey Education Committee	H. L. Butler, Salesman, Schools, Surrey-lane, Battersea, S.W.	do.
Cast-iron Pipes and Castings, Hunslet Goods Station	Lewerick Town Council	Borough Engineer, 346, Kennington-road, S.E.	do.
*Road Improvements, Potter's Bar	Isleworth Burial Board	J. Jarvis & Richards, 36, Victoria street, S.W.	July 14
Griststone Culvers over Ed's Mile Dike, Laughon	Leicester Water Committee	G. Cruickshank, Borough Surveyor, Lewerick	do.
Lecture Hall, etc., at U.M.F.C., Redrith	do.	E. J. Partidge, F.R.I., 39, George-street, Richmond	July 15
Hard Wood Paving, Stamford-road, Kinsland	do.	A. Bovey, Surveyor, King's-court, Colmore-row, Birmingham	do.
*Erection of Church, East Hill, Wandsworth, S.W.	do.	J. B. Everard, Engineer, 9, Millstone-lane, Leicester	July 17
*Repaving, etc., 66, York-road, Lambeth, S.E.	Sheffield Education Committee	J. F. Moss, Secretary of Committee, Sheffield	do.
*Alterations and Additions to Schools	South Shields Town Council	S. E. Burgess, Borough Engr. & Sur., Chapter-row, South Shields	do.
Water Pipes, etc.	Paignton U.D.C.	C. G. Baines, Engineer, Town Hall, Paignton	do.
Repairs (Stonework, Painting, etc.)	Great Northern Railway Co., Ireland	F. J. Lohley, Public Offices, Ashley-rd., Hale, Cheshire	do.
Tramway Depot, Rosebery-street and Camden-street	East U.D.C.	W. Jacques, 2, Fen-court, E.C.	do.
Laying Main—Derwent Main	West Ham Education Committee	do.	do.
Pipes—Derwent Main	London C.C.	Superintending Architect's Dept., 15, Pall Mall East, S.W.	July 18
Painting, Distemping, etc., Council Schools	Commissioners of H.M. Works, etc.	H.M. Office of Works, Storey's-gate, S.W.	do.
Public Slaughter-houses, Station-rd., Clapham-lane	Hull Corporation	Inspector of Nuisances, Hanover-square, E.C.	July 19
Widen, Primley Hill (Toll-rd.) & Batterways Bidge	West Ham Union	J. W. Dunford, Architect, 100, Queen Victoria-street, E.C.	do.
Two Cottages at Dromin Station	Beckenham U.D.C.	J. H. Nicholas, Secretary, County Offices, Chelmsford	do.
Sewerage and Drainage Works	The Committee	J. A. Angell, Architect, Council Offices, Beckenham	do.
*School Furniture, Electric Lighting, H.W. Hoist	Leeds Corporation	J. Morris Williams, Architect, Bishopsgate, Leeds	July 21
*Terrace Paving, Galvanised Iron Portable Duthins	Hawarden R.D.C.	E. S. Taylor & A. C. Williams, 26, Newgate-street, Chester	July 25
*New Entrances, Office, St. Geo-the-M. Ch., Southwark	Governors (see Advt. June 24, p. viii.)	W. G. Wilson, Architect, 6, Bloomsbury-mansions, Hart-st., W.C.	Aug 1
New North Office, Ashford	Hartley Univ. College, Southampton	W. L. Woodhead & Sons, Surveyors, 15, Exchange, Bradford	No date
*Night Soil Collection	Phillips & Sons, Ltd.	The Registrar	do.
*Alterations and Additions at Workhouse, Leytonstone	do.	Rev. J. G. Holborn, Carbrook-vicarage, Sheffield	do.
*Iron Building at Leigh-on-Sea	Faversham Education Committee	Swalwell & Havad, Architects, Steam Packet-chbrs., Dock-st., Newport	do.
*Extensions to Artillery-road Offices, Nantymool	do.	A. Stevenson, 14, Cathcart-street, Ayr	do.
Additions, etc., Workmen's Hall, etc., Nantymool	do.	J. Beck, Carthorpe, Bedale	do.
Cleaning, Paint, etc., Rooms, etc., in Art Gallery, etc.	do.	W. L. Grant, Architect, Sittingbourne	do.
Sewerage Works, Ewloe, Hawarden	do.	do.	do.
New Royal Latin School, Buckingham	do.	do.	do.
466 lb. yds. Pipe Sewer, Huddersfield-rd., Brighouse	do.	do.	do.
Experimental Plant	do.	do.	do.
Rubble Fence Walls	do.	do.	do.
Rebuilding George Hotel, etc., Market-st., Pontypool	do.	do.	do.
Alterations, etc., to Walpole Hotel, Llanhilleth	do.	do.	do.
Additions and Alterations to Court-house, Ayr	do.	do.	do.
Erection of a Schoolroom	do.	do.	do.
*Erection of Schools	do.	do.	do.



## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Teacher of Carpentry and Joinery .....	Ealing Local Technical Inst. Com.	10s. an evening .....	July 8
*Teacher for Engineering Subjects .....	Woolwich Polytechnic .....	150l. per annum .....	July 14
*Teacher for Building Construction .....	do.	Not stated .....	do.

Those marked with an asterisk (\*) are advertised in this number.

Competitions. —

Contracts, iv. vi. viii. x.

Public Appointments, xviii.

## TENDERS.—Continued from page 25.

**BRUMBY.**—For water supply works, Brumby and Frodingham, for the Urban District Council. Mr. A. Atkinson, C.E., Briggs:—  
 Jenkin & Son £3,109 8 1 J. H. Macdonald, £1,767 12 2  
 Bros. .... 8,035 2 5 A. Streeter & Co. .... 1,897 8 10  
 T. Bell .... 2,592 9 0 P. & S. Kearsley .... 1,635 8 5  
 H. H. Barry .... 2,567 8 0 J. H. Harper & Co. .... 1,627 0 0  
 Bennie & Thompson .... 2,435 10 1 R. C. Crawley & Co. .... 1,551 7 3  
 A. H. Ball & Co. .... 2,302 5 0 J. Sangwin & Co. .... 1,471 17 11  
 H. B. Buck .... 2,542 8 6 R. C. Brebner & Co. .... 1,471 17 11  
 Meredith Bros. .... 2,194 4 8 A. & J. H. Andrews & Co. .... 1,397 0 0  
 J. H. Vickers & Sons .... 2,174 5 7 sq. Edinburgh 1,397 0 0  
 Aves & Boulton .... 2,144 18 4 T. Jackson, jun. .... 1,391 7 0  
 J. W. Dean, Ltd. .... 1,910 5 9 T. Parkin & Co. .... 1,386 0 0  
 R. Holmes & Sons .... 1,860 0 4 T. Kearsley, jun. .... 1,283 2 0  
 H. Spardlow .... 1,840 0 0  
 H. Ashley .... 1,780 0 0

**CANTERBURY.**—For renewing the slating of roof and pointing the walls of wards at Workhouse, for the guardians. Mr. H. Doré, architect, 8, High-street, Canterbury:—  
 H. J. Smith & Co. .... £214 0 0 J. C. Elvy, .... £182 10 4  
 W. J. Adcock .... 201 0 0 Amos & Foad .... 181 0 0  
 C. Mount .... 196 8 6 G. Browning, .... 149 0 0  
 F. W. Philpotts .... 190 15 4  
 Gann & Co. .... 185 0 0

**CARLTON COLVILLE.**—For alterations and additions, Carlton Colville, Suffolk, for the Rev. L. W. H. Andrews, Mr. H. J. Green, architect, 31, Castle-meadow, Norwich:—  
 Chaston & Co. .... £285 10 0 G. E. Hauss, .... £702 4 0  
 Grimsby & Co. .... 815 10 4 Norwich 701 18 0

**CARSHALTON-ON-THE-BILL.**—For installation of engineering plant in boiler house, etc., at the Southern Convalescent Hospital, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—  
 W. J. Fraser & Co., Ltd. .... £3,695 J. Simpson & Co. £2,584  
 E. Deane & Co., Ltd. .... 8,693 T. Potter & Sons, 7,249  
 (Oldbury), Ltd. .... 8,693 Wenham & Waters, 7,249  
 Moorwood, Sons, & Co., Ltd. .... 8,920 H. & Herbert, Ltd. 7,040  
 E. & J. May, .... 7,785 Death & Ellwood, 7,040  
 Ross & Russell, Ltd. .... 7,698 J. Joseph-street, 6,492  
 Leicester-street, 6,492

**CARSHALTON-ON-THE-HILL.**—For engineering work (re-erection of machinery) in connexion with laundry, etc., installation at the Southern Convalescent Hospital, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—  
 T. Cudlipp, .... £6,444 Moorwood, Sons, & Clements, Jeakes, & Co., Ltd. .... £3,515  
 J. & E. May, .... 4,450 Wenham & Waters, 4,096  
 Ross & Russell, Ltd. .... 4,066 H. & Herbert, Ltd. 3,370  
 J. Simpson & Co., Ltd. .... 3,835 Death & Ellwood, 3,275  
 Lea, Son, & Co. .... 3,593 T. Potter & Sons, Ltd., 44, South Molton-street, Oxford-street, W.\* 3,249

**CHESILTON.**—For repair of the 12-in. iron pipe sewage outfall in the West Bay, for the Portland Urban District Council. Mr. R. S. Henshaw, Engineer and Surveyor, Council Offices, New-road, Portland:—  
 E. T. Hatch, Engineer-in-Chief:—  
 (Southampton), Ltd. £200 mouth ..... 297

**CHESLER.**—For laying out a building estate, for Messrs. Walkers, Parker, & Co. Mr. J. Little, engineer, R. Hutton £2,910 13 2 J. W. Harris £2,385 0 0  
 J. Hayes .... 2,880 5 6 Bullen Bros. 2,361 10 0  
 J. Allan .... 2,673 2 6 Davis & Co. 2,315 7 10  
 E. T. Hatch, Engineer-in-Chief:—  
 Thompson 2,467 13 6 Reid & Son 2,257 3 9  
 J. Owens, 2,462 4 0 Snape & Sons, 2,098 10 10  
 R. C. Trevelyan, 2,458 0 0 Eccles\*, 2,098 10 10  
 T. Lowe & Sons .... 2,398 18 4 B. Orley .... 2,098 10 10

**CUMMISTOWN.**—For alterations to Central School, Cummistown. Messrs. J. Duncan & Son, architects, Turf:—  
 Mason: J. Duguid, Garmond, Turf, 2,980 1 6  
 Carpenter: W. E. Byrne, Turf, 2,980 1 6  
 Slater: J. Gammon & Co., Turf, 2,980 1 6  
 Plasterer: R. Alder, Inverurie\*, 2,980 1 6  
 Plumber: C. Duthers & Sons, Turf, 2,980 1 6  
 Painter: J. D. Watson, Turf, 2,980 1 6

**DORCHESTER.**—For re-erection premises, 13, South-street, for Mr. E. E. Wernham. Mr. F. T. Maltby, architect and surveyor, Dorchester:—  
 Barrett, Son, & E. Davis & Son. £583 0  
 Davis ..... £549 10 Watts Bros., 873 10  
 J. Selby ..... 590 4 Dorchester\* ..... 573 10

**DOWLAIS.**—For building a free library, for the Merthyr Tydfil Urban District Council. Mr. E. A. Johnson, architect, Abercromby and Merthyr:—  
 W. Watts, Brynbeulog, Dowlais ..... £2,900

**DRUNGWICK.**—For pulling down bridge over old canal at Drungwick, near Loxwood, Sussex, and erecting steel girder bridge, for the Petworth Rural District Council:—  
 Wilkinson Bros. .... £741 H. Lindfield & Son £427  
 Edwards & Co. .... 610 H. Spooner ..... 397  
 E. & H. Rigby ..... 465 J. Boxall, Tillington, E. & J. H. Holden, 454 Petworth\* ..... 340

**DUNFERMLINE.**—For extensions to dormitories and day-rooms at Combination Poor House. Mr. A. Muirhead, architect, 4, Abbey Park-place, Dunfermline:—  
 J. Stewart & Sons, Dunfermline ..... £2,872 18 11

**DURHAM.**—For erecting two iron schools. Mr. W. Rushworth, architect, County Education Offices, Durham:—  
 For Shotton School. For South Church School.  
 The Wire Wove Roofing Co. £280 ..... £140  
 Artistic Construction Co. .... 341 ..... 140  
 E. Crossley, 53, Denmark-road, Wimbeldon\* ..... 305 ..... 163

[The three lowest tenders out of thirty-four received.]  
**EAST GREENSTEAD.**—For new vestries and alterations to Mead Church. Messrs. Macintosh & Newman, architects, Birkbeck-chambers, High Holborn, London, W.C.:—  
 C. Rice ..... £280 0 H. Young ..... £740 10  
 Waters ..... 801 0 Morris Bros. .... 720 0  
 J. Bealcham ..... 793 0 T. Webster, Cran-wood, A. Peckett ..... 785 0 J. Dymally ..... 681 10

**EYE.**—For erecting an elementary school at Eye, near Leominster, for the Herefordshire Education Authority. Mr. A. Dryland, Architect to the Education Committee, Shirehall, Hereford:—  
 H. E. Davis, £1,432 15 0 W. James ..... £1,173 15 4  
 R. W. Wilkin, £339 19 0 W. Fowler & Co. .... 1,170 16 0  
 B. & V. & Co. .... 1,170 16 0  
 Hodes ..... 1,219 14 6 J. Watkins & Co. .... 1,192 0 0  
 W. Powell ..... 1,190 8 8 Son, Leominster\* ..... 1,092 8 2

**GLYNCORRWG.**—For (1) Building an exhaustor house; (2) supply and erection of purifiers, boiler, exhaustor, and engine and pumps; (3) Re-erecting a bed of five retorts, for the Urban District Council. Mr. W. P. Jones, Surveyor, Cymer:—  
 (1) S. T. Rees, Aberystwyth\* ..... £75 0  
 (2) R. Dempster & Sons, Ltd., Rhilani\* ..... £12 10  
 (3) R. Dempster & Sons, Ltd., Eiland\* ..... 98 0

**GUISLEY.**—For erecting a residence and stabling. Messrs. Empsall & Clarkson, architects and surveyors, 7, Exchange, Bradford:—  
 Messrs. S. Mounsey & Son, Guisley. Joiner: W. M. Bluns, Bradford ..... £2,187 10  
 Plumber: A. Ross, Shipley ..... 2,187 10  
 Plasterers: Walsh Bros., Guisley ..... 2,187 10  
 Slaters: R. Hartley & Sons, Idle ..... 2,187 10

**HAYES (Middlesex).**—For the erection of two villas for Mrs. Arldice, of Wood End Green, Hayes. Messrs. Thomas & Thomas, architects, 191, Edgware-road, Paddington, W.:—  
 T. W. Crutchfield ..... £443 Chambers & Cowley £500  
 J. Humber ..... 550 J. R. Cooper\* ..... 494

**HAYES (Middlesex).**—For the erection of villa for Mr. Toger, Hayes. Messrs. Thomas & Thomas, architects, 191, Edgware-road, Paddington, W.:—  
 A. Winch ..... £516 10 T. W. Crutchfield\* £305 10

**HENDON.**—For making-up Ramsey and Argyle roads, West Hendon, for the Urban District Council, Messrs. G. Grimley, Engineer, Council Offices, Hendon, N.W.:—  
 British Paving & Granite Co. .... £2,117 10 11 E. Ballard, Ltd. .... £1,694 8 9  
 T. Adams ..... 1,720 4 6 A. T. Catley, Ltd. .... 1,695 6 6  
 A. B. Champ-niss ..... 1,703 15 0 W.C.\* ..... 1,695 19 4

**IPSWICH.**—For the enlargement of Springfield Council School, for the Education Committee. Messrs. Bishop & Cautley, architects, 32, Museum-street, Ipswich:—  
 W. Grayston £2,586 10 0 Cubitt & Goits £2,285 0 0  
 E. Scott ..... 2,578 0 0 M. Deeth ..... 2,275 0 0  
 R. Gilling ..... 2,467 0 0 H. Lizzell ..... 2,248 0 0  
 G. Grimwood & Sons ..... 2,493 0 0 Spencer, Son, to, & Co., Victoria-st., Ipswich\* ..... 2,230 0 0  
 A. Sadler ..... 2,457 10 0 Felixstowe\* ..... 1,929 0 0  
 E. Catchpole ..... 2,433 18 8 C. Roper ..... 1,929 0 0  
 & Sons ..... 2,294 0 0

**KIRKCALDY.**—For constructing a pipe sewer, with an outfall to low-water, and the necessary manholes, and other relative works, for the Town Council. Messrs. J. & A. Leslie & Reid, engineers, 724, George-street, Edinburgh:—  
 W. Dobson ..... £3,664 5 0 R. C. For-Blair & Whyte 3,184 15 1 Gussion ..... £2,810 0 0  
 Flaher Bros. .... 3,185 18 0 G. Smith & Sons ..... 2,797 5 0  
 Henderson ..... 3,088 5 0 Stirling & Caenbury, 2,692 0 0  
 T. Forgan ..... 2,995 4 4 Backis & W. Mitchell ..... 2,510 8 6  
 Sons ..... 2,919 14 8 J. Martin ..... 2,497 14 1  
 W. Mitchell ..... 2,910 18 9 A. Fraser ..... 2,457 2 0  
 Sons ..... 2,902 11 6 Sons ..... 2,422 11 2  
 T. Christie ..... 2,843 18 8 A. Gray & Co., Kirkcaldy\*, 2,419 0 0  
 D. Gilmore ..... 2,843 18 8

**LONDON.**—For alterations and additions to warehouse on the North Quay of Regent's Canal Dock, for the Regent's Canal and Dock Company, under the supervision of Mr. J. Glass, manager. Plans by Messrs. Thomas & Thomas, Paddington:—  
 Patten & Pether ..... E. Lavranco & Sons, Ingham, Ltd. .... £1,473  
 Bull & Isdale ..... 1,330 Shedd Bros. .... £1,236  
 J. Chessum & Sons\* ..... 1,163

**LONDON.**—For painting, whitewashing, and cleaning at Chelsea Infirmary, Calcutt-street, S.W., for the guardians:—  
 W. Brooks & S. T. Wright, Co. .... £270 0 0 Arthur-street\* £310 10 0  
 R. G. Payne ..... 558 10 0 Lillo & Sons ..... 307 0 0  
 T. Pearce ..... 499 0 0 P. McCarthy ..... 303 0 0  
 R. Dow & Co. .... 450 0 0 Victoria Sani-Rigg & Co. .... 420 0 6  
 H. Bowman ..... 427 0 0 tary Engli-H. Bowman ..... 427 0 0  
 G. Wade ..... 419 0 0 H. Eames ..... 298 0 0  
 M. McCarthy ..... 399 0 0 H. Husey ..... 295 0 0  
 R. Iles, Ltd. .... 375 0 0 C. Ellis & Co. .... 273 0 0  
 W. Dudley ..... 375 0 0 J. Scott Pean ..... 249 10 0  
 Harvey & Co. .... 336 15 0

**LONDON.**—For re-laying the footway of Bech-street, E.C., for the City Corporation:—  
 London Asphalt Co. .... £105 6 6

**LONDON.**—For paving the carriage-ways of Fann-street and Bridge-water-square with hydraulically-compressed rock asphalt blocks, for the City Corporation:—  
 London Asphalt Co.\* {Fann-street ..... £211 6 3  
 {Bridge-water-square 302 6 3

**NEWARK.**—For rebuilding bridge over Witham, on the road leading from Claypole to Newark, for the Claypole Rural District Council. Mr. C. D. M. Trinder, District Surveyor, Braan Broughton, Newark:—  
 W. Smith, Newark\* ..... £380  
 C. Baines ..... 379

**NORWICH.**—For footpath tar-paving and tar-macadam materials, for the Corporation. Mr. A. E. Collins, City Engineer, Guildhall, Norwich:—  
 A. Wickham, 89, Quebec-road, Norwich, as follows:—  
 1-in. footpath tar-paving, 17s. 6d. per ton; 1-in. tar-macadam, 16s. per ton; 1 1/2-in. tar-macadam, 16s. per ton. Free on rail at station in Norwich.

**NOTTINGHAM.**—For house, Lucknow Drive, Mapperley Park, Nottingham. Messrs. A. R. Oulvert & W. R. Gleave, architects, 18, Low-pavement, Nottingham:—  
 Maule & Co.\* ..... £770  
 [Lowest of ten tenders.]

**NOTTINGHAM.**—For alterations and additions to house, Park-row, Nottingham. Messrs. A. R. Oulvert & W. R. Gleave, architects, 18, Low-pavement, Nottingham:—  
 F. M. Thomas & Sons\* ..... £568  
 [Lowest of seven tenders.]

**PETWORTH.**—For a block of three four-roomed cottages near Petworth, Sussex, for Mr. E. E. Bone, Messrs. Barwell & Driver, architects, 23, York-place, Baker-street, W.:—  
 Boxall ..... £400 Rowland Bros., H. S. Loxwood ..... 392  
 Horsham ..... 350  
 Recommended for acceptance.

**PONTARDLAIS.**—For erecting a new mechanics' institute. Mr. W. Beddoe Rees, architect, 3, Dumfries-place, Cardiff:—  
 D. Jenkins ..... £2,232 D. Jones, Pontar, T. Broad, Ltd. .... 2,163  
 Dulais ..... 2,090 A. & A. Thomas ..... 1,770  
 G. Mercer ..... 1,350  
 Accepted with modifications.

**PRESTWICK (N.B.).**—For enclosure walls, gateways, and keeper's lodge, and laying out grounds of new cemetery at New Dykes, for the Monkton and Prestwick Parish Council. Messrs. J. & H. V. Eaglesham, architects, 24, Wellington-square, Ayr:—  
 W. Guthrie, Widdor, Prestwick\* ..... £1,383 10 11

**ROMFORD.**—For kerbing Whalbone-lane, Chadwell Heath; Woodman-road, Great Warley, and Back-street, Romford, for the Rural District Council. Mr. G. Rainham, for the Rural District Council. Mr. G. Rainham, Highway Surveyor, Victoria-road, Romford:—  
 D. F. Jackson, Barking\* ..... £133 8 6



**ROMFORD**—For making-up eight new streets at Emerson Park and part of a new street at Harold Wood, for the Rural District Council. Mr. E. G. Boden, Surveyor, Victoria-chambers, Victoria-road, Romford:—  
 F. Madden ..... £14,304 W. & G. French, £10,914  
 W. G. Wilmetts ..... 12,565 Wilson, Borden, & Co. .... 10,859  
 J. Shelbourne & Co. .... 11,982 Parsons & Parsons ..... 10,823  
 J. Jackson ..... 11,973 G. J. Anderson ..... 10,647  
 W. Griffiths & Co. .... 11,612 Road Maintenance Co., Ltd. .... 10,168  
 D. T. Jackson ..... 11,571 W. J. Wishby ..... 10,074  
 Hewitt & Sons, Ltd. .... 11,375 T. Free & Sons ..... 9,964  
 Buxton & Jenner ..... 11,345 H. P. White ..... 9,430  
 J. Jackson ..... 11,122 B. W. Glenny ..... 8,762

**SHANGHAI**—For the church of St. Ignatius, Shanghai, for the Catholic Mission. Mr. W. M. Dowdall, architect:—

	Taels.		Taels.
Yang Tse Ta ....	397,000	Eastern Construction and Engineering Co., Ltd. ....	278,000
Ko Lai Choo ....	342,800	Shanghai Building and Investment Co., Ltd. ....	278,000
Zen Euen Koo ....	292,250		
Oriental Construction Co. ....	281,500		

[All of Shanghai. The present value of one tael is about 2 1/2 sterling.]

**SHEFFIELD**—For extension of car pits at Tinsley car sheds, for the Tramways Committee of the Sheffield Corporation. Mr. C. F. Wilke, City Surveyor, Town Hall, Sheffield:—  
 W. Craig, Manchester ..... £1,357 7 4

**SLIMBRIDGE** (Gloucestershire).—For proposed Council School, Slimbridge, to accommodate 200 scholars. Mr. R. S. Phillips, Surveyor to the Education Committee, Shire Hall, Gloucester:—

	Common Brick Facing.	Pressed Brick Facing.
Workman & Sons ....	£ s. d. 2,412 3 11	£ s. d. 2,442 3 11
W. T. Nichols ....	2,189 11 0	2,309 4 6
W. Jones ....	2,160 0 0	2,193 10 0
A. S. Cooke ....	2,117 12 0	2,127 12 0
A. Estcourt & Son ....	2,100 0 0	2,124 0 0
Wall & Hook ....	2,038 0 0	2,071 13 0
H. J. Morgan & Sons ....	1,980 0 0	2,040 0 0
Byard & Sons ....	1,984 0 0	2,067 0 0
J. Gurney ....	1,987 0 0	1,993 10 0
Collins & Godfrey ....	1,970 0 0	1,993 0 0
Orchard & Peir ....	1,935 0 0	1,935 0 0
G. Dimery & Son ....	1,960 5 3	1,973 19 5
S. Bloodworth & Son ....	1,960 0 0	1,975 0 0
W. Bowers & Co. ....	1,944 0 0	1,962 15 0
N. Baxter & Sons, Strouds ....	1,920 0 0	1,949 18 0

**STOKE-UPON-TRENT**—For erecting school buildings at Harpfield, also playground, boundary wall, etc., for the Education Committee. Messrs. Lyman, Beckett, & Lyman, architects, Stoke-upon-Trent. Quantities by architects:—

	School Buildings.
S. Heath, Victoria-street, Basford, Stoke-upon-Trent ..... £2,063	
S. Heath, Victoria-street, Basford, Stoke-upon-Trent ..... £427	

**TERRINGTON ST. CLEMENT** (Norfolk).—For the erection of Farmhouse, for Mr. W. Wing. Messrs. Walker & Walker, architects, Wisbech and Terrington:—

Tash, Langley, & Co. .... £495 15	J. Parker ..... £435 0
T. Pryor ..... 488 0	G. J. West ..... 425 0
E. B. Lander ..... 490 0	Elworthy & Co. .... 410 0
J. S. Johnson ..... 446 0	H. W. Reader ..... 391 0
	J. W. Wilkinson* ..... 330 0

**THORNHAM**—For restoration of north aisle, Thornham Church, Norfolk. Mr. H. J. Green, architect, 31, Castle-meadow, Norwich:—  
 J. Cracknell ..... £436 0  
 R. Dye ..... 387 9 6  
 Tash, Langley, & Co. .... 342 1 10  
 R. Hunstanton and Chatteris, Cambst. .... £340 0 0

**TRESILLIAN** (Cornwall).—For alterations and additions to Council School, for the Cornwall Education Committee. Mr. A. J. Cornelius, architect, Truro:—  
 J. H. Crocker ..... £254 10  
 H. Tippet, 34, Lomon-street, Truro\* ..... 245 10

**WEMBLEY** (Middlesex).—For widening and improving Harrow main road at Deadman's Hill, for the Light Railways and Tramways Committee of Middlesex County Council. Mr. H. T. Waklam, County Engineer, Westminster, S.W.:—

F. Howles ..... £5,418 18 7	
Pedrette & Co. .... 5,203 14 10	
J. W. Pedrette ..... 5,231 1 8	
T. Shelbourne & Co. .... 5,085 14 8	
A. B. Champness ..... 5,129 4 0	
F. G. Brumfield ..... 5,112 0 8	
H. Boyer ..... 5,107 1 0	
W. & G. French ..... 4,774 14 10	
B. Haynes ..... 4,763 6 3	
W. Griffiths & Co., Ltd. .... 4,711 0 0	
G. R. Mann ..... 4,492 0 0	
T. Free & Sons ..... 4,615 0 0	
S. Kavanagh ..... 4,389 0 0	
G. Wimpey & Co. .... 4,315 19 2	
Cunningham, Forbes, & Co. .... 4,092 0 0	
Grounds & Newton ..... 4,215 19 9	
W. Neave & Son ..... 4,037 14 11	
T. Adams ..... 3,791 0 0	
C. Ford ..... 3,783 7 0	
T. Turner ..... 3,750 10 6	
J. Jackson ..... 3,757 0 0	
K. Ballard, Ltd. .... 3,725 6 7	
J. & E. T. Bloomsfield, 156, West Green-road, Tottenham* ..... 3,725 6 7	

**WHITLEY**.—For private street improvement works. Whitley and Monkseaton, for the Urban District Council. Mr. J. Moore, Surveyor, Council-buildings, Whitley Bay, N.S.O.:—

T. Brown ..... £1,135 18 8	W. Kennedy £3,420 8 8
G. Thornton & Co. .... 4,100 0 9	W. Johnson ..... 3,533 10 11
R. G. Nesbit & Son ..... 4,040 16 5	M. D. Young, Elm-grove, Hexham* ..... 3,531 1 7
G. G. Shippson ..... 3,759 18 4	

**WIGMORE**.—For general repairs and renovations of the Wigmore Council School. Mr. Alfred Dryland, Architect to the Education Committee, Shirehall, Hereford:—

Devan & Hodges ..... £332 5	J. Watkins & Son, Leominster* ..... £165 10
J. H. Davis ..... 297 0	
Overton & Sons ..... 202 18	

**WOITON**.—For road works, Woiton, near Gloucester, for the Gloucester Rural District Council. Mr. F. E. Weaver, Surveyor, Lipton-chambers, Northgate-street, Gloucester:—

T. Starr ..... £100 0 0	W. Meek, Gloucester* ..... £77 19 6
Byard & Son ..... 83 5 0	
Freeman & Jones ..... 88 5 0	
T. Starr ..... £171 10	Freeman & Jones, Gloucester* ..... £135 0
Byard & Son ..... 141 9	
W. Meek ..... 139 14	

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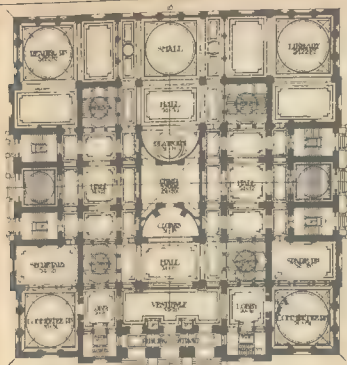
MONUMENT TO ARMAND SILVESTRE.—M. MERCIÉ, SCULP.<sup>OR</sup>  
[EXHIBITED AT THE PARIS SALON.]



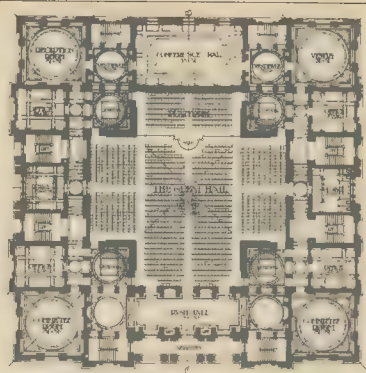




THE BUILDER, JULY 1, 1900.



GROUND PLAN



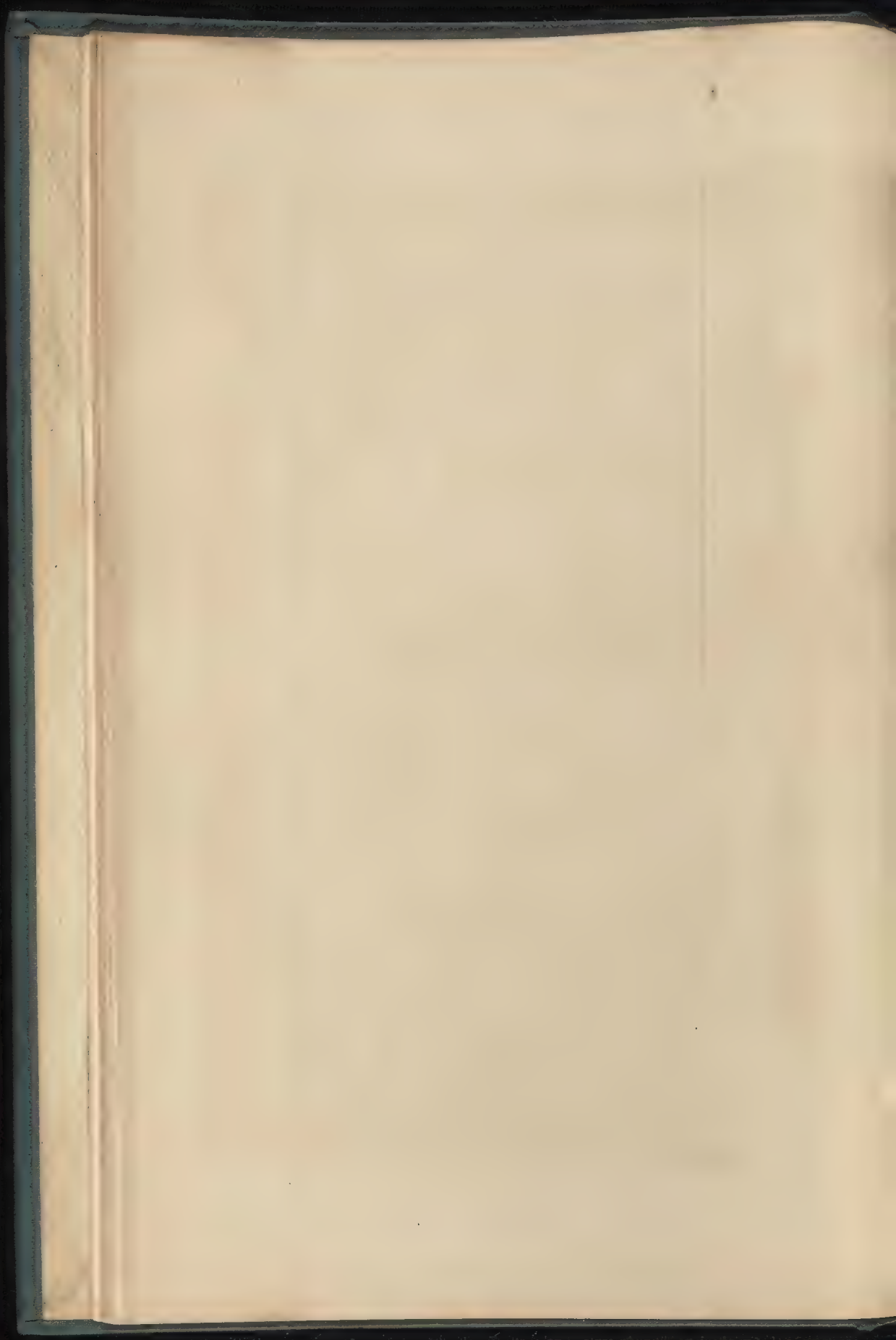
FIRST FLOOR



PHOTOGRAPH BY L. C. L. & A. 2 EAST HARGREAVE STREET FETTER LANE E.C.

WESLEYAN HALL COMPETITION.—DESIGN BY MR C. E. MALLOWS, F.R.I.B.A., AND MR A. W. S. CROSS, F.R.I.B.A.









THE CIRCULAR TEMPLE. BAALBEK.

THE BUILDING, JULY 1, 1905.



FRAGMENTS OF THE FRIEZE OF THE TEMPLE OF JUPITER AT BAALBEK.



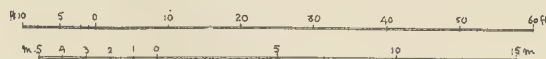
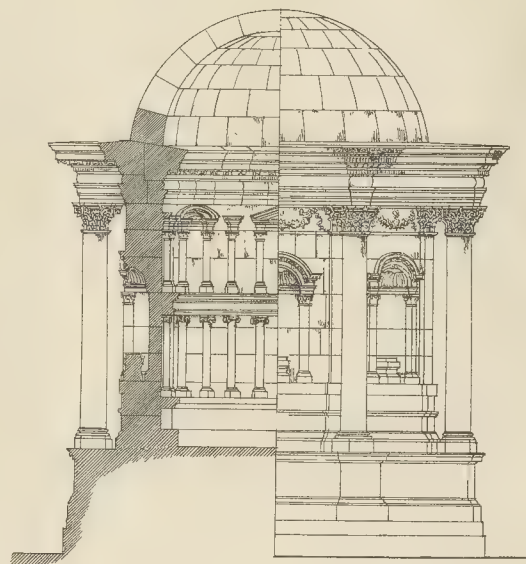
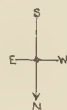
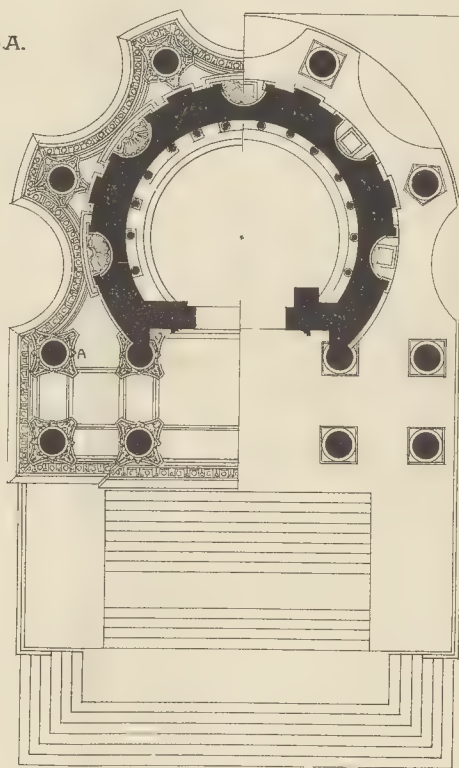




# THE TEMPLE OF VENUS.

## BAALBEK

AS RESTORED BY M<sup>RS</sup> R. PHENÈ SPIERS FRIBA.







# The Builder.

VOL. LXXXIX.—No. 3257.

JULY 8, 1905.

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New Premises, Bury-street.....	Mr. Leslie W. Green, A.R.I.B.A., Architect.
"Ardmillan": South-East View } .....	Mr. E. Turner Powell, Architect.
"Ardmillan": The Courtyard } .....	
Sculpture at the Royal Academy: "Endymion".....	By Mr. A. Bertram Pogram.
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## Masonry Dams.



N a "Note" in our issue of April 1 of this year we referred to the possibility that a recently published theory relative to the stresses in

masonry dams might have the effect of modifying the views hitherto entertained as to the magnitude of the factor of safety in the Assuan dam.

According to all accepted theories the factor in that structure is so very large that engineers have been quite justified in believing the existing masonry to be very well capable of withstanding much greater stresses than those now obtaining. Consequently the proposal was made last year by Sir William Garstin that the height of the dam should be increased by 6 metres, so as to provide for impounding an additional volume of 35,000,000 cubic ft. of water, thereby doubling the capacity of the reservoir at a comparatively small cost.

The new theory is to be found in a paper on "Some Disregarded Points in the Stability of Masonry Dams, by Mr. L. W. Atcherley, with some assistance from Professor Karl Pearson." Mr. Atcherley is a demonstrator in applied mechanics at University College, London, and Professor Pearson occupies the chair of applied mathematics and mechanics in the same college. Before proceeding further we may as well say that the line of reasoning followed in the

paper in question is purely hypothetical, and has no particular reference to any individual dam, being intended to show that previous practice has been generally defective. We are quite ready to admit that a complete solution of the complex problem presented by the design of a masonry dam has not yet been found, owing to the inadequate knowledge of molecular statistics which at present limits the efforts of engineers. But the strength and stability of many important structures designed in accordance with accepted principles have been amply verified by the test of practical experience, and it will take something more than an abstract theory to convince engineers that they have been living in a fool's paradise.

A gravity dam, in which the horizontal thrust of the water is held in equilibrium by the weight of the masonry, is generally considered as liable to failure in one of three ways:—

(1) By sliding along a horizontal section, either at the base or at some higher level.

(2) By overturning about one end of a horizontal section, this condition being necessarily accompanied by tension at the opposite end of the same section.

(3) By crushing of the masonry at the front face when the reservoir is empty, or at the back face when the reservoir is full.

If we assume the dam to be built with a vertical front face and a plane under surface the horizontal pressure of water in the reservoir, tending to push the dam forward, is simply resisted by friction

due to the weight of the masonry. Supposing water to find its way beneath the base the effective weight of the masonry will be reduced by 62·4 lb. per cubic foot, and the friction will be proportionately diminished. When dams are built on porous, sandy foundations it is necessary to provide additional resistance against sliding, either by driving piles in front of the foundation or by the adoption of well foundations or by some equivalent expedient. Treatment of this kind has been applied to the barrages at Cairo, Assiut, and elsewhere in Egypt and other countries with entirely satisfactory results. The aim should be, however, to choose a site on which the dam will be founded in solid rock, the bed being left rough or cut into serrated form, and the masonry sunk below the rock surface so as to secure a condition of fixity.

While the adoption of measures such as these may prevent the dam from sliding bodily, there may still be some risk of sliding along any horizontal section above the base. This possibility is somewhat remote if other essential points of design have received proper attention, and to the remoteness of this risk we may probably attribute the fact that no attempt has been made in the past to determine the distribution of shear on horizontal sections.

The history of the Bouzey dam, built in 1878-1880, illustrates sliding along a horizontal section where the thrust of the water was opposed by cohesion of the mortar, as well as by friction due to the weight of masonry. This dam has a



length of 1,700 ft., and is founded on sandstone of fissured and permeable character. The filling of the reservoir was commenced in November, 1881, and when the water had reached nearly halfway up springs appeared at the down-stream face of the dam, having a flow of 2 cubic ft. per second. In December, 1882, two fissures were noticed, and the discharge of the springs increased to 2.6 cubic ft. per second. Then, in March, 1884, when the reservoir was nearly full, a portion of the dam, 444 ft. in length, suddenly assumed a bent form, and the discharge of the springs increased to 8.1 cubic ft. per second. In 1885 the reservoir was emptied, and it was found that the dam had partially separated from the masonry of the foundation while still remaining vertical, the maximum down-stream movement being 1.1 ft. at the centre of the deflection. Mishaps of the kind are extremely rare, and in this case the sliding was due to defective work in addition to the effect percolation through the foundations.

To ensure stability against overturning it is necessary that the moment of the weight of the masonry should exceed the overturning moment due to horizontal pressure of the water. The thrust of the water may be considered as a single force applied at a distance of two-thirds the depth below the surface of the water. Taking the triangle ABC, in Fig.

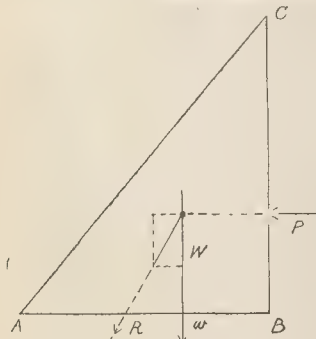


Fig. 1s

1, to represent a dam, the horizontal pressure on the face BC can be represented by the force P. The moment of this force about the point A in the base AB must be counteracted by the moment of the weight of the masonry, which can be represented by the single force W acting through the centre of gravity of the triangle, and cutting the base at  $w$ . Let it be assumed that the resultant of P and W cuts the base at R. Then the moment tending to overturn the dam is equal to  $Rw$ , and the resisting moment to  $Aw$ , the factor against overturning being  $Aw \div Rw$ . In practice the value of this factor should not be less than 2.5, and in important works should be considerably more in view of the serious consequences of failure. The relative values of the forces P and W, and the arms of their leverage, evidently depend upon the cross section of the dam and upon the height to which water is held up.

Safety against crushing of the masonry can be ensured by extending the lower portion of the dam so that compressive stress shall in no place exceed a safe limit of intensity, generally taken in this country at between 6 tons and 8 tons per sq. ft. In the case of the Assuan dam the theoretical toe pressures were limited to about 4.5 tons per sq. ft.; in the United States pressures up to 16.6 tons per sq. ft. have been permitted; and in other countries pressures of 10 tons to 14 tons per sq. ft. are by no means uncommon.

It should be noted that the maximum compressive stress occurs at or near the up-stream toe when the reservoir is empty, and, if we neglect the effect of wind pressure on the down-stream face, the only force then acting is that represented by W in Fig. 1. Conversely, the maximum compressive stress occurs at or near the down-stream toe when the reservoir is full. The horizontal thrust of the water is then added to the downward pressure of the masonry, and the actual compressive stress is due to the resultant of these two forces. Although compressive stress is calculated at the toe, and at other levels in the front and back faces of a dam, it is tolerably certain that when the batter is considerable the maximum stress must occur nearer the middle of the section. In the present state of our knowledge neither the exact value of the maximum nor the point at which it is to be found can be determined, and another unsolved problem is the effect of the horizontal component upon the vertical resistance of the masonry.

A further condition insisted upon as necessary for the stability of a dam is that there shall be no tensile stress at any part of the structure. To illustrate the manner in which tension may be established let us regard the triangle ABC,

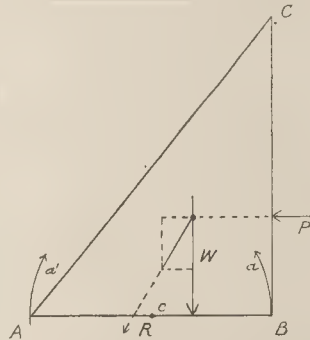


Fig. 2.

Fig. 2, as representing part of a dam, and the line AB any horizontal section. The horizontal thrust of the water above AB is represented, as before, by the single force P acting at one-third of the height BC. The effect of this force is to cause a bending moment about the centre, c, of the section AB in the direction indicated by the arrow, a, and if not counteracted this moment would result in tension at B. But the weight, W, of the masonry acting downwards through the centre of gravity of the triangle ABC has a moment of opposite direction about

c, as shown by the arrow, a'. Hence, if the moment of W be greater than that of P there will be compression at B instead of tension. In the absence of water pressure, and in a dam with a cross section different from that represented in Fig. 2, it is conceivable that the moment of the weight of the masonry might cause tension at the down-stream toe. To guard against the development of tensile stress in any part of the structure the condition is made that the lines of resultant pressure for "reservoir full" and "reservoir empty" shall everywhere fall within the middle third of the cross section.

The effect of a sufficiently excessive value for the moment of P would be to overturn the whole dam, or a portion of it above the section of least resistance, and the overturning action would take place about the point A, or a corresponding point in any horizontal section above the base, because the compressive strength of the masonry would enable it to withstand stress of far greater intensity than that sufficing to pull the masonry apart at the front face.

No masonry dam designed in accordance with the principles stated above has been known to overturn bodily, and the only instance of partial failure in this way is afforded by the Bouzey dam. But it should be noted that at the period in question this structure did not comply with the requirement that the lines of resultant pressure shall be wholly within the middle third of the section. The original drawings of the Bouzey dam provided for a height of 1,187 ft. above ordnance datum. Work was commenced in 1878 and completed in 1880. During its progress the Council of the *Ponts et Chaussées* authorised the extension of the dam to the height of 1,218.5 ft. above the same level, but stipulated that the additional masonry should not be built until the first part of the dam had thoroughly consolidated. Consequently an interval of several months elapsed between the completion of the old work and the commencement of the new.

With the object of ensuring a satisfactory bond between the two portions of the work about 18 in. of the old masonry was taken down before the extension was started. After the partial failure by sliding had taken place and remedial works had been executed a portion of the dam, 594 ft. in length, suddenly overturned in April, 1895. The line of fracture was nearly horizontal longitudinally, and transversely it was horizontal for about 12 ft., dipping thenceforward to the down-stream face. Subsequent investigation showed that the fracture had occurred at the junction of the work done in the two successive seasons of 1879 and 1880. Further it was made clear that at and for some distance above the level of 1,186 ft. the line of resultant pressure for "reservoir full" was well outside the middle third of the section. Hence the masonry had been exposed to tensile stresses which exceeded its power of resistance. This catastrophe demonstrates clearly the necessity for avoiding all risk of tension, as the previous mishap shows the importance of taking adequate precautions against sliding, especially on sites of unstable and permeable character.

Having dealt with the conditions considered essential for the strength and stability of masonry dams, and touched upon one or two points as to which existing knowledge affords little or no assistance, we will next consider the nature of the point raised in the paper by Mr. Atcherley.

Stated briefly, the contention is that, in spite of due compliance with all previously accepted conditions, dangerous tensile stresses probably exist along the base of a masonry dam when the reservoir is full. In fact, Mr. Atcherley suggests that "whether we judge by the line of resistance lying outside the middle third, or by the existence of serious tensile stresses, or by the magnitude of the mean shearing stresses, the vertical sections are critical for the stability in a far higher degree than the horizontal sections."

It is a well-recognised axiom that no masonry structure having to sustain vertical loads should have any continuous vertical joints. In a dam, where both vertical and horizontal forces have to be resisted, there should be neither continuous vertical nor continuous horizontal joints. For this reason uncoursed rubble and concrete are largely employed, with the result that the construction is practically monolithic, and may be regarded as a homogeneous elastic solid. Thus, no lines of weakness should exist in any direction, and the direction of the line of fracture must depend upon the direction of the maximum stresses causing failure. Engineers and mathematicians have always looked upon a dam as more likely to fail along a horizontal line than along a vertical line—a view to some extent confirmed by the Bouzey dam failure. Mr. Atcherley, with the concurrence of Professor Pearson, says that a dam is far more likely to fail along a vertical section. This proposition is not supported by the failure of the Bouzey dam, nor is it conclusively negated thereby, because in that structure a horizontal line of weakness clearly existed at the junction of the old and the new masonry. The only practical evidence Mr. Atcherley can bring forward in favour of his theory is that afforded by the results of experiments with small wooden models. To this he adds a line of mathematical reasoning, which, if not strictly applicable to dams as generally built, is certainly worthy of examination.

The manner in which tension might be developed on vertical planes is shown diagrammatically in Fig. 3. Let ABC be the profile of a dam simply supported upon a flat surface of rock, DE any vertical section, and S a force representing the reaction of the rock supporting the length, AD, of the base. Then S will cause a bending moment about C the centre of the section DE, tending to develop tension at D. But the moment of the weight, W, of the masonry triangle ADE will oppose the moment of S, and additional opposition will be offered by tangential forces—here represented by the single force T—resisting the sliding of the dam in a down-stream direction. It is evident that if the moment of S be greater than the sum of the moments of W and T the resultant stress at D will be tension, and if of sufficient intensity this might cause failure along DE, in spite of the fact that the usual conditions

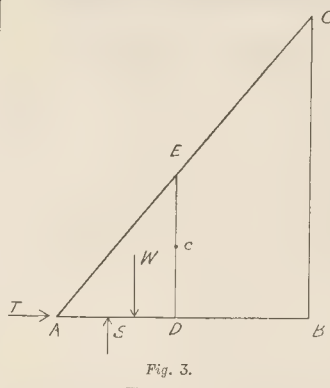


Fig. 3.

of safe design had been fully complied with. On the other hand, if the sum of the moments of W and T be greater than the moment of S the resultant stress at D will be compression, and failure could not occur along the vertical section DE, as suggested by Mr. Atcherley.

The values of S and W are readily ascertainable, but until quite lately no method has been devised for determining the distribution of tangential stresses along a surface such as AB, which may be the base as here assumed, or any horizontal section of the dam.

Mr. Atcherley has assumed the distribution of shearing stress to be parabolic, as in a rectangular beam subject to flexure, but it is doubtful whether the diagram of shearing stress has any such form, and until this question has been definitely settled, the conclusions he has drawn cannot be accepted as correct.

Professor Unwin has now propounded a method for determining the distribution of shearing stresses along a horizontal surface as AB, Fig. 3, but which is not the actual base of the dam. This method has the advantage of simplicity, and is based upon recognised mechanical principles. Therefore the results obtained by its aid must be more trustworthy than those deduced from a pure assumption. The fact that Mr. Atcherley has merely assumed the distribution of shearing stresses along the base invalidates the results he has calculated. If his treatment be amended by the adoption of a definite method for computing such stresses it is probable that his theory may be accepted as fairly applicable to masonry dams with a flat under surface simply resting upon a horizontal foundation bed. As for dams which are firmly bedded at the base into solid rock, his theory can be of little use. The effect of fixing a dam at the base is to add very greatly to its resistance, and to modify the intensity and distribution of internal stresses to a most material extent. Moreover, the complex conditions due to the discontinuity of form at the base of a dam, as designed in practice, are such that it may well be doubted whether mathematics can be successfully applied to determine the stresses actually developed.

Even assuming the new theory to be applicable to all dams it must not be supposed that any structures built in accordance with established principles are in the least danger of failure. Mr.

Atcherley merely points out a direction in which dangerous stresses may conceivably exist. In modern practice all known and unknown stresses are so deeply buried in the calculated factor of safety, and so weighted down by the uncalculated factor, represented by various unconsidered elements of strength, that none of them can struggle to the surface. The designer brings to his aid established data, some scientific knowledge, and a factor of safety, but the greatest of these is the factor of safety, which, like Charity suffereth long and will cover a multitude of sins. The general result is safe but somewhat unscientific design.

Whether the principles propounded by Mr. Atcherley are tenable or not is a question that cannot be decided in a moment. In any event, his paper may be productive of lasting good, for it has already had the useful effect of drawing much attention to the theory of masonry dams, and the upshot of the theoretical and practical investigations now being conducted by mathematicians and engineers will be a benefit to all who are interested in the design of such structures.

#### NOTES.

A  
Technical  
College  
in London.

THE Report of the Committee appointed by the Education Department to consider the question of the establishing of a technical college in London on the German model has now been made public. This is, however, too much a mere outline of a scheme to furnish matter for much discussion, for it is essentially one of detail. Everyone, we suppose, will agree that a central technical college in London worthy of the nation should be created. The idea that it should absorb existing institutions such as the Government College of Science, and other subsidised but not actually Government institutions is equally praiseworthy. It will be remembered that Messrs. Wernher, Beit, & Co. have promised a handsome donation to this object, and it will be necessary to arrange (which is purely a question of detail, but a difficult one) how to unite, in creating and carrying on such a central college, private and State munificence, and new systems and old institutions. At present we can only express a hope that some practical scheme may be formulated which will form the basis not only for public discussion but for immediate action on the part of the Government and those who are responsible for existing institutions.

Birthday  
Honours.

It is satisfactory to find that art has been so far recognised in the official programme that two eminent artists, Mr. Holman Hunt and Sir L. Alma-Tadema, have been admitted to the Order of Merit. But beyond that, which is a special institution, there is no recognition of art or literature in the general list of honours. Two engineers receive knighthood, Mr. E. W. Kennedy, formerly Professor of Civil Engineering at University College, and Mr. J. Clifton Robinson, who has done a good deal towards promoting electrical tramways in London. No one will grudge these gentlemen the distinction conferred upon them; but



one may be excused for asking whether there are not architects, painters, and sculptors with equal claims.

We have received a pamphlet with illustrations, under the title "The Marble Arch—a Suggestion by a Citizen of London," in which Mr. F. W. Speaight, the "citizen" in question, propounds a scheme, illustrated by a plan and a perspective drawing by Mr. Raffles Davison, for giving more importance to the Marble Arch by the formation of an open semicircular place behind it, leaving the arch standing in the middle of a large open space. The most important point in the scheme is the suggestion for the formation of a symmetrical place instead of the present shapeless space formed by the meeting of the park roads. The top end of Park-lane is to be turned normal to the semicircular road, to fall into it. As far as the laying out of this road is concerned Mr. Speaight's scheme would certainly be a public improvement, though it would be much better with a stone screen than the iron railings. But if regarded in special reference to the Marble Arch it is hardly worth doing. The Marble Arch is a mere toy compared with the grand structure at Paris, with which Mr. Speaight compares it; and the Paris arch is the termination of a great vista along the principal avenue of the city, whereas the Marble Arch is and would still be out of place and with little or no meaning. If anything were done with it, it would be better to take it down once more and re-erect it in some position where it would really have a meaning. It was in its place as the entrance to the courtyard of old Buckingham Palace; it has been out of place ever since. And whether a triumphal arch ought to be left standing in the middle of an open space is another question. On this head it is worth note that the Paris authorities are at this moment engaged on a scheme for connecting up the Carousel Arch with balustrades, instead of leaving it standing loose in the midst of an open space as at present. Mr. Speaight's semicircular place we should be very glad to see; but as to the arch, we would rather that the occasion were taken to remove it to a more suitable position.

**Electricity on the District Railway.** THE *contretemps* which occurred in connexion with the inauguration of electric traction on the Metropolitan District Railway may well raise doubts in the public mind as to the reliability of the train services already commenced and others to be started when arrangements are complete. The line has been seriously flooded on other occasions, but as steam locomotives are unaffected by a moderate depth of water the business of the railway has never been so disorganised as it was last Saturday. If the directors had adopted a system of overhead distribution there would have been no trouble, such as may occur at any time with a live rail at track level. It must be remembered, however, that the company were practically bound to adopt the same system as that on the Metropolitan lines, and that the third rail method is one which is universally approved in this

country for railway traction. Taking all things into account, it presents fewer disadvantages than any overhead system. It still remains to be explained why the County Council pumping station at Chelsea failed to clear the drainage conduits so as to avert the unfortunate flood of last week. When this station was built we were assured that the pumps were of sufficient capacity to deal with flood waters in a satisfactory manner even with the Thames at such a level that discharge by gravitation would be impossible. We are glad to find that the electrical service is now re-established between Ealing and Whitechapel.

#### The Lighting of Railway Platforms.

It is satisfactory to find that railway companies have had a useful reminder of their duty in regard to the lighting of railway platforms in a case tried last week in the City of London Court in which the North London Railway Company were defendants. In this case damages were awarded to a person who was injured in consequence of the station being improperly lighted. It is a constant cause of complaint that so many railway stations are inadequately lighted, and the surprising thing is that more accidents do not happen. It is the duty of a railway company to have a good light on all its premises, and it is clear that if it does not it is liable for any harm which may be done in consequence. The inefficient lighting on the staircases and many parts of the underground stations in London is scandalous. We hope that this recent case will show the companies that this kind of parsimony does not pay.

#### Coating Iron or Steel with Zinc.

UPON the invitation of Mr. Sherard Cowper-Coles, we inspected last week a number of articles which had been coated with zinc by a process which has recently been introduced by him, and to which he has applied the name "Sherardising." The process consists in embedding the article to be coated in zinc dust heated to 500-600° F. This temperature is fully 200° F. below the melting point of zinc, and the process differs materially, therefore, from galvanising by immersion of the article in molten zinc. It is not only iron and steel that can be thus coated with zinc; for copper, brass, and a number of other metals and alloys can be equally well treated. A plant has been erected near London comprising four furnaces, capable of taking drums 8 ft. by 2 ft. The furnaces are heated by Dowson producer gas. The drum is charged with zinc dust, and the article to be "Sherardised" is embedded in the dust. To prevent oxidation of the zinc, the drum is then closed and the air is exhausted from the drum. The drum with its carriage is then pushed into the furnace and heated to the desired temperature. The longer the period of heating, the greater is the depth to which the zinc penetrates into the solid metal body embedded in it. The principal advantages claimed for the process are:—(1) the tensile strength of the iron or steel treated is not reduced as in ordinary hot galvanising, (2) low fuel expenditure, (3) the zinc may be made to penetrate to any desired depth, and (4) it is not

necessary to remove grease from the articles to be treated.

#### The Testing of Cast-Iron.

IN a paper read before the Franklin Institute Dr. R. Moldenke points out that if test bars of cast-iron were made round instead of square it would be very much better. The chilling of the edges by rapid cooling always produces more combined carbon than would be the case in a circular section. Hence the chilled edges of a square bar do not represent the true character of the metal which it is desired shall be tested. In some specifications the stipulation is made that a broken square bar shall be turned down to cylindrical form for subsequent tests. Treatment in this way naturally leaves the resulting round bar with four hard and four soft places in its surface, and a bar of the kind cannot correctly indicate the properties of the iron in the castings which it is supposed to represent. The author is quite justified in saying that the general trustworthiness of a round test bar of ample diameter would be much greater than that of a small square bar which by suitable manipulation may be made to show almost any results required.

#### The Electric Power Bills.

THE supporters and the opponents of the electric power Bills now before Parliament have been very active during the last week. Many support the Bills because they believe that the cheapening of the supply of electric power in London will be a very great boon to the whole community. On the other hand, the opponents of the Bills point out that grave injustice will be done to many supply companies and local authorities if they become law. It will be remembered that the House of Lords Committee stated "that the introduction of a new power company not subject to statutory purchase, into areas already occupied by electric companies which are subject to statutory purchase, must necessarily inflict hardship on the latter." The present companies are compelled to supply everyone, and they are prevented from combining for the purpose of mutual assistance and economy of production. They have good reason to fear that the power companies would take away their most profitable consumers. One possible effect of this would be the raising of the price of electric supply to the ordinary ratepayer. It seems to us that private companies and local authorities have a right to demand a relaxation of the statutory restrictions imposed on them by the Act of 1888. The great power station near Newcastle which supplies electricity "in bulk" to the North-Eastern Railway Co., Armstrong & Whitworth, etc., is a practical proof of the commercial feasibility of these power schemes. It is, however, only an application on a large scale of old methods, and we are not convinced that the present companies could not supply power as cheaply as these companies could, provided that the necessary demand for constant large supplies arose. If the Bills pass in their present form we are afraid that it will lead to a monopoly and that the bulk of the ratepayers will ultimately lose over the transaction.



At the School of Wood-Carving, Exhibition-road, South Kensington, there are now on exhibition till July 15 a number of works done by the students of the school, chiefly for the Art Master's Certificate. As might be expected, these vary a good deal in merit, and include some finely-executed carving by the more advanced students, as well as elementary work. Several of the exhibits took prizes at the Carpenters' Hall Exhibition of Works in Wood and Wood-carving. A well-executed Renaissance frieze—the subject selected by the Carpenters' Company—by Mr. Albert E. Smith, gained the first prize (5*l.* and silver medal). It is evident that this student has well studied the fine examples to be found in many of our city churches. The frieze immediately below this, by Mr. Harry Rogers, is scarcely inferior, and shows much delicate work. The design of these as well as the execution is original. A carved truss for a chimney-piece is also interesting, and gained a special prize at the Carpenters' Hall. The majority of the subjects being students' work, are executed in pine and white woods, but a number of panels for the master's certificate are in walnut. The best of these, notably that by Mr. F. Fisher, show considerable skill. Other exhibits include carved door panels, mirror and picture frames, and a series of work done during the session by the students of the school. The majority of these appear very promising, and the school is doing excellent service in training and turning out skilled craftsmen able to execute good work.

The Society still keeps the name derived from its old home, but the "Dudley Gallery" is no more, and the Society's water-colours are to be seen in the large room at the Alpine Club—good enough in point of light, if it only had a better external approach. Special effort, we understand, has been made to render the first exhibition in the new quarters a good one, and not without success. The Dudley Gallery water-colour exhibition has usually represented rather too much what may be called respectable attainment in the art, rather than originality; but this year there is a larger proportion than usual of works that are above the average. The principal contribution by the Society's new President, Mr. Burleigh Bruhl, "On Oulton Broad" (100), is a really fine work, perhaps not free from "manner" (in the treatment of the water), but admirable both in composition and colour. Mr. Newton Bennett sends two of his best works, "Corfe Castle" (3) and "Castle Bridge and Village, Corfe" (268), the latter an architectural subject, very well treated. Mr. Aldridge's "Littlehampton" (72), a highly finished large drawing, has a little too much of that look of prettiness which is too prominent in many of the exhibits, those of Mr. Sylvester Stannard for instance; clever work, but with a suggestion of picture-making about it. But we are not without works in a broader and more vigorous style; those of Miss Margaret Bernard, for instance, and Mr. Waller Stacey's "Late Summer-Time" (192), a truly fine and artistic

landscape. Mr. Duassut's small works, sometimes a little overfinished, are all good; one of them—"On the Common, Danbury" (195)—specially so. Among works of the higher class are also Mr. Wynne's "In the Chulhins, Skye" (37); Mr. Stacey's "The Old Gravel Pit" (43), noticeable, like his other work, for its individuality of colour scheme; Mr. G. Marks's "On Shere Heath" (54); Mr. G. F. Lamb's "A Surrey Common" (76), with a beautifully treated sky; Mr. R. A. K. Marshall's "Willowpark and the Sisters Rocks, Tintagel" (93); Mr. Twigg's "Heather on the Beach, Studland" (94); Mr. F. Dixey's "Burnmouth, Berwickshire" (145); Mr. H. Stannard's "Stormy Weather" (98), a threatening sky above an expanse of ploughed field; and Mr. Stormont's exceedingly fine snow landscape, "The Jaws of Borrowdale, Winter" (67), one of the most important works in the collection. In some drawings which are excellent in their school we are reminded (not unpleasantly) of an earlier epoch of water-colour art, as in Mr. Hereford's "Ben Lawers" (11), highly finished work of a somewhat too Academical order, but not without its interest. Miss Warren exhibits an architectural interior, "The Central Hall, National Gallery" (108), which, though rather hard in effect, has the merit (important in an architectural subject) of excellent perspective drawing.

Soirée of the Society of Arts.

THE annual soirée of the Society of Arts was again held, as on one or two previous years, in the garden of the Botanic Society, on Tuesday evening last. The weather was perfect, and the effect of the myriad lights among the masses of trees most beautiful. Very charming also was the effect of some scenes from the fairy portion of the "Midsummer Night's Dream" in a glade surrounded by trees, with a rising bank of grass for the stage; a part of the play which seems just meant for open-air acting by night. The Royal Artillery band played in the conservatory and the Grenadier Guards' band in the middle of the garden. There were other attractions, and a very large attendance of people, who must have spent a very enjoyable evening.

#### EXHIBITIONS OF THE EGYPT EXPLORATION FUND.

THE exhibition of objects now displayed in the Library of the Society of Biblical Archaeology, at 37, Great Russell-street, W.C., is the result of the excavations conducted last winter by Dr. Naville and Mr. H. R. Hall, and, although perhaps not so rich in the small antiquities which the season of 1903-04 provided from the same site, it will be found to contain results of considerably greater interest to the architect and archaeologist. The temple from which the objects came was discovered by Dr. Naville and Mr. Hall in November, 1903, and is the mortuary chapel of King Neb-hapet-ra, Mentuhotep, of the XIXth dynasty, who held sway over Egypt in the XXVIth century B.C. It is situated at the foot of the frowning cirrus of cliffs which rise precipitously behind Dér el-Bahari, and immediately to the south of the great XVIIIth dynasty temple of Hatshepsut, which is so well known to all who have visited Thebes. The architectural features of the building present many important and interesting data as to temple construction prior to the XVIIIth dynasty, especially as the excavations have revealed the remains to be in a remarkably well-pre-

served condition, and the visitor, by observing the many fragments displayed at the exhibition, aided by the excellent photographs and the plan, will be able to reconstruct in his mind the magnificent building as it stood nearly 4,700 years ago.

The temple itself was in the form of a pyramid on a square base, about 15 ft. high, surrounded by a triple colonnade of octagonal columns. All this was situated on an artificially-squared rock platform, faced with fine masonry, and approached from below by an inclined plane or ramp. Below the rock platform on the side of the ramp was another colonnade, the roof of which was an extension of the flooring of the rock platform. The pillars of this lower colonnade were square, and on the wall behind, formed by the masonry facing of the rock platform, was a series of reliefs, beautifully coloured, representing processions of officials and incidents in the daily life of the court. The very many fragments on view at the exhibition show a beautiful and delicate school of art to have existed during the period in question, quite unlike the usual rough work which Egyptologists have been accustomed to associate with the XIXth dynasty. The columns in both the upper and lower colonnades each bear the name and titles of King Mentuhotep incised in the stone and coloured. The core of the pyramid is of rubble, faced with fine white limestone masonry, the work of the cornice of the base being particularly good, and the visitor will gather from the fragments exhibited to what a high pitch the mason's art reached during the middle empire. Built behind were a number of shrines in which were buried the king's favourites, who also filled the office of priestesses of the goddess Hathor. The stonework of these is most intricate and curious, while one at least is painted to look like wood. The mummies and sarcophagi of two of these ladies were discovered under the pavement of the colonnade, the latter being made of massive limestone slabs incised with a line of inscriptions, the hieroglyphics of which are perhaps the most beautiful of their kind known. Only photographs and drawings of these sarcophagi are to be seen at the exhibition, the originals, owing to their rarity and beauty, being claimed by the Egyptian Government for the museum at Cairo. Another feature is the three black granite statues of Usertsen III., one of the great kings of the XIIth dynasty, which were set up by him in his predecessor's temple. These statues represent the monarch at three different periods of his life—as a young man, in middle age, and in more advanced years. All, however, bear the characteristics of his dynasty, the high cheekbones, sad eyes, and the long fierce mouth with the corners drawn down. The portrait in each case is very striking.

In Ramesseid times, about 1,400 years later, the temple appears to have fallen into disrepair. A fine painted portrait statue of Paser, an official of Rameses II., who superintended restorations, may be seen, while a relief showing a still later king, Siptah, worshipping Hathor, points to his also having probably conducted repairs there. After this the building seems to have fallen into complete decay until it was gradually enshrouded by the sand of the desert, where it has lain covered ever since.

Among other interesting objects to be seen at the exhibition are a very beautiful cow's head in alabaster, of the best type of XVIIIth dynasty workmanship; two wooden coffins, of the period of the XXth dynasty, with the lids carved as portraits of the deceased and painted all over with religious scenes and texts; a bust of a dancing-girl of the Ramesseid period; several portrait statues of officials of various epochs; and a large number of workmen's tools, baskets, etc. It is hoped that next season the tomb of the king will be found and the small remaining portion of the temple cleared.

The Egypt Exploration Fund dispatched also, in 1904-05, an expedition to the copper and turquoise mines at Serabit el-Khadem, in the Sinaitic peninsula, which the Egyptians had worked from the earliest dynasties. Amenemhat III., of the XIIth dynasty, had built a small rock temple there dedicated to Hathor, and stretching out in front of it was a long series of chambers used by the Egyptian soldiers and miners dating from various periods down to late Ramesseid



times, about a.c. 1000. These ruins were described by Lepsius as far back as 1845, and the inscriptions were copied and the temple measured up by the Ordnance Survey of Sinai in 1869. Several archaeologists have since visited the spot, and, last winter, Professor Flinders Petrie was sent by the Egypt Exploration Fund to make an examination of the site. Unfortunately, as might have been expected, the yield of antiquities is poor, consisting chiefly of some broken red sandstone figures of the middle empire, a stele of Amenhotep III., of the XVIIIth dynasty, and some Ramesside figures, including the lower part of a statue of Ramesses II.; in addition are a number of pots and stone tools used by the workmen. Professor Petrie has taken some photographs and prepared a model (scale 1-50) of the buildings restored to what he considers to be their original condition. Plans, elevations, and sections have also been made, and copies and photographs of the early-empire inscriptions in the Wady Maghera, which were published by Lepsius in 1847. Characteristic of the site are a number of round-topped monoliths, some inscribed in hieroglyphs with mining records, others uninscribed. These Professor Petrie considers to be Semitic "Bethels," and has put forward the theory that Serabit el-Khadem was the centre of a Semitic cult. In support of this he claims, as additional testimony, two Egyptian lustral basins found in the court of temple, photographs of which are shown at the exhibition. These he considers to have been used for the purifications so characteristic of Semitic worship. The mounds of ashes which formed the "slag" from the copper smelting he supposes to be the remains of burnt offerings made by "early Semitic pilgrims." That not all archaeologists are able to agree with him is clear from an article in the current number of *Man*. Mention may also be made of a collection of XVIIIth dynasty blue faience and statette

ware, which has, unfortunately, lost most of its colour, and a few curious Egyptian figures inscribed in an unknown script.

Dr. Grenfell's spoil consists almost entirely of antiquities of the Græco-Roman period. It includes some fine specimens of painted Roman glass and a very beautiful little head of Aphrodite. Amongst the small figures, so characteristic of the period, a bronze Ceres is remarkable for its excellent workmanship.

#### RESTORATION OF TOWER, CHALGRAVE CHURCH, BEDS.

CHALGRAVE CHURCH dates from the XIIth century. About fourteen years ago the upper portion of the tower fell, and since then it has been partly pulled down and covered with a corrugated iron roof. The part above the apex of the nave roof has been re-built recently, but it was not considered advisable to restore it to its original height, owing to the condition of the walls. The old peal of bells has been re-hung. The addition has been built almost entirely of the old stone that at one time formed the upper walls. The work has been carried out by Mr. J. Cassé, of Hampton Wick.

JOHN P. SEDDON.

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A SPECIAL general meeting of this Institute was held, on Monday, at No. 9, Conduit-street, Regent-street, the President, Mr. John Belcher, A.R.A., in the chair.

The meeting was summoned in accordance with by-law 60, on the requisition of Messrs. S. B. Russell, Alfred H. Hart, T. Edwin Cooper, Herbert Wigglesworth, Alfred W. S. Cross, Wm. Flockhart, C. E. Mallows, R. Stephen Ayling, *Fellows*; Thomas A. Pole, H. V. Lanchester, J. E. Newberry, Herbert

W. Wills, John Anderson, *Associates*, in order to discuss the following amendments, proposed by the requisitionists, to the regulations for architectural competitions passed at the meeting of June 5, viz. :—

Clause 14 to read as follows :—  
"In all works costing an estimated sum of 25,000*l.* and upwards, three assessors to be appointed unless there are insurmountable objections. As stated above, the President of the Royal Institute of British Architects is always ready to advise on this or other points."

The amendment was negatived after discussion.

[The clause stands as follows :—] "In the case of works of considerable magnitude it is desirable that three assessors should be appointed. As stated above, the President of the Institute is always ready to advise on this or other points."

It was also proposed that the clause as to scale of charges in the original draft should be reinstated in the following form :—

"The usual R.I.E.A. scale of charges for assessing competitions is the sum of 30 guineas plus 1-5th per cent. upon the estimated cost of the proposed building."

This was adopted. A proposal met with the approbation of the meeting that it should be an instruction to assessors that their award should be given strictly on the conditions on which the competition was invited.

#### THE CASE OF GIBBON v. PEASE.

It will be remembered that in connexion with this case, which excited so much interest in the profession a little while since, the Editor of this Journal undertook to take charge of subscriptions for assisting Mr. Pease in the cost of contesting a case which involved a principle of so much consequence to architects in general.

The following letter from Mr. Pease's



CHALGRAVE CHURCH. BEDFORDSHIRE. S.W. VIEW.



solicitors explains the financial state of the position at present:—

"Sir.—We are now enabled to give you a balance-sheet in this matter, that you may see exactly how Mr. Pease is situated, apart from the defence fund which you opened in your paper. The costs of the plaintiff's action have been taxed at 115*l.* 14*s.*; the costs of the plaintiff's appeal have been taxed at 56*l.* 0*s.* 11*d.*, including the carrying of objections to the original taxation as far as the judge in chambers.

Our own bill against Mr. Pease for the costs of the action and of the appeal amounts to 260*l.*, this making a total of 431*l.* 14*s.* 11*d.* To set against this we have received the following subscriptions:—From the Surveyors' Institution, 100*l.*; from the Royal Institute of British Architects, 105*l.*; from the Society of Architects, 50*l.*; from Messrs. James & Morgan (private subscription), 5*l.* 5*s.*, this making a total of 260*l.* 5*s.* You will see, therefore, that this leaves Mr. Pease to pay the difference between these two sums, viz., 171*l.* 8*s.* 11*d.*

We know that you very kindly opened a fund to assist Mr. Pease some months ago; but we do not know how much it amounts to; but we must say we feel that it is only right to our client that we should appeal to you, as the official organ of architects in general, to give Mr. Pease's fellow practitioners an opportunity of seeing that a young and by no means wealthy practitioner should not be a loser by this substantial sum because he has endeavoured instead of propitiating a wealthy client at the expense of professional etiquette, to assert a point of practice of the greatest importance to the architectural profession at large.

CHARLES ROBINSON & CO.,  
Solicitors for the Defendant.

10, Norfolk-street, Strand.

June 23, 1905.

It will be seen that in spite of the assistance from various quarters named in Messrs. Robinson & Co.'s letter, Mr. Pease is still a loser to the extent of more than 170*l.* The subscriptions we have received towards the case have been much fewer in number than we should have expected, considering the great importance of the decision to architects; the following is an alphabetical list of subscribers with the amounts (those not otherwise described are of London):—

Bristol Architectural Society .....	£	s.	d.
Caniff Architectural Society .....	5	3	0
W. J. Hale (Sheffield) .....	10	10	0
G. Hubbard .....	2	2	0
A. Humphreys (Llandudno) .....	1	1	0
Institute of Architects of Ireland .....	5	5	0
S. Isidore Laid (Rutland) .....	0	10	6
Charles Lucas (Paris) .....	1	0	0
J. H. Martindale (Carlisle) .....	1	1	0
A. E. Powie (Norwich) .....	2	2	0
Myddelton Shilleries (Liverpool) .....	5	5	0
H. H. Statham .....	1	1	0
Philip Sturdy (Bournemouth) .....	2	2	0
J. R. Wigill (Sheffield) .....	2	2	0
Wolverhampton Architectural Association .....	2	2	0
	55	1	0

There was also a promise of 5 guineas from a well-known London architect, who I regret to find is too seriously ill at present to attend to any business, though it is understood that the subscription may be counted on.

It is not a very large sum for the profession to have subscribed towards assisting a young architect who was contesting a case of such importance to architects in general. Under the circumstances, I may say that the subscription list may be considered to be kept open till July 31, on which date I shall hand to Mr. Pease's solicitors a cheque for whatever the fund may then amount to, in the hope that some substantial addition may be made to it before that date.

H. H. STATHAM.

A BUILDING SITE IN LOMBARD-STREET.—The banking-house, Nos. 75-76, on the north side of Lombard-street, has been lately vacated by Messrs. Melville, Fickus, & Co. On June 28, at the March, a building lease of the property, for a term of eighty years, was let at 3,000*l.* per annum. The site, which is close to Pope's Head-alley and opposite St. Mary Woolnoth Church, has a frontage of 36 ft., and covers an area of about 1,600 ft. superficial. The lessee has the option of exercising the right of pre-emption within a certain fixed period. The house was formerly occupied by Messrs. Willis, Percival, & Co., bankers and the Society for the Relief of Poor Clergy.

#### THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.\*

In the discussion of Mr. Greatorex's paper Mr. J. Lemon (Southampton) said he was of opinion that the sooner by-laws were done away with the better. They wanted to be placed in the same position as the City of London, and have a Building Act. They all knew that some of the model by-laws, if adopted, were quite unworkable. He did not hesitate to say that legislation of a most drastic character was required. If they had an expert Committee of representatives of the Institute of British Architects, the Surveyors' Institution, and that Association, they might arrive at some solution of this difficult problem. He proposed a vote of thanks to the author of the paper.

Mr. G. W. Lacey (Oswestry) seconded the vote of thanks, and hoped the full report of the Sub-Committee might soon be available for the use of members of the Association.

Mr. James (Grays) protested against the suggested reduction of the size of windows from one-tenth to one-twelfth of the size of the room. Seeing how potent sunlight and fresh air were against disease they ought not to reduce the amount of light.

Mr. Elford (Southend) said with regard to the suggestion that buildings might be allowed to be constructed in wood and other materials, so as to cheapen the cost of construction, the greatest difficulty was likely to arise in the future on the maintenance of such structures.

Mr. MacBrair (Lincoln) contended that legislation that went beyond public opinion was not carried out, and that was why at the present time they wanted some reasonable by-laws. Local Authorities ought to have the power to modify by-laws.

Mr. Simonds (New Malden) considered that rural and urban by-laws should be kept distinct. It was not possible to reduce the cost of building much in urban districts, but it was possible to reduce it very materially in rural districts.

Mr. Smilie (Tynemouth) said he suspected that the representations which had been made would not have much effect with the Local Government Board. Instead of seeking to improve the building by-laws, an effort should have been made in the direction of reducing them to an absolute minimum.

Mr. Chambers Smith (Sutton) deprecated public officials speaking harshly of the Local Government Board, and said he had recently received much assistance from the officials in getting through a new series of by-laws for his district.

The President (Mr. Collins, Norwich) said he was strongly in favour of a general Building Act for the whole of the country, with each district having its own local by-laws to meet local circumstances.

#### Municipal Administration.

Mr. E. J. Elford, M.Inst.C.E. (Southend), read a paper on "Administration by Municipal Engineers." He said one of the prime essentials to the efficient administration of a municipal engineer's department was a sufficient and qualified staff. Unfortunately, some local authorities did not appreciate the importance of the former, but the author was fortunate in serving a corporation who, demanding a high standard of efficiency, recognised that the expenditure required to provide a sufficient staff was money well spent, and was necessary if the work was to be carried out with the greatest economy. The author should not forget to refer to one factor, which had an important bearing upon the quality of service likely to be secured, viz., the question of salary or wages.

It was unreasonable to expect the best results from badly paid employees of any grade, and the author had found by experience that it was the highest economy to pay even more than other people, and so get the pick of the men, than to pay less and have to take what others leave.

In the author's borough the drains of every new house were twice tested, first by water before they were covered in, and again, on the completion of the building, by smoke. The building inspectors were required to enter regularly in a book provided for the purpose a complete record of all visits paid to new

buildings, with particulars of the size and inclination of drains, nature of foundation, size of timbers, and other details of importance.

The President said no words were needed to emphasise the necessity of having a proper system of carrying out the administration and work of a municipal office.

Mr. Bush (Sudbury) proposed a vote of thanks to Mr. Elford for his paper. He believed any gentleman who followed Mr. Elford at Southend would find his work very much easier, because of the excellent system of administration which he had introduced into the office there. He believed the only way in which they could find out whether they were working their department in the best possible manner was by adopting some system of record books, so that they could see week by week and month by month what was going out in expenditure.

Mr. Cooper (Wimbledon) said the application of the matter was a subject to which too much pains could not be given, and with his own staff there was practically a competitive examination for every position.

Mr. MacBrair (Lincoln) did not think it was possible to have a fair monthly average of municipal expenditure.

Mr. Bamber (London) referred to the desirability of the Association having some more ready and economical means of making tests of stores. They ought to inaugurate a central laboratory with a chemist of their own to which samples of stores could be forwarded for testing. That could be done more economically than by referring these matters to experts. As a member of the Standardisation Committee on Cement he realised the importance of greater uniformity in the methods of testing.

The President said he had kept a check of expenditure by means of diagrams for years past, and considered the system well worth the time it occupied.

Mr. Elford, in replying, expressed himself as in agreement with Mr. Bamber as to the testing of cement.

#### Tramway Materials and Construction.

Mr. J. Owen (Colchester) read a paper on "Tramway Permanent Way Materials and Construction." He said the standard specification and section of tramway rails and fish-plates issued by the Engineering Standards Committee were admirably suited to meet the varying conditions of traffic in this country, and their adoption enabled the manufacturer to keep in stock a quantity of each kind of rail, while saving the cost of providing a new set of rails for each individual order.

Rails 60 ft. in length were now nearly universally used, as it had been found that they were but little more awkward to handle than those of 45 ft.

The fewer number of joints more than compensated for any small increased difficulty in handling.

In the earlier days of electric traction the carbon specified in many cases was as low as 0.35 per cent., but with heavy traffic and steep gradients this soon proved much too low. An average of 0.50 per cent. had been proved a happy medium, being sufficiently low to avoid signs of fracture, even when crowded to a curve of 30 ft. radius, and sufficiently high to obtain a chemical composition producing a tough, durable rail.

For the British Standard Section No. 2 the weight of fish-plates was given as 49*½* lb. per pair, but this, being weight before the holes were cut, was somewhat misleading. The actual weight as supplied was 46*½* lb. per pair—a difference of about 6 per cent., sufficient to make a large error where an extensive contract was involved.

Perhaps in no other department of tramway construction had the British manufacturers made such improvements as in the case of points, crossings, etc. A comparison of the old short cast steel point with the 13 ft. 6 in. point now used would best demonstrate this.

Iron-bound crossings were constructed in a similar manner to the above. Automatic and movable points were also fitted with tongues of manganese steel.

The great advantage of using iron-bound points and crossings was that uneven wear at the joint, due to difference in material, was greatly reduced, as the insert plate was played back and tightly fitted.

The life of the rail was only that of the

\* Continued from last week.



joint. To provide support various methods had been adopted.

The joint plate had been used in various places with unvarying success, and was a proved cure for "knocking" joints in an old track. Its principle was that of the parallel plates in a level. It consisted of a metal bed-plate resting on the concrete, a steel "supporting" plate in which two holes were screwed, and of two hardened steel bolts, which, on being screwed home through the holes provided in the supporting-plate, engaged with the bed-plate, and thereby lifted and supported the joint to any required position. Any subsequent depression, due to the rolling load or any other cause, could be readily adjusted by the use of a box spanner without any disturbance of the paving. In new track work it was claimed by the inventor to entirely obviate the necessity of expensive steel fish-plates, their primary function, that of support, having entirely ceased. In place of fish-plates, what were really two large cast-iron washers were substituted, being held from lateral movement by two ordinary tie-bars. In Manchester, where the joint support was first tested, several "knocking" joints were remedied, and were now in a perfect condition after twelve months' test with a one-minute service, which was equal to a five-years' test with a five-minutes' service.

But little saving was effected by using tie-bars notched at one end and screwed at each end. When finally easing the track in line with bars, the notched ends slip, thus altering the gauge. It should be insisted that all tie-bars comply with a certain standard; those supplied by a certain maker were so weak that during the night, owing to contraction of the rails at a curve, the tie-bars buckled, altering the gauge as much as 10 in.

In choosing the type of bond, preference should be given to one which could be reused in case of repairs, etc.

For a 40-ft. curve, with a car 6 ft. 7 in. in width and 4 ft. 8½ in. gauge, the minimum distance between centres of tracks would be: Overhang of car on straight track, 1 ft. 10½ in.; extra overhang on curve, 1 ft. 7½ in.; minimum clearance allowed, 1 ft. 3 in.; gauge, 4 ft. 8½ in.; centres, 9 ft. 5½ in.

With 4 ft. 8½ in. gauge and a curve of 50 ft. radius the cant necessary for a speed of six miles per hour worked out at 208 ft., or 2½ in., thus emphasising the need for cautious driving round curves where the necessary cant might not be obtained, owing to reverse cross-fall of street, etc.

Mr. A. D. Grestorex (West Bromwich) asked for some information as to how long the special joint had been in operation and the towns which had tried it. It appeared to him that the whole weight of the cars went on to the screws. If they had cars such as were in use in the Black Country, of ten tons in weight, carrying seventy passengers, it was a very heavy weight on the screws.

Mr. Elford (Southend-on-Sea) said he had seen a whole piece of track moved over bodily a distance of 18 in. in one night.

The President said the Norwich tramway was laid with the lightest section of rail allowed by the Board of Trade for any electric tramway in England. The rails were something like 54 lb. to 64 lb. to the yard. The track had been working for about five years, and they had the greatest difficulty in finding the joints. They were all laid on the cast-steel system, and he did not know that they had a defective joint in the seventeen or eighteen miles of track. He attributed the good result to the joints, together with a reasonable amount of anchoring.

Mr. Owen, in replying, referred to the alteration of the gauge. At night he left it all right, and passed it for concreting, but next morning he thought a traction engine had been over it, for every tie-bar was buckled. He put it down to the concentration of weight at the curve.

#### Highways and Modern Traffic.

Mr. C. H. Cooper (Wimbledon) read a paper on the adaptation of highways for modern traffic. He said it must be apparent to the most casual observer that many of the existing highways of this country were sadly in need of improvement in order to adapt them for rapid traffic, such as had been introduced with self-propelled vehicles. The

fact that some of the existing carriageways had remained in their present condition as a menace to life and limb for so many years reflected great discredit on highway authorities.

Many authorities allowed buildings to be brought forward in such a manner that ultimately large sums of money had to be expended in order to widen highways which must eventually form arterial thoroughfares. The author had been much struck with the great difficulty experienced in getting local authorities to appreciate the necessity of wide highways and the rounding off of corners, and he had been met with such arguments as that Ratcliff Highway, which was only 30 ft. wide, carried more traffic than any road in his district, and why, therefore, should he insist on a wider road—and this, not from an ordinary member of a council, but from an eminent member of the engineering profession.

It would be well if some provision were in force to compel highway authorities to have all new streets so laid out that every portion of the carriageway was visible from every other part of such carriageway which was within a distance of at least 100 ft., and that at the junction of any two carriageways the same rule was observed as if they formed the same street. The reason of this provision was that vehicles approaching should see each other at as early a period as possible so as to give every opportunity of avoiding collision. The surface of carriageways was a matter which required considerable attention, not only to carry horse traffic in comfort, but more especially to ensure safety and comfort to cyclists and motorists. The surface should therefore be as even as possible, and although all carriageways should be properly arched there should be no excessive arching such as would lead to the centre of gravity of vehicles being placed dangerously near the outer wheel. No gully grating should be allowed in the carriageways, but gullies should be placed beneath the paths, with a proper weir formed in the kerb to take the water on such grating.

Many persons looked on motors with pneumatic tyres as causing considerable damage to highways. This was no doubt the case where carriageways were badly constructed in the first instance, or were badly maintained; but the author knew of no form of traffic which caused less damage to carriageways, provided the surface was properly laid and a proper state of moisture maintained.

There was no doubt that, when railways became the great carriers of the country, the question of our highways became a matter of secondary consideration; in fact, in too many cases, they were neglected to an extent that must have damaged many interests. This state of affairs was rapidly changing, as our carriageways had, with the introduction of self-propelled vehicles, become a great means of conveying the wealthier portion of the pleasure seekers. At the same time the introduction of heavy motor traffic was being instituted for the carrying of goods, a class of traffic which must of necessity increase enormously. Local authorities, if they wished to remain highway authorities, must therefore make up their minds that the ordinary country road, which, in years gone by, was never subjected to a load exceeding 2½ to 3 tons, would in the near future be subjected to loads of at least ten times that amount, and that any attempt to prevent these loads traversing their roads at seasons when injury was likely to be caused could not be maintained. The only step for authorities to take was to form their highways in such a manner as that at all seasons they would be capable of bearing heavy traffic, and, above all, to see that all new streets and roads were so laid out that they would carry heavy traffic at all seasons.

Mr. A. T. Davis (County Surveyor of Shropshire) proposed a vote of thanks to Mr. Cooper for his paper. He agreed with Mr. Cooper as to the rounding off of corners, but considered it better to round off the building line than the footpath line. When driving through the new Aldwyth with a gentleman who was in business, he said the new thoroughfare was too wide for shops, as it was so much trouble to cross from one side to the other, and tradesmen did not want their possible customers to be forced to walk on one side of the road.

Mr. Wakelam (County Surveyor of Middlesex) said he had prepared a scheme for widening the trunk roads of Middlesex from 80 ft. to 100 ft. The estimated cost of widening the Brentford road was 475,000. If the trunk roads were to be widened, it meant an Exchequer grant, because the County of Middlesex could not bear the whole cost. In Middlesex they were erecting about 1,000 notice-boards for dangerous places, which showed the necessity of improving the roads and curves in Middlesex.

Mr. Cooper, in reply, said he had no fear of their having too many wide roads. At Brentford, vehicles had to be pulled up on the footpath to allow them to unload.

#### Cromer Waterworks.

Mr. T. Pritchard, M.Inst.C.E., read a paper on the water supply of Cromer. He said the works were originally designed and carried out in the year 1877, and intended to meet the then requirements of Cromer—at that time only a small seaside village, ten miles from a railway station, with but few summer visitors.

With the advent of, first, the Great Eastern, and afterwards the Great Northern and Midland Railways, the village grew into a considerable seaside resort, and the waterworks had from time to time been enlarged to meet the growing requirements of the district.

The works were originally carried out by a water company, which, with varying fortunes, conducted the business until the year 1902, when it was acquired by the Urban District Council.

The original works carried out by the company, of which Mr. Hodgson Jones, M.Inst.C.E., was the engineer, comprised a pumping-station, situate on the west side of the Roughton-road, having a well (No. 1), 6 ft. in diameter, sunk 85 ft., with a bore-hole varying from 12 in. to 9 in. in diameter, sunk to a depth of 400 ft. into the chalk.

The bore-pipe was taken 10 ft. into the chalk, but, after the pumps were fixed, it was found to be in the water at times, other means had to be found to exclude the sand. A clay-and-cement joint was put lower into the chalk, and a guide-pipe pressed into same and brought up in the bore-pipe, with the space filled with cement. This had the desired effect, and sand was permanently stopped out.

The pumping plant consisted of a 10-horsepower horizontal engine, by Hanna Donald Wilson, driving a bore-hole pump.

A covered service reservoir, holding 120,000 gals., was constructed on the high land above the town.

In 1887, it was necessary to obtain an additional supply when a second well and bore-hole were sunk 30 ft. to the northward of No. 1 well, the well being brick-lined for a depth of 12 ft., and a 12-in. bore-hole carried down 242 ft. into the chalk, boring lined with steel bore-hole pipes to a depth of 172 ft. 9 in.; the remainder being in the chalk was unlined. A 9-in. bore-hole pump, capable of lifting 6,000 to 7,000 gals. per hour, was fixed in this well.

In the year 1888, Mr. J. C. Mellis, M.Inst.C.E., was consulted on the question, and since that time had acted as engineer for the company and the council since the transfer of the works, the author having been associated with him since 1891.

Well No. 3 was sunk to a depth of 183 ft., lined with brickwork to a depth of 50 ft., continued with cast-iron cylinders, varying from 8 ft. to 5 ft. in diameter, into the chalk; a 12-in. bore-hole was carried 40 ft. down from the bottom of this well.

This well was connected with No. 2 well by an adit, curved round so as to miss No. 1 well, so that the water obtained in both No. 2 and No. 3 would be available at either well. As a fissure was visible on the north face of the well, an adit was cut to follow it for a distance of about 50 ft.

The rest-water line was 111 ft. below the surface, and the yield from the wells and adits at this time amounted to 200,000 gals. per day.

Professor Frankland stated in his report—"The water is of most excellent quality for domestic purposes, absolutely free from all evidence of previous sewage or animal contaminations, and of every moderate hardness for chalk water, and Cromer may be



congratulated on being supplied with one of the best waters in Great Britain."

Towards the end of 1895, owing apparently to dry seasons, the yield of the wells had fallen to 63,000 gals. per day, with a water-level about 50 ft. below sea-level. It became necessary to obtain an additional supply; rights were obtained from the owner to drive adits in the chalk under 13 acres of land to the south of the pumping station, and by May, 1896, 400 ft. of adits, 4 ft. 6 in. wide and 6 ft. high, were driven east and west of original heading, which, after continuous pumping during their construction, brought up the yield to 190,000 gals. per day. This was sufficient to last for another two years, when it was decided to further increase the length of adits by 300 ft., which brought the yield up to 254,640 gals. per day.

By September, 1902, when the test pumping for aeration purposes was made, it was found that the yield from the works had again fallen to 160,000 gals. per day, and, as it would be some time before the auxiliary works would be available, it was decided to further extend the adits, when, by driving a further length of 265 ft., the average quantity shown by a five-days' test amounted to 296,000 gals. per day. Since this time there had been no test of the quantity available, so one could not say what it was, but during last summer the yield did not appear to have seriously fallen off.

In the year 1900 it was considered advisable, not on account of any failure in the existing works, but in consequence of the growth of population in many of the surrounding places, to go further afield to secure a larger supply of water. For this purpose it was decided that auxiliary works would be advantageous on account of the increased quantity of water that would be available as well as on account of the benefit that would arise by having a service reservoir placed on the highest ground in the neighbourhood, which would give sufficient pressure to supply the whole of the company's district and allow that district to be considerably extended.

Before deciding upon the site for such auxiliary works, Mr. Clement Reid and Mr. William Whitaker were consulted on the geological aspect of the question.

A site was decided upon in the valley at Melton, about four miles to the south of Cromer and the same distance from the sea, where it was considered the chalk would be met with about 10 ft. above Ordnance Datum (as a matter of fact, the chalk was touched at 12 ft. above Ordnance Datum). A site, having an area of one acre, was acquired for the well and pumping station, together with the right of driving adits in the chalk under the surrounding lands.

A test bore-hole was sunk on the site at Melton in 1901, 8 in. in diameter and 203 ft. deep, lined so as to exclude all water lying above the chalk, when the water flowed over the surface, and had been overflowing ever since.

The permanent well had recently been completed; it was 160 ft. deep, lined from the surface to 125 ft. with cast-iron cylinders 14-in. thick, built up in seven segments to each ring. From the bottom of this well a 12-in. diameter bore-hole had been sunk 100 ft.

Adits had been driven from this well to connect with the test bore-hole, and in following fissures which appeared, the total distance driven being 417 ft.

It had been hoped to have obtained a supply of 1,000,000 gals. a day at the new works so as to ensure an abundant supply for many years to come, but this quantity was not reached (although there was no doubt that by extending the adits it would have been), and, as the council considered they had expended as much as they were justified in doing, the work was stopped and the yield was proved on testing to amount to 730,000 gals. per day.

This amount equalled about 24 times the water supply of Cromer, the maximum day's demand, which, at the height of the last season, amounted to just over 300,000 gals.

In the discussion which followed, The President asked whether the water-level was ever lowered below the mean sea-level, and, if so, were there any signs of the infiltration of sea-water?

Mr. A. D. Greatorex, who moved a vote

of thanks, remarked that it was gratifying to know that Cromer had a good supply of pure water.

Mr. W. Nisbet Blair (St. Pancras), who seconded, remarked that with two wells he had recently sunk in St. Pancras they lifted the water by the air-lift system. That unquestionably proved more economical than the deep-well pump, and they were able to get a higher delivery from the fixed-size bore-hole than they could from the pump fixed in the bore-hole. Had Mr. Pritchard considered the method of lifting water by an air-lift? as any difficulty in getting the quantity by a deep-well pump would be overcome by an air-lift.

Mr. Schlund (Woolwich) said it had occurred to him that the caulking of the joints with oakum to stop the leaking of water from the reservoir was not a sanitary thing to do—that the oakum would form a breeding-ground for bacteria.

Mr. James (Grays) mentioned that in his district they had a pumping station for practically the whole of South-east Essex, situate half a mile from the Thames. A complaint was made that the water was dirty, and, on a sample being sent to Dr. Thresh for analysis, he found that it contained 17 grains of chlorine per gallon and that about 64 per cent. of Thames water was going in, making the supply dangerous to drink.

Mr. Pritchard, in reply, said there had been no infiltration of sea-water. Practically the whole of the water came from the land side. For several years they had felt they might have the sea in at any time, and that was one of the reasons why they decided to go inland for their new works. With reference to the caulking of the faulty joints of the reservoir with oakum, he explained that the joints were cut down the full depth of the brickwork, and there were 2 in. of cement covering the oakum. He asked the chemist before putting it in if there was any risk, and he said there could not be as the water never touched the oakum.

Mr. P. H. Palmer (Hastings) contributed a paper on "Armoured or Reinforced Concrete," and Mr. A. R. Galbraith a paper on "Reinforced Piling."

#### Reinforced Concrete.

Mr. Philip H. Palmer, M.Inst.C.E., in his paper on "Armoured or Reinforced Concrete," said that armoured concrete had been defined as a heterogeneous material consisting of a matrix of concrete in which was embedded a skeleton framework of iron or steel. Its use in various forms of construction had been known for many years, but it was only within the last few years that the varied problems involved in its use had been thoroughly studied and understood. On the Continent and in the United States the progress had been rapid, but in this country engineers had not, until a comparatively recent date, given that attention to this work and its enormous possibilities that it should have received. The author was of opinion that, before many years, the principles of armoured concrete would have been fully appreciated, and this method of construction almost universally used in concrete structures for engineering purposes.

The laws governing the combination of concrete and steel, although not absolutely determined, were known with sufficient exactness to permit the design of nearly all classes of structures with the assurance—employing good material and first-class superintendence—of permanent strength and durability.

The concrete itself played a part as important as the steel, and the variation in the strength and elasticity of this material under different conditions had sometimes been overlooked in the theoretical study of the combination of concrete and steel.

Concrete structures, when reinforced with iron or steel rods properly placed, developed a capacity for carrying loads or resisting strains several times greater than would be the case without reinforcement. It was evident that the position and nature of the reinforcement in the structure must conform to the principles of mechanics, so that the concrete should be strengthened in its weakest part; and, as concrete was comparatively weak in its resistance to tension and shear, the reinforcing metal should be placed where it would aid the concrete in carrying these stresses.

The position of the metal would vary accord-

ing as the parts of the structure were in compression or tension; in beams, it should be as near to the surface on the tension side of the beam as was consistent with properly embedding it and providing a sufficient thickness of concrete to protect it from the heat or weather, and to ensure that the stretching of the tension surface did not result in the formation of cracks in the concrete.

As concrete was a comparatively brittle material, and steel a ductile one, it was not only necessary to have a proper quantity of metal in the structure, but it must be correctly located, and of good quality.

Professors Talbot and Turneure (America) both concluded that the tensile strength of concrete might be disregarded in the consideration of the ultimate load carried by a beam. This agreed with actual practice, and with the regulations issued by the Minister of Public Works of Germany in 1904. The tensile resistance of the concrete affected the deformation and deflection of beams under the smaller loads, but if, as was customary, the working strength was taken as a definite fraction of the resistance at the elastic limit of the steel, the tensile resistance of the concrete need not be considered in the design of reinforced beams.

The depth to which the steel rods should be embedded in the concrete, varied considerably, whether they were round, square, flat, or some patented irregular section or surface. In reinforced structures it was necessary to securely anchor the ends of the rods to prevent slipping of the steel, or by introducing stirrups, or other vertical or inclined reinforcements. The rods should not be spaced nearer together in the clear than the sum of their two diameters, and in no case less than 1½ in. apart, nor nearer than 1½ in. in either side of the concrete.

It was of the first importance that the concrete used in reinforced design should be composed of the best materials, properly proportioned, mixed, and packed.

The proportion of cement to the aggregate depended upon the nature of the construction and the required degree of strength or watertightness, as well as upon the character of the inert materials, and as both strength and imperviousness increased with the proportion of cement to aggregate, relatively rich or fat mixtures were necessary for loaded columns and beams, for thin walls subjected to water pressure, and for foundations laid under water.

The systems more frequently used in this country were the Cottancin, Expanded Metal, Hennebique, and Monier, but these and some others were used considerably in the United States and the Continent of Europe.

The application of reinforced concrete to engineering designs was becoming more general in this country, but to nothing like the rate of progress which was being made in North America and Western Europe. The Government departments of Germany and the United States had acknowledged its reliability, advantages, and suitability for almost all structures; and, in the former country, rules and regulations to govern its use had been drawn up by the Department of Public Works. In this country most of the work executed in reinforced concrete had been carried out in one or another of the various systems in use, for companies or private individuals, who had not to apply to a government department for a loan to cover the cost of such work.

The adaptability of reinforced concrete for a building material was exemplified in numerous structures which not only from an engineering standpoint, but architecturally as well, were models of the builder's art. The fire-resisting qualities of reinforced concrete appeared, both from experimental and actual fire tests, to be superior to those of any other material; and, in fact, it was doubtful if, without reinforced concrete construction, it would be practicable to erect the sky-scraping structures which abound in the great cities of America, but, it was hoped, might never be seen in this country on the same lofty scale.

#### Reinforced Piling.

Mr. A. R. Galbraith, A.M.Inst.C.E., read a paper on reinforced piling. He said that, in addition to the usual advantages that were associated with the adoption of these constructions—for instance, fire-resistance, durability, homogeneity, economy, etc.—the use of these piles in submarine work ensured



immunity from the dreaded attacks of the teredo navalis and other boring pests that destroyed timber piles, and there was no serious oxidation of the metal to be feared, as in steel piles. One of their most important advantages was that, owing to their impermeability when properly constructed, they were equally durable in dry or wet soils, whereas in order to preserve timber piles they must be constantly submerged. Unlike timber and steel piles, they could be easily lengthened, shortened, jointed, altered, or repaired (the last being seldom necessary), and there were virtually no maintenance expenses, such as were connected with their timber or steel prototypes. Their most serious disadvantage was their first cost, although under favourable circumstances they would be found nearly as cheap as timber ones, and a great deal more economical than those of steel. Pile for pile, the cost would generally exceed that of timber; but often, however, their adoption would mean a saving in the ultimate cost of the work, especially in foundations, owing to the piles not having to be cut off below ground water-level, and the reduction of the excavation and in the volume of masonry. The concrete pile had also a much greater bearing capacity than the wooden one. In strata where a wooden pile 20 ft. long, 12½ in. diameter at the top, and 10 in. at the bottom would carry 17,000 lb., a concrete pile 20 in. at the top and 6 in. at the bottom would carry 65,000 lb. This was for plain concrete, and when to this resistance of the reinforcement in the reinforced concrete pile had to be added, it would be at once perceived that the bearing capacity was considerably in excess of that of the ordinary timber one. They were also as elastic and as resilient as timber, a pile 14 in. square, 43 ft. long, suspended in the middle, giving a deflection of from ¾ to 4 in.; and they could be used for driving through strata of the most formidable character, standing a punishment that would absolutely wreck a timber pile. The ease and efficiency with which they could be connected to the reinforced concrete or other superstructure they had to support, and their freedom from vibration, owing to their monolithic nature, rendered them peculiarly adaptable for the foundations of piers and bridges, locks of docks, and other structures of a similar description, eliminating the heavy expenditure for cylinders, and, in the case of masonry piers, the indispensable, but expensive, cofferdams and pumping. In short, these piles comprised the advantages of timber piles, with some of the advantages of masonry piers, and the busy engineer would find by their adoption the solution of many problems not so easily or cheaply solved by the ordinary methods. Last, but not least, should be mentioned the facility with which the component materials could be procured or transported, and the economy of space when these piles were used for dock, quay, and wharf walls, together with the ease with which such structures could be suitably anchored by means of connecting tie-rods to anchor piles driven in the adjacent strata beyond the line of pressure of the superimposed filling.

Mr. J. Lemon (Southampton) in proposing a vote of thanks to the authors of the papers said he superintended the construction of some coal hoppers at Portsmouth in ferro-concrete on the Hennebique principle. The experience he gained was that the construction was slow in carrying out, and was not cheaper than other modes of construction; but, notwithstanding this, he was of opinion that ferro-concrete had come to stay.

Mr. J. T. Eayrs (Birmingham) was of opinion that great care should be exercised by engineers in the designing of these structures, and more particularly in the materials which were used in making up the concrete. He had had some conversation with the engineering staff of the Local Government Board, and had come to the conclusion that the Board was not very favourable to reinforced concrete.

Mr. Martin (Leeds), Mr. Bamber (London), Mr. A. D. Grestorez (West Bromwich), Mr. James (of Grays), and the President took part in the discussion on the papers.

The members visited the works of the Norwich Water Company, where they were received by Ald. Chamberlin (chairman) and Mr. Chas. Hawkesley (consulting engineer), under whose guidance the works

were inspected. The Waterworks Company entertained the President and members of the Association to luncheon. In the afternoon the city depot, the gasworks, and the castle museum were visited.

#### FIRE PROTECTION IN LONDON.

On Friday of last week Mr. E. T. Hall, Vice-President of the Royal Institute of British Architects gave evidence, before the Committee of the House of Commons which has under consideration the London Building Act Amendment Bill and the Bill promoted by the City Corporation, on behalf of the governors of Dulwich College. From his experience of building matters in London he had, he said, come to the conclusion that the legislation of 1894 was still sufficient, and he could see no ground for the proposed alteration of buildings erected in accordance with the Act of that year.

Mr. Edward White, a member of the Building Act Committee of the London County Council, said that the Bill certainly required further consideration before it was made law. Witness, who spoke on behalf of the London Chamber of Commerce, considered that the Bill would press very hard in the case of the majority of existing buildings.

On Tuesday last the Hon. J. D. Fitzgerald replied at great length on behalf of the London County Council, and the Committee deliberated in private.

On the re-admission of parties to the committee-room, the Chairman announced the decision of the Committee. He said that he would deal with the City of London (Escape from Fire) Bill first. The Committee decided that the preamble of the Bill had not been proved. With regard to the other Bill—the London County Council's Bill—the Committee decided that the preamble was proved so far as it related to escape from fire.

Some discussion between counsel ensued, and it was arranged that the clauses should be settled on Thursday.

#### THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

##### III.—AUDLEY END AND SAFFRON WALDEN.

In brilliant weather, an excellent excursion was made on Saturday afternoon, 1st inst., to the famous XVIIIth century mansion, Audley End, upon the occasion of the third summer visit. The subject is too well known to call for detailed reference, and there is a great amount of authoritative literature concerning its history within easy reach. It may be of interest to our readers to know, however, that we published a number of photographs of the exterior and interior on March 31, 1894, together with notes upon them, and we have, at various times, illustrated some of the more important internal details.

The setting of this stone house in leafy woodlands is both beautiful and dignified, while the scene is enhanced by the grass lawns and meadows, and by a river. By the courtesy of the owner the party of members of the Architectural Association were enabled to view the whole of the apartments. Great interest was aroused by the elaborate plaster ceilings, the banquetting hall, the two magnificent oak staircases in which a free use of the newel is predominant, the mantelpieces, the valuable collection of pictures, furniture, armour, and *objets d'art*. There was, however, one element in the whole which entirely marred the completeness of a great design—the glass in the windows. Here the original leaded lights had been removed to give place to sliding sashes with large panes of plate-glass, and the result is disastrous.

Saffron Walden, about a mile distant, was next visited. This little town teems with architectural interest. Foremost is the fine church, standing upon high ground, and containing many good monuments. Then the plastered fronts to the houses form a collection of a beautiful decorative process for which the eastern counties are still renowned. Many good brick facades of Georgian times are to be seen, and much modern work of a high order. Mr. Rickman designed the new spire to the church, while the half-timbered town hall is by the late Edward Burgess. A very interesting brick and stone building is "Gibson's Bank," by the late Eden Nesfield, who also restored the adjoining inn. The stone drinking fountain, by the late J. F. Bentley, has much to repay a careful study.

#### THE LONDON COUNTY COUNCIL.

The first meeting of the London County Council after the Whitsun recess was held on Tuesday, in the County Hall, Spring-gardens, Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee it was agreed to loan Camberwell Borough Council 12,000l. for paving and channelling works, and 5,000l. for contribution to cost of street improvement; Chelsea Borough Council, 5,000l. for wood-paving works; Finsbury Borough Council, 915l. for asphalt paving works; Islington Borough Council (sanction), 4,885l. for electric-light installation, and 15,504l. for electric-light installation and meters; Metropolitan Asylum District Managers, 100,000l. for various purposes; Paddington Borough Council, 5,816l. for reconstruction of Warwick-road bridge; and Stoke Newington Borough Council, 900l. for site for electricity station.

**Site for New School, Brixton.**—The "Reg."—It was agreed to acquire the site for the school in Hackford-road, to be known as the "Reg." London County Council school.

**Calford Bridges.**—The Bridges Committee recommended that authority be sought in the session of Parliament of 1906 to enable the Council to reconstruct, in accordance with the plan submitted to the Bridges Committee on May 11, 1904, the bridge carrying Calford Hill over the South-Eastern and Chatham Railway Company's line; and that the application to Parliament be made dependent upon the Levisham Metropolitan Borough Council contributing a sum, not exceeding 26,500l., towards the cost of the work, on the understanding that, in the event of the total cost of the bridge being less than 53,500l., the difference shall be deducted equally from the respective proportions of the cost to be borne by the Council and the Metropolitan Borough Council.

**Proposed Footway Tunnel under the Thames.**—They also recommended that authority be sought in the session of Parliament of 1906 to enable the Council to construct a footway tunnel to connect North and South Woolwich; and that, in the Bill, provision be made to amend section 16 of the Metropolitan Board of Works (Various Powers) Act, 1885, so as to enable the Council to make such modifications in the present ferry services as may be considered desirable.

**Vauxhall Bridge.**—Mr. Straus, in reply to Lieut.-Colonel Rotton, said the progress of the construction of Vauxhall Bridge still remained satisfactory, and there was every possibility of the bridge being completed by the end of the year.

On the recommendation of the Committee the Council approved of an agreement with Mr. A. Drury, A.R.A., for the payment of 1,200l. to him for the modelling and casting of each of the eight panels for Vauxhall Bridge, the fee to include everything necessary to render the panels fit and ready for fixing.

Sir Melvill Beachcroft asked what kind of panels these were to be.

Mr. Straus replied that they were heavy bronze Pre-Raphaelite panels in high relief. The Council, having transacted other business, adjourned.

#### APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

##### Lines of Frontage and Projections.

**Strand.**—An iron and glass shelter at the entrance of the Gaiety Restaurant, Strand (Messrs. Jones & Willis, Ltd.).—Consent.

**Westminster.**—A one-story shop on part of the forecourt of No. 124, Victoria-street, Westminster (Messrs. Griffin & Woodard for Mr. J. B. Mansel).—Consent.

**Lambeth (North).**—A mission hall with projecting steps thereto on a site abutting upon the northern side of Webber-street, and western side of Ufford-street, Lambeth (Mr. G. D. Stevens for the trustees of the "Collingwood" Wesleyan Mission).—Consent.

**St. George, Hanover-square.**—Projecting bay windows and a porch to a building between Nos. 60 and 63 Grosvenor-street, St. George.



Hanover-square (Messrs. Balfour & Turner for Mr. J. Garlick).—Consent.

St. Pancras, South.—Underground cellars in the forecourts of Nos. 16, 17, 18, and 21, Euston-road, St. Pancras (Mr. W. Flockhart for Dr. Parry).—Consent.

Brixton.—Retention of a showcase at No. 133, Clapham-road, Brixton (Mr. J. U. Davis).—Consent.

Camberwell, North.—One-story shops on part of the forecourts of Nos. 98, 99, and 92, Wyndham-road, Camberwell (Mr. R. Pettifor).—Consent.

Dulwich.—Buildings on a site abutting on the south side of Barry-road and east side of Lordship-lane, Dulwich (Messrs. Harrington & Ley for Mr. J. Redapple).—Consent.

Hammermith.—A porch, bay window, and balcony at No. 38, Blomfield-road, Uxbridge-road, Hammermith (Messrs. Macintosh & Newman for Mr. E. J. Clayton).—Consent.

Hammermith.—A bay window at No. 65, The Grove, Hammermith (Messrs. H. Chapman & Co. for Mr. M. Griffe).—Consent.

Hampstead.—A projecting lantern light over a portion of the area in front of the Palmerston-road baths, Kilburn (Mr. H. G. Leggo for the trustees of the Wells and Campden Charity).—Consent.

Hampstead.—Enclosures to a portico at No. 12, Belsize-square, Hampstead (Messrs. Bouchier, Burnmaster, & Galsworthy for Mr. J. Davis).—Consent.

Hampstead.—A bay window at No. 3, Wedderburn-road, Hampstead (Mr. V. H. King for Mr. F. E. F. Barham).—Consent.

Levensham.—One-story shops upon part of the forecourts of "Rosebank" and Nos. 1 and 2, Blake-villas, Brownhill-road, Clarendon (Mr. W. M. Proudfoot for Mr. A. Blake).—Consent.

Newington, West.—Two houses, Nos. 39 and 40, De Laune-street, Kennington (Messrs. Briant & Son for Mr. A. F. De Laune).—Consent.

Norwood.—That the application of Messrs. D. Young & Co. for an extension of the periods within which the erection of buildings on the western side of Brixton-hill and New Park-road, Norwood, was required to be commenced and completed, be granted.—Consent.

St. George, Hanover-square.—Projecting stone balconies to new premises on the site of St. George's Chapel, Albemarle-street, St. George, Hanover-square (Messrs. Gale, Durlacher, & Emmett for Mr. G. Durlacher).—Consent.

St. George, Hanover-square.—The retention of an iron and glass covered way at No. 98, Knightsbridge (Mr. J. Tattersall).—Consent.

Westminster.—A bay window at No. 58, Emslie-gardens, Westminster (Messrs. Flood & King for Mr. C. W. Parish).—Consent.

Woodwich.—A porch and verandah at "Findon," Southwood-road, New Eltham (Mr. R. Baker for the executors of the late R. C. Davis).—Consent.

Marylebone, East.—Projecting bay windows and a balcony at No. 60, Portland-place, St. Marylebone (Messrs. Boehmer & Gibbs for Matthews, Rogers, & Co.).—Refused.

St. George, Hanover-square.—The retention of a stone balcony and entrance porch at "Symond's Hotel," No. 34, Brook-street, St. George, Hanover-square (Messrs. G. Trollope & Sons and Collis & Sons, Ltd. for the Symond's Hotel Company).—Refused.

Brixton.—A one-story shop on part of the forecourt of No. 87, Bedford-road, Clapham (Messrs. Price, Arrow, & Taylor for County of London Estates Company).—Refused.

Hackney, North.—An advertising hoarding in front of No. 4, High-street, Kingsland (Messrs. F. Matcham & Co. for the London Coliseum, Ltd.).—Refused.

Strand.—A projecting sign at No. 11, Wardour-street, St. James', Westminster (Mr. J. Richardson for Messrs. Sam Isaacs & Co., Ltd.).—Refused.

Woodwich.—A greenhouse at No. 10, Basil-don-terrace, Basildon-road, Plumstead, to be abut upon Cordite-street (Mr. J. O. Cook for Mr. C. W. Reynolds).—Refused.

#### Width of Way.

St. George-in-the-East.—A building upon a site abutting upon the east side of Splids-street and south side of Ellen-street, St. George-in-the-East (Mr. A. Davis).—Consent.

Brixton.—Retention of a one-story office building at No. 175, Fendal-road, Brixton (Mr. W. H. Duffield for Mr. D. Greig).—Consent.

Greenwich.—A house at No. 58, The Stowage, Deptford, with a foundation boundary at less than the prescribed distance from the centre of the roadway of the street (Mr. J. Webster for Messrs. May & Roberts).—Consent.

Marylebone, East.—No. 97, Henry-street, St. John's Wood, with external walls at less than the prescribed distance from the centre of the roadway of Bantine-court (Mr. A. J. Hopkins).—Consent.

Whitechapel.—A building at No. 18, Tenter-street East, Whitechapel, with external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. G. H. Lovegrove for Messrs. Hyman & Son).—Consent.

Woodwich.—Deviation from the plan approved for the erection of houses with bay windows on

the east and west sides of Back-lane (renamed Belford-grove), Artillery-place, Woolwich, and the widening of Back-lane so far as relates to the erection of houses on the east side of Belford-grove (Mr. F. C. Hensy).—Consent.

Peckham.—Three buildings on the south side of Wagner-street, Peckham (Mr. J. P. Choate for Mr. B. Gale).—Refused.

Chelsea.—A motor shed at the rear of No. 31, Cadogan-place, Chelsea, with external walls at less than the prescribed distance from the centre of the roadway of Little Cadogan-place (Messrs. Allen & Mannoch, Ltd., for Mrs. Eliot).—Refused.

Fulham.—Four dwelling-houses between Nos. 27 and 32, Caroline-place, Lillie-road, Fulham (Mr. H. Curzon for Mr. B. Rohle).—Refused.

Brixton.—A building at the rear of No. 1, Bellsfields-road, Brixton, with external walls at less than the prescribed distance from the centre of the roadway of a street at the rear of those premises (Mr. G. Guy-Rogers for Mr. F. Prebble).—Refused.

Southwark, West.—A block of working class dwellings on the eastern side of King's-court, Southwark (Mr. A. Burr for the Jolly Trust).—Refused.

#### Width of Way and Lines of Frontage.

Dulwich.—An addition at the rear of No. 184, Camberwell-grove, Camberwell, to abut upon Staines-road, and of a bay window in front of such building (Mr. A. Laycock).—Consent.

Hampstead.—An entrance porch at "West Heath Lodge," Branch-hill, Hampstead (Mr. W. T. Farthing & Son for Mr. M. Kuehn).—Consent.

#### Lines of Frontage and Space at Rear.

Hampstead.—A stable building, with an irregular open space at the rear, and the erection of brick and oak porches to two houses on the west side of Bracknell-gardens, Hampstead (Mr. J. D. Hunter for Mr. J. Wilson).—Consent.

#### Lines of Frontage and Construction.

Finsbury, East.—An iron gangway across Basterfield-street to connect the third floor of premises on the north side of that street with the third floor of No. 6, Bayers-street, Golden-lane, St. Luke's (Mr. J. Groom for Messrs. Pearks, Ltd.).—Consent.

#### Width of Way, Line of Frontage, and Space at Rear.

Lambeth, North.—Three cottages on the western side of Over-place, Lambeth, northward of No. 92, Princess-road (Messrs. J. A. J. Woodward & Sons for Mr. G. Brittain).—Refused.

#### Width of Way and Construction.

Whitechapel.—An iron and glass shelter over a portion of a yard abutting upon the north side of Fashion-street, Whitechapel (Messrs. Still, Wheat, & Luker for Messrs. Scammell & Nephew).—Consent.

#### Width of Way, Line of Frontage, and Construction.

Poplar.—The erection of a street leading out of the west side of Emma-street, Poplar, of an iron gangway and overhead traveller to connect the premises of Messrs. Venesta, Ltd., with the premises of the Aberdeen Steam Navigation Company (The Fireproof Co., Ltd., for Messrs. Venesta, Ltd.).—Refused.

#### Space at Rear.

Bethnal-green, South-West.—That Messrs. Joseph and Smith be informed, in reply to their request on behalf of the Four Per Cent. Industrial Dwellings Co., Ltd., that the Council should declare that a disused burial ground at the rear of the site of proposed buildings on the eastern side of Brady-street, Bethnal-green, is secured permanently or to the satisfaction of the Council as an open space by covenant or otherwise, that the Council is of opinion that such disused burial ground is such an open space as is contemplated by section 41 (1) (iii) (h) of the London Building Act, 1894; and that moreover the Council is satisfied that the maintenance of such burial ground as an open space is secured in accordance with such section.—Consent.

Levensham.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of two houses on the western side of Salehurst-road, Crofton Park, Lewisham, with irregular open spaces at the rear (Mr. H. Lilly-white).—Consent.

Dulwich.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on a site abutting on the south side of Barry-road and east side of Lordship-lane, Dulwich (Messrs. Harrington & Ley for Mr. J. Redapple).—Consent.

Fulham.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a shop with dwelling-house over on the western side of High-street, Fulham, adjoining the "King's Head" public-house (Messrs.

Brown & Barrow for Messrs. Charrington & Co., Ltd.).—Consent.

Wandsworth.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of seven houses on a site abutting upon the northern side of Wimbledon-road and southern side of Garratt-lane, Wandsworth, and the erection of a house on the northern side of Wimbledon-road next St. Mary's churchyard (Mr. G. Pinkerton for Mr. A. W. Lee).—Consent.

#### Deviation from Certified Plans.

Paddington, South.—Deviations from the plan certified so far as relates to the proposed rebuilding of Nos. 7 and 8, Polygon-mews, Paddington (Mr. L. E. G. Collins for Mr. L. Fimoro).—Consent.

Hampstead.—That an order be issued to Mr. O. E. Winter, sanctioning the formation or laying out of a new street for foot traffic only, to lead from Sarre-road to Gondar-gardens, Hampstead (for the Council of the Metropolitan Borough of Hampstead).—Consent.

Hampstead.—That an order be issued to Mr. F. Hington refusing to sanction the formation or laying out of a street for foot traffic only to lead from High-road, Kilburn, to Kilburn-priory (for Mr. W. Stephens).—Refused.

The recommendations marked † are contrary to the views of the local authority.

#### ARCHÆOLOGICAL SOCIETIES.

WORCESTER DIOCESAN ARCHÆOLOGICAL AND ARCHÆOLOGICAL SOCIETY.—The first summer excursion of this Society took place on the 20th ult., a start being made from Shrub Hill. Shipton Station was reached at about noon, and brakes conveyed the party to the church, where the vicar (the Rev. W. Collingwood Carter) was in readiness to point out the many features of interest in Shipton Church, which consists of nave, with side aisles, large chancel, south porch, with chamber over, and an Early English tower and spire. North and south of the tower are remains of two narrow Norman aisles, which have now given place to late XIVth century aisles, that on the south side being wider than the nave, while the east portion is considerably earlier, and was probably originally a transeptal chapel, when the church had not assumed its present ample dimensions. The font and pulpit are both good examples of early XVth century stonework. There is a curious palimpsest brass in the north chancel aisle, a mutilated early XIVth century effigy of a lady placed in one of the two canopied sepulchral recesses, which, however, is too small for it, and a curious little monument, without name, on the south side of the sanctuary. A drive of four miles over a Cotswold ridge, and through what was once the forest of Wyche-wood, brought the party into the Windrush Valley, where Swinbrook Church was soon discovered, perched on its little hill. On approaching the church the small early XIXth century tower and the large perpendicular east window arrest attention. On nearer approach the square-headed windows on the north side reveal a quantity of ball-flower ornament. The interior is a good specimen of a small church, with side aisles and clerestory, but is chiefly remarkable for the Fettiplace monuments, which occupy nearly the whole of the chancel walls, and two good brasses on the sanctuary floor. One of the Early English nave arcade capitals is remarkable for its ornamentation, which suggests a XIIIth century edition of Roman work, and which the medieval artificer may have seen in a Roman villa, perhaps at Widdford, close at hand. Widdford must be visited to be appreciated. Built on the site of a Roman villa, its chancel floor is still partly composed of tessellated pavement. Frescoes cover the walls, the subjects including a S. Christopher, the Three Kings in life and death, the latter being crowned and sceptred skeletons, both subjects dear to our mediæval forefathers, and other subjects are still clearly distinguishable. The pulpit is the original XVth century wooden one. This little building is now being repaired with the greatest reverence and care. A two-mile drive brought the party into Burford, the church and priory being visited. The little church of Fulkhook, with its fine Early English porch and remarkable nave arcade capitals, was visited on the return to Shipton Station, which was reached in time to catch the 7.15 train, arriving at Shrub Hill at 8.47.—*Worcester Herald*.



## ENGINEERING SOCIETIES.

**SOCIETY OF ENGINEERS.**—The President and members of the Society, on Wednesday, June 28, visited the Lots-road Electric Power Generating Station of the Underground Electric Railways Company, of London. The building is 453.5 ft. by 175 ft. and 140 ft. in height from the ground floor to the peak of the boiler-house roof. The office building adjoining on the east measures 81 ft. by 25 ft., and has three floors, the lower of which forms the machine shops. The main building has a self-supporting steel frame weighing about 6,000 tons. There are four chimneys, each 19 ft. internal diameter and 275 ft. high; the foundations for these chimneys are 42 ft. square and 34 ft. 6 in. below the ground-floor level. There are 2,200 cubic yds. of concrete in each foundation. The electrical capacity of the building at normal load is 57,000 k.w. The steel frame of the building is enclosed with brick and terra-cotta. The roof and all the floors are concrete except the engine-room, which is floored with checkered steel plates. In general details the building is considered as a factory for the production of a commodity, and there are no ornamental features. The south side of the building contains sixty-four water-tube boilers arranged two stories high and carried directly on the steel frame of the building. Floor space is available for sixteen additional boilers. Each boiler has 5,212 sq. ft. of heating surface and 672 sq. ft. of superheating surface. The boilers are piped in groups of eight, each group supplying the steam for one electric generating set and one feed pump, there being no steam connections between the several groups except that a supplemental header at the east end of the building is connected to two groups. This header supplies the exciter engines, air compressors, house pump, etc. The chain grate stokers under each boiler have 83 sq. ft. of surface. Economisers, with tubes 10 ft. long and placed wider apart than the usual practice, are grouped behind the boilers, with the customary bye-pass flues; 1,540 sq. ft. of heating surface is provided for each boiler. Boiler feeders are placed on the ground floor, and supply ring mains on both the boiler-room floors. The main generating sets consist of a horizontal turbine engine running at 1,000 r.p.m., and a three-phase generator wound for 11,000 volts 33½ cycles; there are eight such sets, with floor space for two more of the same size, and one of half the size. The normal rating of each generator is 5,500 k.w., but they will carry an overload of 50 per cent. for two hours at practically the same steam consumption per k.w.h. There are four 125 k.w. 125 volt steam-driven exciters set running at 375 r.p.m. The condensing system consists of vertical condensers each with 15,000 sq. ft. of cooling surface; these are located in pits between the engine foundations. The circulating water is supplied by 66-in. pipes laid to the edge of the channel of the Thames. Each condenser has a 20-in. centrifugal pump; the duty of this pump is simply to overcome the friction of the pipes, as the system is arranged on the siphonic principle, the top of the condensers being within 29 ft. of minimum low tide, and the circuit is closed. The intake and discharge mains are arranged for reversible flow. The condensers are designed to work on the dry vacuum principle, the air pump and the water pump being separate. All the condenser pumps are driven by induction motors. The switch-board is carried on three gallery floors extending across the north side of the engine-room with returns across the east end. All high-tension engines are motor operated, and the feeder system extending to the twenty-three sub-stations is in duplicate. A line of sixty-four ducts is constructed to carry these feeders to the nearest point on the District Railway at Earl's Court. Coal is received on lighters in a tidal basin at the east end of the station, or by rail at an unloading point of the West London Extension Railway on the opposite side of Chelsea Creek. For unloading barge coal the basin is spanned by two travelling cranes, each working a 1-ton grab. Ashes are removed by an industrial railway worked by a storage battery locomotive.

**INSTITUTE OF SANITARY ENGINEERS.**—On Thursday, the 29th ult., by kind permission of Messrs. Doulton & Co., upwards of ninety members and students of the Institute of Sanitary Engineers visited the Royal Lambeth

Potteries for the purpose of inspecting the manufacture of their sanitary specialties. After inspecting the pipe-making and the interesting process of the junction sticking, the attention of the party was directed to the method of salt glazing. This process is not applicable to any other kind of ware than stoneware, as the glaze is really formed by the partial fusion of the clay itself. During the last stage of firing, when the ware is just on the point of vitrification, common salt is thrown into the kiln. The decomposition of the salt fills the kiln with dense fumes of salt vapour, producing on the wares a thin glass or glaze of silicate of soda. The testing of the drain pipes, by subjecting them to considerable internal hydrostatic pressure was then inspected, and also the process of furnishing sewerage pipes with Doulton's patent self-adjusting joint. Great interest was taken in viewing the various stages in the manufacture of Messrs. Doulton's famous art productions; the sculptural work of Mr. Geo. Tinworth, the grotesques of Mr. M. V. Marshall, and the etchings of the Misses H. B. and F. E. Barlow being much admired. After an inspection of the fine display of baths, lavatories, and other sanitary fittings in the show-rooms, the party dispersed.

## SMOKE ABATEMENT REGULATIONS IN FOREIGN COUNTRIES.

In fulfilment of a promise made by the Government to the advocates of smoke abatement, a circular was sent in May last to the representatives of His Majesty in certain foreign countries calling for reports respecting the laws in force in such countries for the regulation, restriction, or prevention of the emission of smoke from factories and other business premises, and from private dwelling-houses. Reports have been received accordingly by the Secretary of State for Foreign Affairs, and have been presented, by the King's command, to both Houses of Parliament. We subjoin a brief extract from the reports:

**Austria.**—No direct legislative measures exist at present, but the problem of combating the smoke nuisance has never been lost sight of, and is at present forming the subject of negotiations between the competent Government departments. The Minister of Railways has also taken steps to deal with the question by encouraging the introduction of appliances for consuming smoke in the case of locomotives both on the State and on private railways, but there is no immediate prospect of a satisfactory solution of the problem. The Statutory Law for Trades contains the following paragraphs:—"Sanction (of the sanitary administrative authorities) is necessary in the case of factories where furnaces, engines, or other motive powers are employed, or which are calculated to endanger or harm the surrounding neighbourhood by the emission of an injurious quality of smoke": "such factories may not be erected until the necessary permission has been accorded". In the case of factories belonging to the above-mentioned category it is the duty of the administrative authorities to examine the harmful conditions under consideration, and to prescribe the necessary measures to be observed in the erection of the building, and to take especial precautions that churches, schools, hospitals, and other public buildings are not damaged in any way by the erection of these establishments. These provisions are strictly enforced with the object of diminishing as far as possible the evil arising from the emission of thick black smoke from chimneys, etc.

**Danmark.**—There are no laws in force which have been framed with the specific object of regulating or preventing the emission of smoke, but smoke and soot are mentioned by the Imperial Civil Code among the nuisances which may be made the subject of legal action if material injury is done to the complainant's property. Official authorisation is required for the establishment of any business likely to constitute a danger or a nuisance to neighbouring property. The police also have considerable control over the construction of chimneys, and can enforce such alterations as they consider necessary to prevent annoyance to neighbours.

**Belgium.**—No separate law exists having directly for its object the regulation, limitation, or prevention of the emission of smoke, but the laws relative to establishments classed as dangerous, unhealthy, or objectionable give power to the authorities to attach certain conditions to the licences they issue, notably as regards the prevention and the emission of smoke.

**France.**—There is no legislative enactment, but a series of police Ordinances has been published in Paris from time to time dealing with

the subject. In 1854 an Ordinance required the owners of steam engines to consume their smoke or to use fuel which would not produce more smoke than coals or wood, but this was found to be unworkable, as were some other Ordinances. As the result of an inquiry extending over some years the Prefect of Police published an Ordinance in 1893 prohibiting the prolonged emission of thick black smoke from establishments. Six months were allowed industrial manufacturers to carry out the necessary improvements, but the police have refrained from a rigorous application of the regulations owing to the impossibility of finding an absolutely perfect apparatus for consuming smoke. Choice of fuel, care in stoking furnaces, well-constructed chimneys may contribute largely to the restriction of smoke, but cannot entirely prevent its emission. After stoking furnaces every morning, and after each successive stoking during the course of the day, the inspector allows an emission of smoke three times as long as that allowed in London under the law of August 5, 1891. Difficulties were met with by the municipality in carrying out the regulations owing to the example set by many public buildings, the managers refusing to comply with the provisions of the Ordinance of 1893. The statistics show, however, a continued increase in the number of manufacturers who comply with the regulations. No regulations have been issued with regard to the emission of smoke from private dwelling-houses.

**Germany.**—There are no actual laws on the subject in force. For the erection of any new building or important alteration of premises, however, the permission of the local police authorities must be obtained, and special sanction is required for the erection of premises which, by their position or their nature, might cause considerable danger or annoyance to the owners or inhabitants of neighbouring property or to the public generally. Under these regulations due consideration is given to the question of the emission of smoke. There appears to be a consensus of opinion against direct police regulations on the subject. One of the main objections seems to be the difficulty of deciding as to what constitutes "black, thick, or continuous smoke," and the experiments that have been made in taking observations of smoke emissions from various points and in various conditions of the atmosphere have shown that it is exceedingly difficult even for experts, to agree. It would be almost impossible to furnish police or other officers with the instructions necessary for their guidance. In the opinion of the Prussian Government the employment of proper frames will go far to minimise excessive emissions of smoke. Against the emission of smoke from private dwelling-houses there are also no laws in force in Germany. Largely owing to the almost universal use of coal-dust bricks, and to a system of central heating, for which coke is generally employed, comparatively little smoke is emitted—certainly not sufficient to render it necessary for any legislative measures to be taken.

**Hungary.**—At Buda-Pesth chimneys used for boilers having a heating surface of 3 sq. ft. or upwards, or for furnaces consuming 4 lb. of coal or more per hour, must be furnished with smoke-consuming appliances. The exact nature of these appliances is not prescribed, but they must be approved of by the engineering department of the municipality. The results obtained have not been commensurate with the expense incurred, and it is considered by experts that careful stoking, which is not at present enforced, would be as effective in preventing smoke as any apparatus yet discovered. As regards household fires, no regulations are required, as stoves are in universal use.

**Italy.**—The Department of Public Health is responsible for the control of the emission of noxious fumes from factories and other business premises in large towns. There are, however, no special provisions on the subject of smoke in Italian sanitary legislation. The Sanitary Law speaks in general terms of industries which diffuse unhealthy exhalations, and of industries which may be dangerous to the public health. Those in the first category are established in the country and at a distance from inhabited houses. Industries in the second category may be carried on in towns or near inhabited houses, but with the precautions necessary for avoiding all danger to the public health. The question of the emission of smoke from chimneys is of very small importance in Italy, as the majority of Italian industries are established in the country outside towns and continue to make increasing use of electric energy produced by water power.

**Netherlands.**—The only law that has any connexion with the subject is the Hindere wet of June, 1875, which deals with the conditions upon which factories and other buildings employing smoke, gas, or steam may be erected. One ground on which permission to erect may



be refused is "fear of nuisance, and the emission of foul or obnoxious smoke." There are various local regulations requiring chimneys to be heightened or altered in certain circumstances.

**Saxe-Coburg and Gotha.**—In the case of already existing premises where a nuisance is caused by the emission of smoke, the intervention of the police can be obtained and alterations in such premises be enforced, but compensation for the expense to which he may thereby be put can be claimed by the owner from the complainant. In regard to the erection of new buildings, whether private dwelling-houses or factories, it is enacted that "every fireplace must be connected with a chimney of the width required by the rules of construction. The lighting of fires must be so managed, and conducted through chimneys of such height and construction, that smoke, soot, or sparks may not escape in a manner calculated to cause a nuisance or danger to the neighbourhood. All premises exposed to special danger of fire, and of large extent, such as yards for storage of timber or building materials, must be situated at a certain distance from other buildings, or from special kinds of buildings, and in premises where some industry is carried on by which smoke or evil-smelling fumes are likely to be given off, it is forbidden to make openings from such buildings on to the street, through which these fumes would escape."

**Saxony.**—According to the General Building Law of 1900, care must be taken in the construction of any building that no serious inconvenience will be caused to adjoining properties by the escape of smoke and soot. There are strict regulations as to the construction and height of chimneys. The stoking of furnaces must be so managed that adjoining properties suffer as little as possible from the emission of smoke or soot. A by-law in force in Dresden provides that, in private dwelling-houses, the heating arrangement must be so contrived as to produce as little smoke and soot as possible.

**Switzerland.**—The question of the abatement of smoke has never yet been raised, and consequently no legislation bearing upon it more than upon any other possible form of nuisance connected with the working of factories has been enacted. The factories are, to a large extent, driven by water or electric power, and consequently there is, few, if any, complaints on the ground of smoke nuisance.

**United States.**—There is no general legislation in the State of Pennsylvania on the subject of smoke abatement, but the larger cities and other municipalities have, in some cases, adopted local regulations controlling the matter. At Pittsburgh there is a total absence of regulations. The Mayor states that an Ordinance was issued, but that the Courts have declared it to be unconstitutional, and that no further action has been taken. At Philadelphia there is an Ordinance to regulate the smoke from chimneys, stacks, flues, or open spaces within the city. This Ordinance provides a colour scale for the measurement of the degree and darkness of smoke, making it unlawful to permit the escape of smoke of certain degrees of darkness, and fixing a penalty for the violation of its regulations. The City of Allegheny has an Ordinance, dated 1897, prohibiting the emission of dense smoke from engines, stacks, and chimneys within the city, but excluding from its provisions private residences unless using steam boilers. In New York City the Sanitary Code contains a provision that no owner, occupier, superintendent, foundry, engineer, or fireman of any shop, business is done, or premises where any engine or boilers or locomotives are used, shall cause, suffer, or allow smoke to escape or be discharged from any such building. In the City of Buffalo there is an Ordinance making it unlawful for any person or corporation to allow smoke, soot, etc., in such quantities or in such manner as to cause injury, detriment, or annoyance. The Smoke Ordinance of the City of Chicago came into effect in May, 1905, but other amendments are expected. In dwelling-houses in Chicago very few ordinary fireplaces are used, the houses being generally heated by furnaces, for which only anthracite coal is employed.

**HOUSING SCHEME, WINGBORNE, SHEFFIELD.**—A meeting of the Housing Sub-Committee of the Health Committee of the Sheffield Corporation was held at the Town Hall, on the 29th ult., when it was decided to recommend to the Council the plan of Mr. H. L. Paterson, the successful competitor in the recent architect competition for the erection of twenty houses at High Wingborne, to be accepted, and to accept the tender of Mr. Nathanson, builder, for the erection of the houses at a cost of 2,620.

## THE TRIBUNAL OF APPEAL UNDER THE LONDON BUILDING ACT.

ON Friday last week the Tribunal of Appeal consisting of Messrs. Penfold, Gruning, and Hudson, sat at the Surveyors' Institution, Great George-street, to hear an appeal made by Mr. Cunningham Glen (instructed by Mr. B. Barnes, solicitor), on behalf of Mr. Loftus Henry Canton, under section 13 (4) of the London Building Act, 1894, against the determination of the London County Council, dated April 18, 1905, to grant an application for consent to allow the erection of a boundary wall on the south-west side of the playground of the New End School, Hampstead, at less than the prescribed distance from the centre of the way as submitted by the Education Committee of the London County Council as not complying with the provisions of section 13 of the said Act. Mr. Andrews, for the Solicitors' Department, represented the London County Council.

Mr. A. W. Hudson asked what the position was with regard to the County Council giving consent. Did it apply to itself for its own consent.

Mr. Andrews said the Education Committee applied to the Building Act Committee for its consent, and the Building Act Committee recommended the Council to grant the consent. It was a most peculiar position. If any other procedure were suggested no doubt the Council would willingly accept it.

Mr. Hudson said the point covered the question of jurisdiction.

Mr. Andrews said he had a preliminary objection. The representative of the Education Committee who made the application to the Building Act Committee was not aware at the time he made the application that the defunct School Board had, subsequent to acquiring the site, obtained from the District Surveyor a certified plan showing all the buildings on the site and all forecourts, fences and walls, including this particular wall which was the subject matter of the appeal. The building, as proposed to be erected, would not occupy any land within the prescribed distance which was not formerly occupied by buildings as shown on the plan. That being so, his contention was that the School Board would have been able to rely on their certified plan, and the consent of the London County Council would not be necessary. That being so, he submitted that there was no jurisdiction of the Council to give consent, for the consent which was obtained was not necessary; because whatever the result of it might be they would be entitled to keep the wall in exactly the same position as it was now.

Mr. Glen disputed the statement that the Education Committee would only occupy land that was occupied by buildings before.

The Tribunal overruled the objection. Mr. Andrews contended that the Council could make a valid order sanctioning itself doing something as a builder in the same way that the ordinary builder might be sanctioned.

Mr. Hudson: Then you claim it is a good order?

Mr. Andrews said it was in that sense, but he did not wait what he had said before that it was made under a mistake, and that there was no necessity.

Mr. Hudson said it was not the order but the application which was made under a mistake.

Mr. Glen said that had the facts been known to the County Council they would have said: "This order is not necessary, and we won't make it." What he wanted was to get rid of the consent so that he would not be stopped hereafter.

Mr. Andrews said his contention was that the order was valid, but the application was made under a mistake.

Mr. Hudson said the application of the Education Committee was to be allowed to put up a wall, but from the plans there appeared to be a wall there already.

Mr. Andrews said they were going to pull that down and build up another.

Mr. Hudson pointed out that the application was in somewhat extraordinary language; it was to erect a line of boundary, and they did not ask to erect a wall.

Mr. Andrews said it was merely a boundary wall. No part of the building was to be erected on the line marked on the plan. The inside space would be a playground.

Mr. Hudson said he understood that the new wall would be exactly on the site of the old wall except at one end, where there were once railings and now a hoarding. Apart from the question of law, what was the objection?

Mr. Glen said the objection was this: If the road was not widened by the wall being put back to the prescribed distance from the roadway, then his client, who owned the land on the old side of the roadway, would be forced by the County Council, when he developed the land, to widen the road to 20 ft.

Mr. Andrews said the Act could only make Mr. Canton go back the prescribed distance.

Mr. Glen said even in that case his client was prejudiced, because if he wanted the road widened he would have to sacrifice his own land,

unless the County Council were obliged to go back the prescribed distance.

Mr. Hudson asked what was the effect of the County Council's consent. Was it not to enable the Education Committee to build all over the site?

Mr. Andrews said that was not the case. When the site was acquired it was the intention to erect a caretaker's house, and this would have necessitated the consent. The idea of erecting this house was abandoned so as to leave more room for the playground, and so there was no reason for giving any consent at all.

Mr. Glen said that they could fight the County Council elsewhere as to whether they were doing more than they were entitled to do, but their hands would be tied if the consent to erect this wall was allowed to stand.

Evidence was then called by Mr. Glen to prove that the roadway between the proposed boundary wall of the school and the property owned by Mr. Canton was a narrow passage and required widening in the public interest.

Mr. Penfold asked why the parties did not agree to a widening.

Mr. Canton said he was prepared to do his share of the widening when he developed his property.

Mr. Andrews said that at present the local authority saw no necessity for such widening. After all, if hereafter a widening was required, it would only mean setting back the wall. He argued that if the Tribunal came to the conclusion that the consent should not be granted then the Council could still be able to stand on their legal rights, and there was no question but that they could retain the wall on its present lines.

Mr. Hudson asked Mr. Andrews if he was not going to call rebutting evidence to that given by Mr. Glen as to this passage being a nuisance.

Mr. Andrews said he was not prepared to do so. He did not know that he had to meet a case of nuisance.

Mr. Hudson said it was not only a case of nuisance but of perpetrating a narrow thoroughfare. He would have thought that Mr. Andrews would have called evidence to show that the traffic through the passage was not such as to make a widening material.

Mr. Andrews said he preferred to rely on the local authority with regard to the necessity of widening.

The Chairman announced, after consideration, that the Tribunal had resolved to reverse the decision of the County Council dated April 18, 1905, consenting to the erection of the boundary wall at less than the prescribed distance from the centre of the roadway.

## Illustrations.

### COMPETITION DESIGN FOR WESLEYAN HALL, WESTMINSTER.



IN this competition the question of the position and shape of the large hall dominated the whole scheme, and in the first and second set of drawings submitted by me this hall was placed on the first floor, and the shape based on the ordinary theatre plan.

A serious attempt was made to provide a number of offices available for letting purposes; these were placed next Tothill-street, where they would command the best light and highest rentals, and were designed so that they could be included in the Wesleyan Connexion offices as and when required.

In the original and revised conditions the conference-hall or reception-room was desired to be "placed in proximity to the great hall," therefore it was designed by me as a vestibule to the large hall, and also capable of being used as a private room.

The elevations and detail should be considered as suggestive sketches only for an important work; the time required for a complete and exhaustive study of the treatment of a building of this size and character is more than any architect could reasonably expend on a competition design.

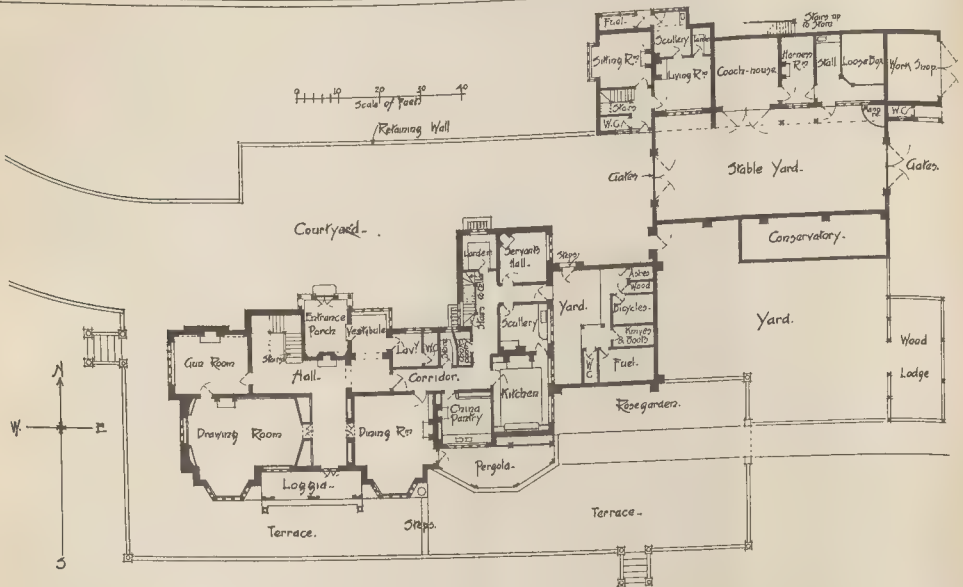
The cubical contents of these buildings amounted to 2,560,000 ft., and the cost was taken at 1s. 1d. per ft. cube, making a total cost of 138,667l., exclusive of decorative carving, mosaics, and painting.

JAMES S. GIBSON.

### NEW PREMISES, BURY-STREET.

THE building here illustrated is situated on the east side of St. James's-street, adjoining Boodle's Club, and has a back frontage in Bury-street. The building is constructed of fire-resisting materials throughout. The front elevation in St. James's-street is composed of one story of granite, and the upper stories in Portland stone; the caps and bases to the





"Ardmillan," Sussex. Plan.

pilasters in the front entrance are bronze. The elevation in Bury-street, shown in the illustration, is in Portland stone and red brick, with polished teak bays.

The building is designed with an entrance in St. James's-street, also one in Bury-street, the ground floor being laid out as shops. The upper stories are residential chambers, with kitchen service on the top floors in the Bury-street block. This block is connected with the St. James's-street block by a corridor on the first floor, thus giving the tenants in the Bury-street block the benefit of the St. James's-street entrance.

Every room in the building is connected by telephone communication with the service department and the hall porter's room on the ground floor.

The builders are Messrs. Howard & Co.; the lifts by Messrs. Waygood & Co.; electric light by Mr. Donnison Sillem; service telephones by Messrs. Hammond & Co.; carving by Mr. Geo. Hawkings; electric-light fittings by Messrs. Osler; ironwork by Messrs. Young & Co.; and heating apparatus by Messrs. Wontner, Smith, Gray, & Co. Mr. Leslie W. Green is the architect.

#### "ARDMILLAN," EAST GRINSTEAD.

This house was erected for the Rev. C. W. Payne Crawford, the principal feature of the property being a series of beautiful natural ponds extending below the terraces which overlook them. The view from the south extends over Ashdown Forest.

The facing bricks used for the house, lodge, and stables were obtained from Petersfield, Hants, the roofs being covered in old tiles, the whole of the external woodwork being of English oak, with the exception of the pergola, the beams of which are in larch. The walls surrounding the rose garden, etc., were carried out in local brick, roofed in old tiles, and the terrace walls in local stone and the same brick. The vestibule, hall to garden entrance, and staircase are panelled in white wood.

The fireplaces in the reception-rooms and hall were supplied and fixed by Messrs. Shuffrey & Co., of Welbeck-street, whilst the rest were supplied by the Teale Fireplace Company. Mr. A. W. Solater, of Oxford-street, wired the house for the electric light. The septic tank was carried out by the Septic Tank Company, of London.

Mr. H. Young, of East Grinstead, was the builder, and the architect was Mr. E. Turner Powell, of Westminster and East Grinstead.

The pair of stone falcons mounted at the east end of the garden terrace are handsome and interesting reproductions of the family crest, and stood, until recent times, at the entrance gates of Ardmillan, near Girvan, Co. Ayr, an ancient estate, which came, about the year 1653, to Mr. Crawford's lineal ancestor, Major James Crawford, of Baidland, Co. Ayr, through his marriage with Miss Kennedy, of Ardmillan, and remained in the Crawford family till 1876, when it was sold on the death, without male issue, of James Crawford, Lord Ardmillan, who was Solicitor-General for Scotland, 1853-5.

It was from Ardmillan, Co. Ayr, that Mr. Crawford's lineal ancestor, John Crawford

(afterwards messenger to the Great Seal), migrated into Sussex about the year 1725, and built Saint Hill, in East Grinstead, which remained the seat of this branch of the family for many generations, and where Mr. Crawford, the only surviving son of the late Robert Crawford, of Saint Hill, J.P. and D.L., himself was born.

The age of these stone falcons is not known, but, judging from the appearance of the stonework, they might, perhaps, be 150 years old, thus forming an interesting link with Ardmillan, N.B., a house now largely modernised, but most picturesquely placed near the Ayrshire coast, and still retaining vestiges of its former glories.



"Ardmillan": Back View Showing Position of the Hawk Finial Figures on Wall.



One of the Hawk Finials at "Ardmillan."

#### SCULPTURE AT THE ROYAL ACADEMY.

We have devoted one page this week to Mr. A. Bertram Pegram's fine group under the title "Endymion," in the central hall. In reviewing the sculpture of the year, we remarked that the sculptor had taken a new view of the legend, according to which Endymion was supposed to be kissed by Diana in his sleep; however, we see that the treatment is justified by Keats in a line which should perhaps have been quoted in the catalogue:—

"—and knelt adown  
Before his goddess, in a blissful swoon."

The four subjects on the other page are "The Long, Long Dreams of Youth" (A), by Mr. Harold Parker; "The Charmed Circle of Youth" (B), by Miss Esther M. Moore; "Maternity" (C), part of a memorial to Queen Victoria to be erected at Nottingham; and "Hebe" (D), by Mr. Mervyn Lawrence, a life-size figure which stands in the lecture-room.

"TREATMENT OF SEWAGE."—Mr. A. S. Goodridge writes, in reference to his letter under this heading in our last issue (page 14 *ante*), that in the second column, 4th line, "ferro-culture" should be "terra-culture," and in last paragraph but one "ash pits" should be "cess pits." We must say that in the first case it is entirely the fault of the writer's MS.

#### LONDON BUILDING ACTS (AMENDMENT) BILL.

At the meeting of Lambeth Borough Council, the General Purposes Committee reported that the London County Council had forwarded for consideration a copy of its proposals for the amendment of the London Building Act, and had asked to be furnished with the observations of the Council upon such proposals. The Committee had also received from the Council of the Royal Borough of Kensington a memorandum containing observations and suggestions of that Council upon the proposals. The Kensington Council strongly favours the transference of duties from the London County Council to the local authorities, and considers that the whole question of the amendment of the Acts is one which should be reported on by a Royal Commission, and that any amending or consolidating Bill should be introduced as a public measure by the Government on lines to be indicated by such Commission. The Committee held that the Council should support the opinion of the Kensington Borough, and they, therefore, recommended that a resolution be passed in the following terms, namely:—

"That, in the opinion of the Lambeth Borough Council, the London County Council should be relieved, as much as possible, by the transference to the Metropolitan City and Borough Councils of all duties that can be efficiently discharged by the latter bodies; and that the whole question of the amendment of the London Building Acts is one which should be reported upon by a Royal Commission; and that any amending or consolidating Bill should be introduced as a public measure

by the Government, and not as a private Bill by the London County Council."

This was agreed to.

The Building Acts Special Committee of Camberwell Borough Council reported on Saturday having considered communications from the London County Council, the Surveyor of the Rolls Estate, the Kensington Borough Council, the London Chamber of Commerce, and the Musical Instrument Trades' Protection Association. After full consideration of the circumstances of the case, the Committee held that no good purpose would be served by considering the question until the definite proposals of the London County Council are embodied in a Bill in November next. They had therefore adopted the following resolution:—  
"That the London County Council be informed that this Council has no observation to make upon the present suggestions, but will consider the whole question when the complete Bill is received, and that the Kensington Borough Council, the Surveyor of the Rolls Estate, the London Chamber of Commerce, and the Musical Instrument Trades' Protection Association be informed accordingly."

The General Purposes Committee of Lewisham Borough Council reported on Monday having further considered the subject of the London Building Acts (Amendment) Bill. They had received a report from the sub-committee appointed by them. This sub-committee stated that, having regard to the complicated state of the law relating to buildings in the metropolis, they are of opinion that the law should be codified, and that evidence should be taken by a Royal Commission with that object, and they submitted the following resolution, which the Committee had confirmed:—

"That as the London Building Act of 1894 is already complicated by the amendments of the Act of 1898, this Committee is of opinion that a new Building Act for London—codifying the present laws with such amendments as may be deemed desirable therein—should be formulated, but before any such Bill is drafted the whole question should be reported upon by a Royal Commission, in order that the views of the London County Council, the Corporation of the City of London, the Council of the City of Westminster, and the several Metropolitan Boroughs, also the various professional associations connected with building work, may be ascertained and considered."

The Wandsworth Borough Council has received a letter from Messrs. Pratt Brothers calling attention to clauses which have been added to the London Building Acts (Amendment) Bill, which provide that where any part of a building used or adapted to be used as a shop, projects for a distance of 8 ft. or more beyond the main front, side, or rear of any building of which it forms part, and in which any persons are employed or sleep, the projecting portion of such shop shall be provided with a roof constructed of fireproof materials; that an enclosed fireproof staircase shall also be constructed from the upper part of such shop to the street; that where shops do not project and twenty persons are employed therein, a fireproof staircase shall be provided, and that skylights shall not exceed one-tenth part of the area of the roof on which they are placed, and be within 6 ft. of any party wall; stating that should the Bill become law, probably two-thirds of the retail drapers in London would be called upon to carry out the required alterations, which would be very costly, and in many cases practically impossible; and asking for the influence and support of the Council in opposing the Bill. The letter is to be considered by a Committee of the Borough Council.

The General Purposes Committee of Bethnal Green Borough Council reported on Monday having considered a communication from the London County Council asking for the observations of the Council on the proposals contained in the London Building Acts (Amendment) Bill. The Borough Surveyor had reported to the Committee on the proposals contained in the most salient provisions of the measure, especially those which affect local authorities. It appeared that several proposals of the County Council are of a drastic nature, and do not sufficiently safeguard the interests of the borough councils. In consequence, it seems desirable that any Bill introduced on the subject should be a Government measure. The Committee think it expedient that evidence should be obtained from the several authorities concerned in carrying into effect the provisions of the Building Acts, and that the question should be reported upon by a Royal Commission. They had, therefore, passed the following resolutions:—

(1) That any Bill regulating buildings in London should be introduced as a Government measure after the whole question has been reported upon by a Royal Commission, who should obtain evidence from the London County Council, the Corporation of the City of London, the Councils of the City of Westminster, and of the Metropolitan Boroughs, the District Surveyors, and the several professional associations connected with building work in London. (2) That in any new measure, the London County Council should be relieved as much as possible by transferring to the City and Borough Councils all duties that can be efficiently discharged by the latter bodies in accordance with the views expressed by the Royal Commission in 1894."

The Highways Committee of Shore ditch Borough Council reported having considered



the communication from the London County Council with regard to the London Building Acts (Amendment) Bill. The Committee had received a further report from the Borough Surveyor to the effect that a comparison of the Bill now proposed with that which was recently withdrawn from the consideration of Parliament reveals practically no alteration therefrom, and that the London County Council still seek to interfere with the present powers of the Metropolitan Borough Councils have not consolidated the existing Acts of 1894 and 1898 into one Bill, nor relegated any of the duties to the Metropolitan Borough Councils as suggested by them in conference. The Committee therefore had resolved:—

"That the London County Council be informed that the Council have no suggestions to make beyond those which were contained in their Borough Surveyor's report, dated February, 1905, and that a copy of such report be forwarded to the London County Council."

#### BOOKS RECEIVED.

GARDEN CITIES, IN THEORY AND PRACTICE. By A. R. Sennett, A.M.Inst.C.E. (A. R. Bennett. 21s.)

PRACTICAL PLUMBERS WORK. Edited by Paul N. Hasluck, (Cassell & Co. 2s.)

THE PRINCIPLES OF DESIGN. By G. Woollicroft Rhead. (B. T. Batsford. 6s.)

RESIDENTIAL FLATS OF ALL CLASSES. By Sydney Perks, F.R.I.B.A. (B. T. Batsford. 21s.)

#### Correspondence.

##### TRAMS OVER THE BRIDGES.

SIR,—Referring to recent reports upon this matter, there is no questioning the present congested state of the traffic at the foot of Blackfriars Bridge, where the traffic of five streets converge, viz.—Queen Victoria-street, Upper Thames-street, New Bridge-street, and the Embankment and the bridge, and the importance of preventing an augmentation of the block at this point by including the tramways.

Undoubtedly it is a most awkward matter to regulate the traffic at this point, and it would be impossible for the trams to get from the Embankment on to the bridge without an enormous amount of trouble, and causing delay and stoppage of the traffic as matters now exist.

The widening of the bridge as suggested will be a costly undertaking, and I think the difficulty can be overcome without so large an expenditure, and result in little or no interruption to the present traffic during construction. It is not so much the width of the bridge as the approach, as there appears to be sufficient room on the crown of the bridge when once clear of the obstruction at the approach, and an improvement might be effected by the regulation of the present traffic on the bridge by police supervision, thereby preventing the carmen wandering about out of the track, which I have noticed constantly causes a great deal of obstruction.

Seeing there are two important factors to consider, viz.—firstly, the cost of widening or rebuilding the bridge at, say, £200,000; and secondly, the delay consequent upon completing the circle tramway—say for a matter of two years—I therefore suggest that, instead of widening the bridge throughout, the approach

from New Bridge-street, at the foot of the bridge on the west side, from a point at the rear of the fire-float up to the first buttress, be widened, and the tram track kept next the river, and reserve the portion on the north side, that is, next De Kaiser's Hotel, for light vehicles, such as carriages, cabs, motors, etc.

In this way the trams could pass on to the bridge with little or no obstruction to the traffic, and thus avoid the block at the point above referred to.

This arrangement would likewise relieve the pressure at this point by giving more space for the traffic to clear quickly. The cost of this work would probably not exceed £10,000, and the time to execute the work say six months, and all could be finished and opened by probably Christmas next, or very soon after.

I might add that this scheme would tend to improve the entrance to the bridge; at all events it would in no way disfigure it.

In order to show this more clearly I have enclosed a sketch, and shall be glad if you will kindly find a space for this in your paper.

JOHN JAS. DOWNES.

##### BATH STONE.

SIR,—An article appeared in your June 24 issue entitled "Decay and Preservation of Stone-work," in which an incorrect statement is made as to "Box Ground" stone, of which we are the sole proprietors. The statement is made that the quarries are nearly, if not wholly, exhausted. This is so absolutely untrue that my directors must take serious notice of it, and must ask you to have it immediately corrected, as we are having letters on the subject from our customers.

I shall write you more fully to-morrow, but to be in time for your next issue or article, I must ask you to notify our denial. The article is a very able one, and I think after this your contributor should come to Bath and Box and see facts for himself.

T. STURGE COTTERELL,  
General Manager.

\*\* We may point out to our correspondent that the article is a signed one, for which we do not accept responsibility. See the first paragraph under the standing heading "To Correspondents."—ED.

SCHOOL, NEW ELGIN, N.B.—The new school which is being erected at New Elgin is now almost completed. The contractors were:—Mason, Mr. D. Forsyth, Elgin; carpenter, Mr. Thos. Macenzie, New Elgin; plumber, Mr. John A. Russell, Elgin; slater, Mr. George Murray, Lonsmouth; plasterer, Mr. James Brodie, Elgin; painter, Mr. Wm. Fordyce, Elgin. The architects were Messrs. A. & R. McCulloch, of Leith, whose designs were accepted in competition. CHURCH-ROOM, NEWELAND.—The foundation was laid recently of a new church-room which is being erected in connexion with Christ Church, Newhaven. The ground floor of the main hall will be 72 ft. by 36 ft., and in the basement below will be a gymnasium, two classrooms divided by movable partition, kitchen, cloakrooms, lavatories, etc. The main hall, which will accommodate about 500 people, will have an open roof, with wrought-iron principals. The front of the building will be in stock brick with red brick dressings. The architects are Messrs. Oakden & Hawker.

## The Student's Column.

### STEAM-BOILERS AND PIPES.—II. SELECTION OF BOILER TYPE.



WHEN a boiler has to be selected for a building where steam has not been used previously, or for a building where additional power or heat is required, the amount of floor area available is often a governing factor. Under such circumstances, it may be necessary to adopt a type of boiler occupying a minimum space, and to disregard other considerations. Except in small sizes, the ordinary vertical boiler cannot be recommended, but special designs of this class may be taken into consideration. Combinations such as types (6), (7), and (8), mentioned last week, will be found of advantage, so far as the saving of space is concerned. Definite information as to the dimensions for any given duty can be obtained quite readily from numerous boiler makers.

For the purpose of facilitating the selection of boilers for confined spaces, we have summarised in Table I. some particulars given by Mr. C. E. Strohmeier\* relative to the weight of steam produced per sq. ft. of floor space occupied by steam boilers of different types.

Taking the largest size of each boiler in this table, we see very clearly the great economy of floor area to be secured by the marine type, even when the dimensions are kept within the limits necessarily imposed by railway companies. Next to this, in the same respect, come the dry-back tubular, locomotive, vertical, and water-tube types, all within measurable distance of each other. The compound Lancashire is next on the list, while the ordinary Lancashire and the Cornish are at the bottom, the Cornish boiler requiring more than twice the space occupied by the smallest size marine boiler for a given steam production.

Taking the smallest size boilers mentioned in the table, we find that Cornish, locomotive, and vertical boilers are extremely wasteful of floor space, and that the small Lancashire is very little better. The Lancashire tubular boiler shows more favourably in this case than in the previous comparison, while the dry-back and marine types head the list as before.

When a boiler has to be selected for a new building, or for an existing building where an extension of the boiler-house is possible, a wider range of apparatus is open for consideration, and the best type for adoption should be determined after various essential points have been made the subject of inquiry.

The following are the main factors governing the selection of a boiler type:—

(1) Suitability for the purpose for which the boiler is to be used, and for the conditions under which it is to be worked.

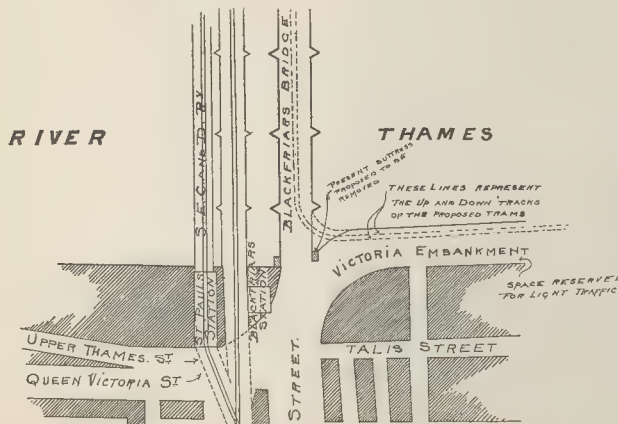
(2) Ratio of output to capital expenditure, including cost of seating chimney and boiler-house.

(3) Ratio of output to total expenses, including fuel consumption, attendance, interest on capital expenditure, and sinking fund.

(4) Where a boiler has to be worked continuously day and night with a fairly uniform load, the conditions are so simple that, so far as concerns the first consideration, any type of boiler may be employed.

In continuous working, however, it is absolutely necessary to duplicate the plant so that cleaning may be attended to at regular intervals without interruption of the service.

Where steam is required throughout the day and either none is required during the night or only just enough for maintaining the temperature of the building or buildings in cold weather, preference should be given to a boiler containing a large volume of water. Then the fire can be banked at the end of the day, and the water will store sufficient heat to keep the buildings warm until next morning without necessitating the expense of a night stoker. Even in summer time when steam is not required at night for warming purposes, the retention of heat in the water is advantageous, for it enables the attendant to get steam up to the normal pressure with very little trouble and delay.



Plan showing Scheme for Junction of Blackfriars Bridge with Victoria Embankment.

\* Manchester Steam Users' Association. Mem. by Chief Engineer, 1902.

TABLE I.—RATIO OF ESTIMATED STEAM PRODUCTION TO SPACE OCCUPIED BY VARIOUS TYPES OF STEAM BOILERS (Strohmeyer).

Type of Boiler.	A. Boilers Surrounded by Flues.										B. Boilers Lagged.										Steam Production per sq. ft. of Floor Space.	
	Boiler Dimensions.		Dimensions over Brickwork, 9-ft. Stokehold, and Valves 4 ft. high.								Water Evaporated per hour.	Dimensions over Lagging and 6-in. Clearance for Inspection, 9-ft. Stokehold, and Valves 4 ft. high.				Water Evaporated per hour.						
	Dia- meter.	Length.	Width.	Length.	Height above Floor.	Total Floor Space.	Width.	Length.	Height above Floor.	Total Floor Space.		A.	B.									
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	sq. ft.	lb.	ft. in.	ft. in.	ft. in.	sq. ft.	lb.	ft. in.	ft. in.	ft. in.	sq. ft.	lb.	lb.	lb.			
Vertical Cylindrical.....	8 0	7 0	15 0	—	—	—	—	4 8	9 9 <sup>5</sup>	11 0	48	40	8 0	12 9 <sup>5</sup>	19 0	102	2,000	—	8.7			
Cornish*	5 0	25 0	8 2	37 0	9 9	302	1,850	—	—	—	—	—	—	—	—	—	—	6.2	—			
	6 0	28 0	9 2	40 0	10 9	387	2,700	—	—	—	—	—	—	—	—	—	—	7.4	—			
Lancashire*	6 6	28 0	9 8	40 0	11 8	387	3,700	—	—	—	—	—	—	—	—	—	—	9.8	—			
	7 6	30 0	10 8	42 0	12 8	448	5,100	—	—	—	—	—	—	—	—	—	—	12.0	—			
	9 0	30 0	12 2	42 6	13 0	517	6,300	—	—	—	—	—	—	—	—	—	—	12.1	—			
Lancashire Tubular.....	7 6	20 0	10 8	37 0 <sup>3</sup>	12 8	395	6,800	9 3	37 0 <sup>3</sup>	12 8	342	5,400	10 9	37 0 <sup>3</sup>	13 9	398	6,300	14.7	15.8			
	9 0	20 0	12 2	37 0 <sup>3</sup>	13 9	450	6,700	—	—	—	—	—	—	—	—	—	—	14.9	15.8			
Dry Back Return Tubular ..	9 9	9 6	12 11	24 6	14 1	317	5,800	11 6	24 6 <sup>6</sup>	14 1	282	5,400	11 0	23 9 <sup>6</sup>	15 4	303	6,300	18.3	19.1			
	11 0	8 9	14 2	23 9	15 4	337	6,700	—	—	—	—	—	—	—	—	—	—	19.9	20.8			
Marine Return Tubular .....	11 0 <sup>0</sup>	9 3 <sup>0</sup>	—	—	—	—	—	12 9	19 7 <sup>6</sup>	15 4	250	5,800	—	—	—	—	—	23.2	—			
	12 0	9 8	—	—	—	—	—	13 9	20 0 <sup>6</sup>	16 4	275	6,700	—	—	—	—	—	24.3	—			
	13 0	11 0	—	—	—	—	—	14 9	20 4 <sup>6</sup>	17 4	300	8,700	—	—	—	—	—	29.0	—			
	14 6	9 9	—	—	—	—	—	16 8	20 1 <sup>6</sup>	18 10	326	10,000	—	—	—	—	—	30.6	—			
Locomotive .....	2 9	9 6	—	—	—	—	—	4 5	24 6 <sup>3</sup>	9 3	108	880	—	—	—	—	—	8.1	—			
	5 0	13 6	—	—	—	—	—	6 8	28 6 <sup>3</sup>	11 6	190	3,900	—	—	—	—	—	20.5	—			
Babcock & Wilcox Water-tube Boilers .....	3 8 <sup>1</sup>	19 0	8 3 <sup>2</sup>	28 0	16 0	231	2,430	7 6 <sup>4</sup>	28 0	16 0	210	2,430	5 1	23 0	18 0	296	4,600	10.5	11.6			
	8 6 <sup>1</sup>	23 0	10 0 <sup>2</sup>	32 0	18 0	320	4,500	9 3 <sup>4</sup>	32 0	18 0	296	4,600	—	—	—	—	—	14.1	15.2			
	—	—	18 6 <sup>2</sup>	32 0	18 0	432	7,650	12 9 <sup>4</sup>	32 0	18 0	408	7,650	—	—	—	—	—	17.5	18.8			

\*These are the dimensions of the largest marine boiler that can be sent by rail. †Width includes one 2-ft. side passage for tube sweeping purposes. ‡Length includes 6 ft. at end of boiler for tube sweeping purposes. §No side flues, but two boilers placed side by side. ¶Length includes only a 6-ft. stokehold and 6-in. space at boiler back. ††Length includes 10-ft. stokehold instead of 9 ft., on account of overhanging smoke-box.

Cornish and Lancashire boilers are clearly indicated as most suitable for complying with the condition of intermittent working here in question, which is that prevailing in all public institutions, and in most industrial establishments.

If a watertube boiler was employed, a night attendant would be required to watch the fires and the water level, for, as stated by Mr. C. E. Strohmeyer, "with a slight access of air, combustion may suddenly be started, and the water in the boiler evaporated."

Where the working load is continuous during day and night, but irregular, as in electric light stations, the watertube boiler certainly claims favourable consideration.

The rapid steaming qualities of the watertube boiler enable the engineer-in-charge to raise the pressure with a minimum delay by increasing the draught if the fire has been banked and kept in proper condition.

Still, a certain amount of warning is necessary, for if the fire happens to be low at the critical moment fresh coal must be added, and the first effect of this will be a reduction of pressure, and it will be equally difficult for the engineer to respond to a sudden call for power if the fire has only recently been banked.

Problems of this character rarely, if ever, \* Manchester Steam Users' Association. Mem. by Chief Engineer, 1902.

come before the architect for solution, but they serve to suggest the conclusion that, unless skilled attendance can be provided, the watertube boiler is best left alone.

In establishments where the boiler is only required during the day, and where the day load is irregular, a boiler with a large storage reserve of heat is clearly advisable. Cessation of steam demands during the day can be met by banking the fires, and the absence of demand during the night in a similar manner.

So far as regards workhouses, a point to be remembered is that really competent stokers are not always provided, and, for this reason, simplicity of construction is a most desirable feature in boilers intended for such establishments.

(2) We now come to the second point affecting the choice of a boiler type—namely, the ratio of output to total capital expenditure. This is a matter upon which it is not difficult to arrive at a generally accurate opinion, in spite of the somewhat inconsistent results of many boiler tests. The anomalies evidenced by comparison of various trials conducted with boilers of similar type and dimensions, and worked on apparently identical conditions, are due to the influence of attendant circumstances which appear to have escaped notice. Recent investigation has shown that, within certain limits, the efficiency of a boiler and the output of steam

depends more upon perfect combustion than upon the actual area and arrangement of the heating surface. Hence, an important point to be remembered is that a small boiler properly managed may be made to produce better results than a larger boiler improperly managed.

With the object of throwing light upon the relations existing between steam production and first cost in the case of various types of boilers in general use, we give in Table II. some of the results obtained by a series of experiments undertaken by Professor Kennedy and the late Mr. Bryan Donkin, in conjunction with Professor Unwin and Professor Déry, of Liège University. The investigations in question were conducted upon boilers under actual working conditions with coal of similar quality, and all the tests were made in accordance with a programme drawn up beforehand.

The usefulness of the results for purposes of comparison has been much increased by an investigation by Mr. A. Hansen, A.M.Inst.C.E.,\* into the actual cost of the various boiler installations on which the experiments were conducted. The cost of the boilers was ascertained as far as possible from the makers and owners, and, in cases:

\* Transactions of the Civil and Mechanical Engineers' Society, 1896.

TABLE II.—RATIO OF STEAM PRODUCTION TO COST OF BOILER INSTALLATION.

No.	Type of Boiler	Dimensions.		Heating Surface.	Water Evaporated per hour.	Horse Power at 30 lb. of steam per h.p.	Estimated Cost of Installation.					Total Cost Horse Power cost per h.p.	Authorities for Tests.
		Length.	Diameter.				Boiler and Fittings.	Brick Setting and Flues.	Chimney.	Boiler House.	Total.		
1	Cornish .....	ft. in.	ft. in.	sq. ft.	lb.	48.0	£ 225	£ 120	£ 180	£ 160	£ 685	£ 14.01	Professor Kennedy and Mr. Bryan Donkin.
2	Cornish .....	18 9	5 6	700	1,407	70.1	150	80	180	115	525	7.49	Professor Unwin.
3	Lancashire .....	21 0	7 0	682	1,277	42.6	300	160	180	139.5	779.5	18.30	Professor Kennedy and Mr. Bryan Donkin.
4	Cornish .....	9 7	4 4	191.5	2,369	79.0	110	40	60	68	278	9.86	"
5	Multitubular .....	19 0	7 0	804	3,930	13.7	435	75	80	162	752	18.78	"
6	Locomotive .....	6 0	3 0	218	676	22.5	130	7	7.5	40	184.5	8.20	"
7	Locomotive .....	7 9	3 7	318	335	11.2	170	8	11.5	44.5	234	16.47	"
8	Locomotive .....	7 7 <sup>1</sup>	3 0 <sup>1</sup>	285	1,057	38.2	170	7.5	7.5	44.5	234	16.47	"
9	Locomotive .....	7 7 <sup>1</sup>	3 0 <sup>1</sup>	285	990	30.7	187.5	7.5	7.5	44.5	214.25	7.04	"
10	Water-tube .....	14 9	2 7 <sup>1</sup>	470.5	2,028	67.5	370	100	80	83	583	8.63	Professor Déry, Liège University.
11	(De Navier) .....	—	—	—	1,9 7	63.9	—	—	—	—	—	9.12	—



where this proved to be impracticable, the values were carefully estimated, the cost of the boiler settings, flues, and chimneys having been ascertained in a similar manner. The boiler-house costs were determined by calculating the floor space required for each boiler, assuming the mean height of the building at 15 ft. from foundation to roof and taking the value of the building at 6d. per cubic ft. of space. The values in the columns of Table II, which refer to the cost of the various installations are taken from Mr. Hansen's figures.

It will be noticed that the values of the To al Cost

ratio Horse Power vary considerably, a cord- ing to the working conditions adopted for boilers of the same type, and, in one or two cases, for the same boiler. These differences are very interesting, and should be carefully noted when comparison of the figures is made, especially as it is very often necessary to lay down a boiler plant with a view to increased output for future requirements.

If the cost of each boiler mentioned in Table II, be divided by the total heating surface, it will be found that the values do not differ very materially, the average, including delivery and fitting, being about 10s. per sq. ft.

As evaporative efficiency depends, other things being equal, upon the heating surface provided, there is not very much to choose between any of the types mentioned so far as price is concerned. The difference in the total cost of the complete installations is due to the outlay involved in building work. The costs per indicated horse power of the

various installations mentioned in Table II. are given in diagrammatic form in Fig. 12 with the object of enabling the reader to make a ready comparison of the data.

We may add that the marine and other modifications of the multitubular type are very similar in principle to the multitubular Cornish boiler, for which results are given in Table II., and would show to equal advantage if tested under the same conditions.

#### OBITUARY.

MR. JOSEPH WOOD.—We have to record the death, on the 27th ult., of Mr. Joseph Wood, Fellow of the Royal Institute of British Architects, Past-President and Vice-President of the Bristol Society of Architects. Mr. Wood, who was born in the earlier quarter of the last century, entered into practice at the age of twenty-two years, and as he never retired, he was for nearly sixty years actively employed as an architect and surveyor. Mr. Wood's loyalty to his partner always precluded him from claiming any particular building as his own design, and to the public they are only known as the work of Foster & Wood. The works of this firm include the principal portion of the important buildings erected in Bristol in the latter half of the last century, and include premises now in the occupation of many well-known firms, besides many of the best ecclesiastical buildings in the same city. Mr. Wood, however, admitted that he had only once fully realised his ideal in this class of buildings—viz., in the simple little chapel of the Trinity Almshouses. The chief appointment held by Mr. Wood was that of surveyor to the Trustees of the Bristol Municipal Charities. This he held for more than half a century, only relinquishing the post a short time ago. Mr. Wood closely identified himself with the affairs of the Bristol

Society of Architects from its earliest years, and during the latter part of his life, was annually re-elected Vice-President, and served his two years' term as President, yielding place to the present occupant of the position, Mr. Oatley. A few years ago he was selected by the Royal Institute as one of those who, from the nature of their accomplished work, were worthy to be elected to the Fellowship without examination. Mr. Wood's old pupils writes:—"To a young man a walk through Bristol with Mr. Wood was a liberal education. He seemed to know every piece of ornament worth noting, and the spots from which they could best be sketched. His knowledge of the history of the city was a cause of wonderment. He would point to windows which had been closed on account of the light tax, and show water-marks caused by the overflowing of the gutters in the days before underground drainage was dreamed of or adopted. Occasionally he would forget that his companion was not of his age, as when he asked the writer if he remembered the old House of Parliament before they were burned, or alluded to the creation of some edifice now regarded as historic."

MR. HOWELL.—Mr. Charles Henry Howell died on June 22, aged eighty-one years, at Lynwood, Leatherhead. He was elected as an Associate in 1848, and in 1861 a Fellow of the Royal Institute of British Architects. Mr. Howell, until his retirement from practice about ten years ago, had been surveyor of public buildings for the county of Surrey; he was formerly architect to the Lunacy Commissioners, and an assessor to the Norwich Union Assurance Company. He made the plans and designs for the County Hall, after the Renaissance style (1892-3), at Kingston-on-Thames, and was employed in the erection of several asylums and similar buildings.

MR. BUCKLER.—The death, in his eighty-first year, is announced of Mr. Charles Alban Buckler, a member of the Order of Malta, and architect, we understand, of the Dominican Church, near Haverstock Hill, Hampstead. Mr. Buckler was a learned ecclesiologist, and was well versed in the history and literature of architecture.

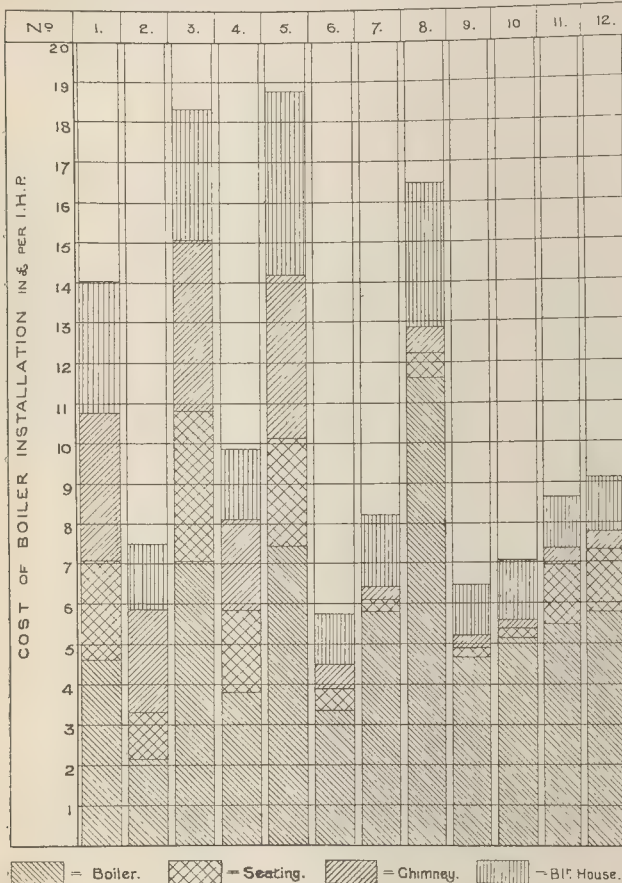
#### GENERAL BUILDING NEWS.

CHURCH, TROEDYRHW.—The new Church of St. David's, situated in Merthyr-road, Troed-y-hw, has just been completed. The church, which will accommodate 250 worshippers, is intended for the holding of Welsh services, and adjoining it is a hall designed for church meetings and for general public purposes, with accommodation for about 750 persons. Messrs. Evans & Green were the architects, and the contract has been carried out by Messrs. Jones Brothers, of Quakers' Yard.

BAPTIST CHURCH, EASTLEIGH.—The foundation-stones were laid recently of the new church which is being erected on the site adjoining the present one in Desborough-road. The new building, costing 3,200l., and seating 750 people, is constructed of red brick, with Bath stone facings. Inside, a gallery and organ loft, with accommodation for the choir, will be provided, whilst near the rest room will be situated the Baptistry. The heating will be on the high-pressure hot-water system, and the lighting by incandescent burners. The floor will be of wood blocks, and the seats of pitch pine. The builders are Messrs. Golding & Ansell, Southampton, and the architect Mr. J. Wills, Derby.

WESLEYAN CHURCH AND SCHOOLS, SALTBURN.—These buildings have just been completed at a cost of over 7,000l. The church is divided into nave, aisles, chancel, and organ chamber, with pillars and arches in Whitley stone. Internally, the whole of the woodwork is in pitch-pine, and there is sitting accommodation for 650 people. The old chapel has been converted into Sunday school premises by gutting the old gallery, and provision has also been made for a large guild room, ladies' parlour, and classrooms. The schoolroom will accommodate 350 scholars. The contractors for the whole work have been Messrs. T. Dickinson & Son, of Saltburn and West Hartlepool, while the architects were Messrs. Garais & Pennington, of Castleford and Pontefract.

CHURCH, CHESTER-LE-STREET.—On the 21st ult. the foundation-stones of a new P.M. Chapel were laid at Chester-le-Street. The new chapel is being erected by the members of the Chester-le-Street P.M. Red Rose Mission. The site of the new building is in Clifford-terrace. When completed the chapel will provide seating accommodation for between 400 and 500. It will comprise a nave, three vestries, gallery, and organ gallery. The main entrance will be situated in Clifford-terrace, while the entrance to the gallery will be in the tower. The building will be in the Gothic style, and the design will be executed in red brick with stone facings. Subsequently it is intended to extend the building by the erection of a Sunday school, which will contain six classrooms. It is expected that the chapel will be completed within nine months, and will cost about 2,200l. The building is being erected by Mr. C. Groves, of Chester-le-Street, from plans prepared by Messrs. Boyd & Groves, architects, Newcastle.



— FIG. 12. —

Illustration to Student's Column.



**SCHOOL, HOVE.**—A new school is to be built in Portland-road, Hove, at a cost of 6,500*l.* Provision will be made for 600 scholars, and the school will have a frontage of 124 ft. to Portland-road. There are to be eleven classrooms and a central hall, all on one floor, with the usual teachers' rooms, cloak lobbies, lavatories, passages, etc. For heating purposes, Tesla's open fireplaces will be installed in the different departments, but the central hall and the cloak lobbies are to be warmed by Grundy's hot-air system. The building will be of brick with green slated roofs. The internal walls will be plastered above salt glazed brick dados, and the woodwork lightly stained and varnished. For the new school the architects are Messrs. Clayton & Black, of Brighton, and the building contract has been entrusted to Messrs. Norman & Burt, of Burgess Hill.

**LEYS SCHOOL, CAMBRIDGE.**—A few days ago the Duchess of Albany laid the foundation-stone of the Moulton Memorial Chapel and opened the new swimming bath at Leys School, Cambridge. The chapel, which forms a memorial to the late headmaster, Dr. Moulton, is being erected by Mr. W. Saint, contractor, after plans and designs by Mr. Robert Curwen.

**SCHOOL PREMISES, PRESTON.**—The cutting of the first sod on the site for a new school to be erected in Christ Church, Preston, took place on the 19th ult. The school, which, together with the site is expected to cost upwards of 3,000*l.*, will be in Gothic style, constructed of Accrington brick, with stone dressings, and roofed with Welsh slate. The main entrance is by a porch on the north side which leads into a corridor 10 ft. wide. On the right of the corridor is the cloakroom, with lavatories, and on the left a classroom 24 ft. by 18 ft., with accommodation for forty-eight children. From the corridor as well as from the class and cloak rooms access can be gained to a central hall 26 ft. square, and lighted by a lantern light. Flanking this hall in the east and west angles are classrooms, and on the south side another corridor leads from the hall into a yard. On the right of this corridor is a babies' room for fifty-four children, and on the left another classroom for forty-eight children, and beneath the corridor is the heating-chamber and storage for fuel. The floors of the rooms will be laid with coke-breeze on concrete, and the roofs are open timbered. The central hall is divided from the classrooms by sliding screens so arranged as to provide a room 53 ft. by 25 ft. The height of all the apartments from floor to the square is 14 ft. Messrs. Myers, Veevers, & Myers, of Preston, are the architects, and the contract has been let to Mr. R. N. Hull, also of Preston. The total accommodation of the school will be 250.

**PRIMITIVE METHODIST BUILDINGS, WALKLEY, SHEFFIELD.**—The new Sunday schools and Young People's Institute, adjoining the Primitive Methodist Chapel at Walkley, were opened recently. The new buildings have a frontage to Greenhow-street, at the rear of the present chapel in South-road. The school is on the ground floor, and consists of an assembly-room, 58 ft. 6 in. by 34 ft., around which are grouped five small classrooms, separated from the assembly-room by movable glazed screens. Accommodation is provided for a total of 500 children. The institute, also on the ground floor, measures 32 ft. 6 in. by 22 ft. 6 in., and accommodates 140 adults. Infants' room, kitchen, and other accessories are situated on the basement floor. The building is of Crookes stone. It is lit with electricity, and heated on the low-pressure system. The architect was late Mr. W. J. Taylor, and the work has been carried out by Messrs. John Vasey & Sons. The contract price was 3,000*l.*

**COUNCIL OFFICES, WOODFORD, N.E.**—New offices are to be erected by the Woodford District Council at the junction of Monksham-avenue and King's-avenue. The building is in the Georgian style, and will be built of red brick and stone, the roof being covered with green slates. It is proposed to light the building by means of gas. The site belonging to the council on the opposite side of King's-avenue will be utilised for the provision of a fire-station, cart-sheds, and stores, etc., in connexion with the surveyor's department. The principal building will be the fire-station, which will contain accommodation for a resident fireman, storekeeper, call office, mess-room for men, engine-house, with hose tower adjoining, and practice platform. At the further end and sides of the site will be placed the stores, cart-sheds, mortuary, and ambulance-shed. The architect of the new buildings is Mr. Arthur C. Blomfield, and the cost will be over 18,000*l.*

**FEVER HOSPITAL, PETERHEAD, N.B.**—On the 17th ult., the foundation-stone of the new infectious diseases hospital for the burgh of Peterhead was laid. The building, which is situated on the north side of the town, is being built after plans by Mr. D. H. Scott, the Burgh Surveyor. It is of the villa type, built in four blocks, and will contain sixteen beds. Mr. William Stuart is the contractor, and the cost is estimated at about 4,000*l.*

**LIBRARY, CROSBY.**—The new public library, which has been erected at a cost of 5,600*l.*, was opened at Crosby on the 23rd ult. The library has been erected on a triangular piece of land belonging to the District Council, with a frontage to College-road. It is near to the Alexandra-hall, being separated from that building by the newly-constructed road called Coronation-road. The plans were prepared by Messrs. Anderson & Crawford, architects, of Liverpool, and the new building is arranged as follows:—Opposite the porch is the entrance to the lending library, and to the right and left of same access is provided to the boys' room and newspaper and magazine reading-rooms respectively; whilst in the rear of the latter is placed the reference library. The librarian's room is situate between the boys' and ladies' rooms, and is within easy reach of the public counter in the lending library. The building is divided into three parts by two lines of arches on either side of the lending library, which is the central room, and these are filled in with bookcases and counters for direct service to the different rooms. Behind the ladies' room, which has a separate entrance on the south side, is lavatory accommodation for the staff. Adjoining the same is a staircase leading to the heating and coal-cellar in the basement, and to the book-repairing room on the first floor. An entrance for the staff is provided at the rear of the building, whilst over the vestibule is placed a book store, access to which is attained by a spiral staircase from the lending library. The ground floor of the building is with wood block, and the walls are covered with a tiled dado about 5 ft. high. Externally, the library is faced with red pressed bricks, relieved with Stancliffe stone dressings; and the semi-circular entrance porch is supported by two granite columns. A small clock tower is a feature of the front of the building, the roof of which are covered with Westmorland green slates.

**PUBLIC LIBRARY, LOUGHBOROUGH.**—A new public library has just been opened at Loughborough. The building consists of a reading-room, 40 ft. square; lending library, 28 ft. by 36 ft., with accommodation for 10,000 volumes; and reference library, 25 ft. by 19 ft. Behind these are the librarian's office, stores, staff room, caretaker's room, lavatories, etc., the librarian's residence, which adjoins, having a frontage to Packe-street. Externally the building is faced with sand-stock bricks, with terra-cotta dressings, and is in the Renaissance style. The lighting and heating are by electricity, and the hot-water low-pressure system respectively. The contractors have been Messrs. W. Moss & Sons, Loughborough, and the architects Messrs. Barrowcliff & Alcock, Loughborough (their design being accepted in open competition with representative Nottingham, Leicester, and Derby firms).

**FOOTBALL PAVILION, PITTOCHIE, ABERDEEN.**—The directors of the Aberdeen Football Club have decided to erect a new pavilion at Pittodrie. The plans for the building have been prepared by Messrs. Cameron & Watt, architects. It will be a two-story building, constructed of wood and iron, with stone foundations running along its front. The frontage will be 45 ft., and the pavilion will be 21 ft. in height.

**WEST CORNWALL HOSPITAL, PENZANCE.**—The new West Cornwall Dispensary and Infirmary at Penzance is nearing completion. Mr. Oliver Caldwell is the architect of the new hospital, and Messrs. Perkins, Caldwell, & Caldwell, of Penzance, are the contractors, the amount of their contract being 7,400*l.* The new hospital comprises a central administrative block of two stories, with a ward block on each side, and various rooms attached. From the south wing of the building the new public dispensary will be built. The central, or administrative, block comprises on the ground floor a vestibule, entered from St. Clare-street, and the main corridor, which runs the whole length of the hospital, and branching from which on the west are the nurses' dining-room, the matron's room, the medical officer's room, the operating theatre, and the storeroom, etc. The main staircase to the first floor branches off from the main corridor, and is being made of extra width to permit of the erection of an additional story in the future, if necessary. Throughout provision has been made for any prospective extension of the hospital by the erection of another story. On the other side of the corridor of the main block are the kitchens, scullery, pantry, lavatory, and the boys' room. Going north in the main corridor are the secretary's and porter's rooms, the main ward, to contain twelve beds, two private wards, ward kitchen, and sanitary towers. Additional sanitary arrangements are provided for the private wards. The main ward is 60 ft. long and 26 ft. 6 in. wide. The ward is lighted by fourteen windows, which run to the ceiling level, is ventilated on the Boyle system, and is heated by one of Shorland's double-fronted stoves with under flues. At the south-west end of the ward is an airing verandah for convalescent patients. The private wards are similarly heated and ventilated. The ward kitchen is situated centrally between the main and private wards. The south ward will be the same as the north ward. The opera-

ting theatre is 24 ft. long and 15 ft. wide. It will have a terrazzo-tiled mosaic floor, and the walls will be lined with white glazed tiles. A feature of the scheme is that all the administration will be performed on one floor. In case of accident, the ambulance will be wheeled right into the hospital and the patient treated without being moved up or down steps. The corridors throughout will be laid with wood blocks, and the floors of the kitchens, scullery, and other offices tiled. On the first floor of the administrative block are the bedrooms for the staff, the matron's room, linen and store room, and baths and other sanitary arrangements. The temporary block comprises a public hall, 32 ft. by 27 ft., room-physicians' room, physicians' examining room, surgeons' room, surgeons' examining room, visitors' room, dental room, dispensing room, and separate sanitary arrangements for male and female out-patients. The laundry, built in the south-west corner of the ground and detached from the hospital, includes a washhouse, ironing-room, and drying-room. The walls are of stone, with red brick dressings, granite sills, and plinth.

**WEAVERS' INSTITUTE, NELSON.**—The Weavers' Institute in Pendle-street, Nelson, has been erected on a site at the junction of Pendle and Cross streets, the principal entrance being from Pendle-street. There is also a side entrance from Cross-street. The basement contains store-rooms, heating cellar, etc. The ground floor contains general and secretaries' offices, committee-room, and a large lecture-room capable of seating 150 persons. The first floor contains reading, conversation, committee, debating rooms, refreshment-room, and a billiard-room, the size of the lecture-room below. On the second floor is an assembly-room, capable of seating 600 persons, with raised platform and two ante-rooms. The floor is specially prepared for parties, and a hoist connects this room with the basement. The lighting is electric throughout, supplemented by gas for emergency purposes. The work has been designed by and carried out under the personal supervision of Mr. Thos. Bell, architect, Burnley and Nelson, at a cost of over 4,000*l.*

#### APPOINTMENT.

**PANAMA CANAL COMMISSION.**—Mr. John F. Stevens, who, as expert on behalf of the Government, superintended the construction of railways in the Philippines, and was formerly Vice-President of the Chicago, Rock Island, and Pacific Railway, has been appointed chief engineer of the Panama Canal Commission, at a salary of 8,000*l.* per annum, vice Mr. John F. Wallace, resigned.

#### FOREIGN.

**FRANCE.**—The "envois" of the students of the Villa Medici are shortly to be exhibited, as usual, at the Ecole des Beaux-Arts. In architecture M. Jousse (1st year) sends the Trajan column and fragments of the Ara Pacis Augustae; M. Prot (2nd year) fragments of the mosque at Kairuan (Asia Minor) and the tombs of Innocent VIII. and Sixtus IV. at the Vatican; M. Hulot (3rd year) sends drawings of the ruins at Selinonte as now existing; and M. Bigot (4th year) a restoration of the Colosseum.—M. Ziem, the painter who has made scenes in Venice and the East his special study, has presented to the city of Paris forty paintings and as many water-colours. They will be arranged, after the 14th inst., in a room in the Petit Palais to be called after the name of the painter.—M. Gilbert has been appointed architect of the hospital at Vésinet, in place of the late M. Boudin.—A Parliamentary Committee is to be appointed to consider the condition of the provincial museums, and the means of making the best use of collections some of which are little known.—The buildings of the Grand Chartreux, now abandoned, have been classed as Monuments Historiques, and their preservation therefore is ensured as a State charge.—The Municipality of Reims are about to devote a sum of 1,500,000 francs to various architectural works, more especially the completion of the Institut Leconte, and the continuation of the works at the hospital of Pontchaillou.—There is talk of forming a great bathing establishment at Dieppe, with a casino on the site of the present Hôtel de Ville, which, with the museum, is to be rebuilt at another part of the town.—The Municipality of Paris has voted a sum of 884,000 francs for various new scholastic buildings.—M. Amersheim, the architect, has just completed the restoration of the church of St. Urbain, at Troyes, which dates from the XIIIth and XIVth centuries.—M. Girault, the architect of the Petit Palais, has been commissioned to erect at Brussels a large building for the Belgian Colonial Institute, the first stone of which has been laid by the King of the Belgians.—MM. Le Cour and P. Bouvreuil have obtained the first premium in the competition for a block of school buildings at Dieppe.—Mr. James Stillman, President of the National City Bank of New York, has presented to the Ecole des Beaux-Arts a sum of half a million francs, to be applied (under certain



conditions, not yet finally fixed) in prices for a certain number of pupils of French nationality.

**FURTHER NEWS ON THE CEMENT TRADE ABROAD.**—According to the report of the British Consul at Cadix for 1904, the output of the local cement works for the year was 5,872 tons, which was all sold in the country at 60 pesetas (11. 16s. 4d.) per ton. The price of British cement in Cadix is about 83 pesetas (22. 11s. 6d.) per ton. Only 956 tons of cement were imported during the year—600 tons from France, 150 from Germany, 35 from the United Kingdom, and 171 from Belgium.—Mr. Consul Wardrop, reporting on the trade of St. Petersburg, writes:—"At the beginning of 1904 there were thirty-eight Portland cement works, with a maximum productive power of 7,970,000 kegs per annum; there were also eighteen Roman cement works. No trustworthy figures of recent actual production can be obtained."—In Norway, according to the report of Viscount Melville, H.M. Consul-General, cement has very strong competition—especially German—to fight against, which has forced prices below the normal, and German factories are said to have disposed of their production in Norway for less than the cost of production in Norway itself. The duty was raised on April 1, 1904, but complaint is made that it is insufficient to protect the Norwegian industry. The native consumption of cement has decreased since 1899. The export of Norwegian cement in 1903 amounted to about 68 tons, while about 18,000 tons of foreign cement entered Norway, nearly 12,000 tons of which came from Germany, 5,000 tons from Denmark, and 233 tons from the United Kingdom. The principal Norwegian cement works, the machinery of which is driven by electric power from the Glommen River, are at Slimestad, in the Christiania Fjord.—The trade in cement in Portland, Oregon, U.S.A., in 1904 was large, and nearly all the imports were either from Germany or Belgium. Best brand sold at 8s. 9d. to 8s. 2d. per cask. There was some competition with California cement, packed in bags, which is sold at 1s. to 1s. 6d. less. It is not generally considered equal to imported cement, but is likely to prove an important factor in the trade. Heavy stocks are held at ports in Oregon, but consumption has increased largely. During the past year at Astoria cement was used for pavements and macadam for the roadways, adding very much to the neatness of the town. The cement used was of California production, very little of European manufacture being employed.

At Seattle (writes Mr. Vice Consul Pelly) the average price hitherto obtained for imported cement of standard brands has been from 7s. 7d. to 10s. per barrel. The price is now somewhat lower. German and Belgian makes are mostly used. Japanese cement is only used to a very limited extent in California, but has not yet entered this field (Seattle). The rate of freight from British Columbia will probably not exceed from 5d. to 74d. per barrel. The rate of freight of California cement is 1s. per barrel. In shipping the exact weight should be given in the bill of lading, otherwise the Customs reckon 400 lb. to the cask. The duty is 8 cents per 100 lb.—The trade in cement in Puget Sound is considerable, the average yearly value of the imports for the four years prior to 1903 having been 43,525; in 1903, 198,190 casks were imported, valued at 55,560l., and in 1904, 254,972 casks, valued at 71,437l.—The imports of cement to Oporto from the United Kingdom during the past four years has been—in 1901, 358,335 kilos, value 5,343,800 reals; in 1902, 78,610 kilos, value 783,800 reals; in 1903, nil; in 1904, 649,096 kilos, value 5,082,000 reals.—Mr. Faber, British Consul at Fiume, writes under date May 20—"The cement trade is supplied by the home works, and there is even a considerable export trade via Trieste. This market was supplied in 1904 with 2,250 tons from Hungary and 865 tons from Austria. The submarine masonry blocks used in the harbour works are made with a natural cement brought from the island of Santorin, in Greece, as this is found to harden when immersed.

**PRESERVATION OF ANCIENT MONUMENTS IN INDIA.**—It is officially reported that during the year 1903-4 the Archaeological Surveyor of Western India toured in Central India, the Central Provinces and Rajputana. The expenditure on the conservation of ancient monuments in the Bombay Presidency amounted to 2,200l.; that in the Central Provinces and Berar to 700l. The amalgamation of the archaeological circles of the United Provinces and Punjab was effected in July, 1903. There are still, however, two officers, one of whom, known as the superintendent, has his headquarters at Lahore, and is concerned solely with the architectural side of Muhammadan archaeology. The other officer, known as the surveyor, has the supervision of the buildings at Agra, Jaipur, Delhi, Lahore, and Ajmere, and deals with matters affecting Hindu

and Buddhist buildings. The former was engaged at first in excavations at Charsada, in the Frontier Province, and subsequently visited Chamba and the ancient temples of Kashmir, and places in the United Provinces. The North-West Frontier Province and Baluchistan have been placed, as regards archaeological work, under the separate charge of Dr. M. A. Stein. The amount of 12,400l. was spent in the United Provinces and Punjab circle from Government revenues on conservation of monuments. In Madras, excavation of prehistoric remains at Adinachallur, and other places in the Tinnevely district, resulted in the unearthing of a very large number of objects of great interest. In Bengal the chief work of the year was the excavation of the ancient site of Vaisali, at Basari, and the adjacent villages in the Muzaffarpur district; 4,150l. was spent on conservation in Bengal. In Burma the amount of such expenditure was 6,100l. Much progress was made in improvements to the Mandalay palace and its surroundings by the Council of the Kings. An Act, passed by the Governor-General in 1904 to provide for a preservation of ancient monuments and of objects of archaeological, historical, or artistic interest, was designed to secure the preservation of those in the hands of private owners, to control the traffic in antiquities by reserving power to prevent the removal from British India of any antiquities it may be deemed desirable to retain, and to prevent the excavation by ignorant or unauthorised persons of sites of historic interest and value.

**SOUTH AFRICA.**—At the ordinary general meeting of the Master Builders' Association (Johannesburg), Mr. C. Woods presiding, Messrs. Seago & Gabriel, who were the delegates representing the Association at the recently held conference in connection with the building trades at Port Elizabeth, gave an account of the business transacted at that meeting.—Work on the new City Hall in Capetown is nearing completion, and it is expected that the work will be finished early in July.—The Town Engineer of Germistown (Transvaal) is engaged in drawing up a scheme for municipal buildings, which will include a town hall and the necessary offices for the Council's work.—Among the improvements about to be carried out in Cradock is the construction of a large block of shops and offices for Mr. S. G. Webb. The architect is Mr. Jones, of Port Elizabeth, who designed the local new Victoria Hotel.

**QUEEN VICTORIA STATUE, NASSAU, BAHAMAS.**—On Empire Day, May 24, Sir William Grey-Wilson, the Governor, unveiled a statue of Queen Victoria at Nassau, which has been erected by Mr. J. Adams Aton in Carrara marble, mounted upon a pedestal, 8 ft. high, of Peterhead granite, is of heroic size, and represents Queen Victoria seated upon a throne, wearing her robes of state and holding the sceptre and orb.

### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.** The permanent offices of the "Quantity Surveyors' Association" (Incorporated) are now fixed at 17, Bedford-row, W.C. Mr. F. B. Hollis is the secretary.—Mr. Morgan Williams, consulting engineer, of 39, Victoria-street, Westminster, has been appointed partner in the firm of W. Cousins, M.Inst.C.E., and the business of the firm will henceforward be carried out under the title of Morgan Williams & Cousins.—Messrs. J. Hodson & Son (Nottingham) are the appointed agents for the "Hopton Wood Stone Firms, Ltd.," an amalgamation of the Hopton Wood Stone Company with the firm of Messrs. Killer Brothers, as announced in a previous issue.

**A NEW COMPUTING SCALE.**—For finding the areas of irregular figures, surveyors and engineers have been obliged hitherto to rely upon direct computations by Simpson's rule, or some analogous method, upon the computing scale, or upon the planimeter. In the "Radial Area-Scale," patented by Mr. R. W. K. Edwards, we have an extremely simple and ingenious instrument which is equally available for computing the area of a regular or irregular figure. We have received, for example, this scale, consisting of a celluloid sheet, 8 in. by 6 in., on which eleven diverging lines are engraved radiating from a centre 1.75 in. outside the sheet, each line being graduated with fractional dimensions. The two outer lines—those at the top and bottom, respectively—are separated by an interval of 28 deg., and the eleven lines are equally spaced so that the distance between any two adjacent lines is 2.8 deg. The lineal distances between the lines are nearly 0.1 in. at the left-hand of the scale, and nearly 0.5 in. at the right-hand side. Roughly speaking, this particular example is not available for computing the area of a figure of which the greatest length and breadth are more than 7.5 in. and 4.5 in., respectively. But larger areas can be measured by dividing them into two or more

parts. Larger sizes of the instrument are made in celluloid or plate-glass to meet the requirements of those having to deal with figures of greater area than can be measured on the small-sized scale. The use of the radial area-scale is very simple, and, with the object of testing this characteristic, we placed it, together with the printed directions, in the hands of a junior member of our staff, with instructions to find the area of two figures, one being a square and the other a circle, in one being a square and the other a circle, in each case the correct result was found without the least difficulty or delay. The manner in which the scale is used may be thus briefly outlined:—Place the scale, with the lines radiating from left to right, over the figure to be measured, so that the two outside lines touch the upper and lower boundaries of the figure. Then read off the figures graduated on each of the nine intermediate lines at the points where these lines are intersected by the right-hand part of the boundary of the figure. Next read off the values in like manner for the left-hand boundary of the figure. Add the first nine readings and the second nine readings; subtract the second from the first, and the result is the required area in square inches. One set of the required area is given for guidance in particular applications of the instrument, but they are of equally simple character. This area-scale is made by Messrs. Morgan & Kidd, of Richmond, and we feel quite sure it will be found a most useful aid to architects, surveyors, and engineers.

**FIRE-RESISTING PARTITIONS.**—Two of the "Red Books" issued by the British Fire Protection Committee (namely, Nos. 92 and 93) describe the results of fire-tests of the "Mantada" partitions (24 in. and 24 in. in thickness) fixed by the Adamant Company (Birmingham). Red Book No. 93 records the earlier test made on January 18, 1904, with partition slabs 2 in. thick, plastered on the side exposed to the fire, so that the total thickness was 24 in. Each whole slab measured 24 in. horizontally and 12 in. vertically, and was perforated vertically with seven holes 1 in. in diameter, and each end had a semi-circular groove. The horizontal joints were square. The slabs were laid to break joint, and were keyed together by means of wood slips 4 in. by 4 in. placed in all the end joints, and continued through the central holes of the alternate courses; in other words, the wood slips were placed in every fourth hole, and the alternate courses to centre. Finally, all the holes were centred to centre. The test was very severe, the internal temperature of the test-kiln at one point ranging from 1,300° to 1,940° Fahr., and being maintained for two hours and a half. Immediately after the gas was turned off, water was turned on to the inside faces of the partition, through a 1-in. jet. "The partition was weakened during the fire-test by the carbonising of the wood slips which should have held it together," and although it stood well through the fire-test itself, about 20 ft. super. of the partition fell two minutes after the water had begun to play on it. In the later test (Red Book No. 92) the same method of construction was adopted, but the slabs were 24 in. thick (finishing 24 in. when plastered on one side), and iron tubes, 4 in. in internal diameter, were used instead of wood slips to key the slabs together. The official note states that "although the fire and water passed through the partition, it retained its position, and the result indicates that the quantity of metal was excessive."

**SWEDISH WOOD EXPORTS.**—In his report for 1904 on the trade and commerce of Stockholm and the Eastern coast of Sweden, Mr. Macgregor, British Consul, observes that, on account of the unfavourable state of the wood market in the United Kingdom and South Africa, and also because of the lack of co-operation among the Swedish exporters, a continuous fall in prices took place, which for red wood deals may be put at about 4l., and for other kinds of wood at about 1l. and 2l., with the exception of planchets and slatings, for which the fall amounted scarcely to 10s. all per standard. As the circulars sent out seemed to indicate that the stocks in the ports of export were relatively small, and those in the ports of import very scanty, both sellers and buyers were hopeful at the beginning of 1905. Germany bought up large quantities of white wood batons and red and white deals at prices which were at least 10s. better than those of last autumn. British orders also increased, and altogether a fair start was made, except for red wood deals, for which the demand continued insignificant. It is hoped, however, that South Africa will soon absorb the surplus stocks imported during the last two years, and again become a good customer for deals of red wood, the prices for which have been ruinously low. According to the report of the Swedish Sawmill and Wood Exporters' Association, the export of deals, batons, and boards, planed and unplanned, from the wharf of Sweden, was in the year 1903, 1,009,448 standards; in 1901, 908,787 standards; in 1902, 1,004,606 standards; in 1903, 1,039,462 standards; and in 1904, 915,390 standards. In 1904 there was a decrease in the total export of



wood from Sweden of about 124,000 standards, as compared with the previous year. Of this amount there were over 88,000 standards less to the United Kingdom, while the export to Germany shows an increase of 10,000 standards, and to France (Algeria and Tunis included) 14,000 standards. The quantities sent to Australia, Portugal, and Egypt also show improvement, but to Belgium and Spain they have considerably diminished. The amount sent to South Africa (including Cape Colony) was about 59,000 standards less than during 1903. This was the largest decrease comparatively to any country during 1904, and, being chiefly red deals, is considered the most serious one.

**CITY AND GUILDS OF LONDON INSTITUTE.**—In the annual report of the Council of the City and Guilds of London Institute it is noted that Mr. Colton is the fourth sculptor student of the Institute who has been singled out for election as an Associate of the Royal Academy. The report continues: "He was a student at both the South London School and in the Art Department at Finsbury, and exhibited some of his early work at the exhibition of students' work collected by the Institute at Slitters' Hall in 1893. The Council may claim that by establishing their School of Art in South London, and allowing it freedom to develop its own methods of training, they have contributed very materially to the advancement of English sculpture to the eminent position it has now attained both at home and abroad. Mr. Sparkes estimates that at least two hundred capable men trained and educated in this school are at the present moment doing the best work in the country in architectural sculpture in marble, bronze, silver, ivory, and other materials."

**THE LABOUR MARKET IN THE COLONIES.**—The July circulars of the Emigrants' Information Office state that in Canada, though the demand for more mechanics is not so great as for farm labourers, there has been good employment for skilled men in the building and manufacturing trades. In the six States which compose the Commonwealth of Australia there is not much demand for more labour, and none of these States give any money assistance towards emigrants' passages except Queensland and Western Australia. An emigrant must be careful not to enter beforehand into any agreement to perform manual labour in the Commonwealth, as in that case he will not be allowed to land. There is as a rule a sufficient supply of mechanics, and men of this class are not recommended to go to Australia unless they are specially skilled in their trades, or have friends to go to, or unless they can afford to wait a little till they find suitable employment. In New Zealand, though there is no special demand for more men, a competent mechanic should be able to find employment without much delay. No one may enter Cape Colony unless he possesses 20*l.* on arrival, or has secured work beforehand. The building trade at Cape Town shows no sign of improvement, and at Port Elizabeth there is a good deal of distress owing to the depression. No one may enter the Transvaal without a permit, which should be applied for at least a week before sailing. Though the output of gold is very large, and more white men are being employed about the mines than was the case last year, the supply of labour in all trades at Johannesburg is still considerably in excess of the demand. Many mechanics are out of employment, and others have left the country. In Pretoria, and in country districts also, the supply of white labour is ample. Men are therefore warned against going to the Transvaal at the present time unless they have secured work beforehand or have sufficient means to keep themselves for some months. No one may enter the Orange River Colony without a permit. There is no improvement in the demand for labour, and persons are warned against going to the Colony at the present time in search of work. Country districts also are suffering as well as the towns.

**PROPERTY SALES.**—The "old vicarage house" at Shiplake-on-Thames has been sold for 11,000*l.*; it was the residence in the XVIIth century of James Oglethorpe, who there completed his "Biographical History," and gathered his collection of portrait-prints, and there was celebrated the wedding of the late Lord Tennyson. Consequently upon the death of Mr. John Sussan, covering about 400 acres in all, which was offered for sale at auction; the house was built by Messrs. William Lawrence & Sons, and designs—Amongst other properties now placed on the market are "Laggis," in Netherlands, Hampstead, which was built twenty years ago by Messrs. Kelly from Mr. George Sherrin's designs, the fittings and decorations Renaissance style—being carried out by Messrs. Gillow. The manor-house, Mancetter, Warwick, and which contains some fine old wood—Protestant martyr, who was burned in 1555, and of which the descent is traced from Walkeline de Mancetter, who derived the manor from Hugh Lupus, Earl of Chester, temp. William I.

Bearhill estate, of about 510 acres, near Hershams and Weybridge, and including a park, 200 acres, which once formed a demesne of Hampton Court. The estate, near Peterborough, extending over 5,000 acres, with Orton, in Overton Longueville parish, Hunts.—a seat of the Marquis of Huntly, and yielding an aggregate rental of 6,140*l.* per annum.—Temple House, the adjacent paper mills, Hurley House, and other properties, near Marlow, owned by the late General Owen Williams, and comprising some 700 acres, Temple House, in Bisham parish, which stands on the backwater near Temple Lock and the mills, was built on the site of a preceptory of the Knights Templar; some of the principal rooms were decorated by Adam.—The Earl of Cork's estates of about 3,500 acres in and near Frome, with Marston House, have realised an aggregate of 120,000*l.* at auction valuations of timber, etc., excluded; and Mr. George Coates, of Paisley, has purchased from Mr. Ean Cecil, for 155,000*l.*, at the Mart, the Glen Tana estate of 29,200 acres in Abney and around, consisting mainly of deer forest and grouse moor, with eleven miles of salmon fishing in the Doe.

**A "GOODBYE" TO SIR CASPAR PURDON CLARKE.**—On June 28 Sir John Gorst, M.P., presided at a farewell banquet given in the Criterion restaurant to Sir Caspar Purdon Clarke, who will shortly take up his new post as director of the New York Metropolitan Museum in succession to General di Cesnola. More than forty years ago Sir Caspar entered the National Art Training Schools at South Kensington, where he won the National Medal for architectural design. In 1870 he went to Italy as superintendent of mosaic reproduction in Rome and Venice, and in 1872 he completed the decorative work at the Church of St. Mark, Alexandria, for the late James Wild, Esq. (1874) went to Persia to complete the British Embassy buildings in Teheran; and four years afterwards was appointed an architect to the Royal Commission and agent to the Indian Government for the Paris Exhibition. Having rearranged the Indian collections at South Kensington, he, in 1880, visited India. On his return to England he was made a Companion of the Order of the Indian Empire, and Keeper of the Indian Section at South Kensington, where, in 1892, he was appointed Chief Keeper, and, in 1896, Art Director, of the Museum. He was knighted in 1902; and was appointed Royal Commissioner for the Paris Exhibition, 1900, and the St. Louis Exhibition, 1904. In the course of the evening a large silver cup, suitably inscribed, was presented to their guest in the name of the committee.

**CHEAP SCHOOL BUILDINGS.**—An important decision of the Board of Education was communicated to the Northumberland Education Committee at its meeting recently. Hitherto the Board has insisted upon very substantial school buildings being erected, but the Northumberland Committee, faced with a very large number of new schools to construct, many in districts where subsidies are common and where there is no guarantee of permanent population, wrote asking whether buildings less substantial than brick or stone would be accepted in districts with a liability to subsidence, where the population depends on a fluctuating industry, and where small schools are desirable owing to a sparse population, who could not bear the cost of expensive buildings. The reply of the Board of Education, communicated by the chairman, is to the effect that it is prepared to consider favourably proposals for buildings of the kind described in districts where they would come under any of the three heads mentioned, but that each case would be considered on its merits. The class of building the Education Committee proposes to put up would be of galvanised iron, lined with boards, and with a layer of felt between the outer and inner coverings. The Committee remarks that these buildings are much improved in appearance and design in the last few years, and their life when properly built is estimated as at least twenty-five years.—*Yorkshire Post.*

## Legal.

### THE WESTMINSTER PAVING LITIGATION.

The case of *Alcott v. The Mayor, etc.*, of Westminster came before Lord Chief Justice and a special jury in the King's Bench Division on the 3rd inst.

On the case being called on, Mr. J. D. Crawford, on behalf of the plaintiff, applied for an adjournment. He said that on May 29 Mr. Justice Wills had made an order postponing the trial of the action. The plaintiff, in consequence of business engagements, had to leave England last October, and since then his solicitors had been changed. Plaintiffs' leg had been amputated, and he had cabled that he was too ill to attend to business.

Mr. McCall, K.C., for the defendants, asked for judgment on the claim. As long ago as November 19, 1903, Mr. Justice Phillimore had made an order for a speedy trial, and Mr. Justice Wills, on May 20 last, made an order for a peremptory trial. After that it was said that the

plaintiff had been in a railway accident. On the terms of paying costs to the amount of 70*l.*, a further postponement was allowed till July 8.

Mr. Crawford said he was not ready to go for trial. The defendants had obtained control of the streets and had also 1,000*l.* from the plaintiff, for the return of which he was now asking. The whole amount of the claim was about 18,000*l.*, and the counter-claim was over 30,000*l.* The plaintiff was willing to pay 300*l.* The Lord Chief Justice said he thought Mr. Justice Wills's order should be carried out and judgment entered for the defendants on the plaintiff's claim with costs. The plaintiff must pay 64*l.*, and also the taxed costs of this application. The hearing of the counter-claim to be postponed to the first day of the Michaelmas Sittings, with liberty to apply. The paragraph in Mr. Justice Wills's order as to the defendants' control of the streets to be continued.

### PATENTS OF THE WEEK.

#### APPLICATIONS PUBLISHED.

12,955 of 1904.—J. CALLEB: *Windows.* This relates to a pivoted window, a portion of the lower part of which is hinged and so articulated to side pieces hinged to the window as to form therewith a collapsible ventilating hopper, which, when closed, pivots with the window, in combination with means for raising the window comprising a worm, worm wheel, crank, and cross head, the latter acting on the lower pivot.

15,723 of 1904.—W. MALLINSON: *Self-sustaining Lift Gearing.*

This relates to self-sustaining lift gearing. The centre pulley supporting the cage has a screw thread formed on it, also a similar screw formed on the main shaft, so that when the hauling wheel is stationary the load moves the centre pulley against the face plates, which are supported in a box with small rollers, forming one way clutches, to prevent the cage running down. 16,117 of 1904.—P. S. TRIGGS: *Disintegrating Machines.*

This invention relates to disintegrating machines. In carrying the invention into effect upon a rotating shaft is arranged a rotary element in the form of a drum, the external periphery of which is constructed of a series of pockets, the teeth being of a triangular shape, and being arranged by detachable and renewable beater plates on that surface of the tooth which receives the impact. This rotary element is arranged within a casing, and within the casing upon the internal periphery thereof is arranged a reaction device consisting of a series of pockets, the axis of each pocket being tangential to the drum, and so formed that any material caught by the breaking plates on the drum is delivered into one of the said pockets, and the latter having a round return the said material on to the same breaking plate or its successor at a high velocity.

16,475 of 1904.—W. ROSS and T. ROSS: *Apparatus for Flushing Water-closets.*

The apparatus consists mainly of a cistern fitted with an automatic closing valve for regulating the supply of water for flushing water-closets. The valve works in a seat fixed in the bottom of a cistern, to which is attached the down pipe leading to the closet. The valve is balanced by a counter-weight, which is suspended inside of a vertical tube fixed to the bottom of the cistern. This tube may also be utilised as an overflow, and to its upper end is fixed the fulcrum attachment for the lever for working the valve. The valve should be in two main parts, the cover or lifter, which is attached by a link to the lever, and counter-weight and the valve proper, which fits into the seat and detaches automatically from the cover or lifter to close the orifice to the down pipe. The action is as follows:—When at rest the cover or lifter is suspended upon a counter-weight above the valve proper, which is resting on the valve seat. The lever, on being pulled, brings the cover or lifter down on the valve, and on being released the counter-weight raises the valve which adheres by suction to the cover or lifter, for a regulated period, when it drops and closes the outlet. The apparatus is then in position for another flush so soon as the cistern has been refilled from the usual ball-cock.

16,796 of 1904.—F. FARNWORTH and T. PINKERTON: *Combined Ashpan and Fireguard for Domestic Fireplaces.*

This invention relates to a combined ashpan and fireguard for domestic fireplaces, and consists of a fireguard made of sheet metal, twisted metallic wire, or other material, same being placed vertically inside an ashpan in such a manner that it can be lifted up to any required height for the purpose of guiding the fireguard, when same is being lifted up. Projecting pieces are attached outside the fireguard, these projecting pieces, being in groups, formed by strips of metal, attached to, or cast on inside faces of ashpan. The fireguard is the same height as ashpan, and when fireguard is at its lowest position, its top

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



edge is level with the top edge of ashpans. When the fireguard is lifted up, it is supported, at any required height, by means of a catch, which is fulcrumed on a pin fixed in ashpan, the points or ends of cage engaging with corresponding projections formed on outside face of fireguard.

#### 17,304 of 1904.—A. FIRTH: *Water-Heating and Steam-Generating Apparatus.*

This invention relates mainly to gas-heated boilers for use in connexion with the heating of water for domestic purposes, for hot-water circulation, and for general water-heating purposes. It is applicable also, however, to boilers heated otherwise than by gas, and used for steam generation or like purposes. The object of the invention is to provide means whereby the whole of the hot products of combustion given off by the burners or furnace may be utilised in the boiler. In constructing the apparatus the body of the boiler is vertical and is preferably cylindrical in form, the bottom of the water-chamber being slightly conical and having a slight upward cast towards the centre. The sides of the boiler are extended to a convenient distance below the conical base to the water-chamber, forming a flange which (in a gas-heated boiler) serves as a heat trap, and at the same time prevents the emission of any fumes from beneath the boiler. The boiler is heated either by an annular burner or burners fitted immediately within the said boiler, or by means of a coal or other furnace immediately beneath the water-chamber, and the hot products of combustion are conducted through the water-chamber by means of a coiled pipe which leads from the apex of the conical bottom of the boiler, passes round and round within the boiler and discharges through the top of the boiler.

#### 7,652 of 1905.—W. G. HEYS (THE INTERNATIONAL CONTRACT COMPANY): *Ventilators.*

A ventilator comprising a casing having a longitudinal passage there through and having expanded or funnel-shaped ends, a perforated web secured along its upper edge to the top wall of said casing and forming a chamber which communicates with the space to be ventilated, the side of bottom walls of said chamber being separated from the adjacent walls of said casing, and deflectors secured at the upper inner corners of said casing, extending downwards and longitudinally therefrom and merging into and closing the ends of said chamber.

#### 462 of 1905.—E. G. HARCOURT: *Door Fasteners.*

This relates to door fasteners, consisting in the combination of a retaining piece formed with or adapted for attachment to a door bolt casing but independently of the bolt aperture or barrel part, and a guard-chain with cage adapted for detachably engaging said retaining-piece, the parts being so formed and arranged that the required engagement and disengagement is effected by a lateral and rotary movement of the said slide.

#### 813 of 1905.—A. WHITLOCK and E. CARR: *Heating Apparatus Boilers.*

This invention relates to a system of joining together the different sections of sectional heating apparatus boilers. Hitherto they have been joined together by means of sockets cast on each section, in which are introduced either push nipples, screwed nipples, or the like, or an india-rubber ring introduced, and by other means. According to the present invention, the sections are joined together by means of caulked joints, the sockets and rendering the process far more simple and inexpensive.

#### 8,594 of 1905.—J. PERKS: *Spigot and Socket Joint for Stoneware Pipes and the like.*

In carrying out the invention the inside of the socket is lined for about one-half its depth with a ring or lining of a composition formed preferably of gas tar, brimstone and sand, and the internal surface of this ring is made slightly elliptical instead of circular, the minor axis of the ellipse being slightly larger than the average smallest pivots across the end of the spigot. In making a joint the spigot end of a pipe is inserted in the socket of another, and it will probably be found that the spigot cannot be forced into the composition ring. The spigot is then turned round until a position is found in which it can be forced into the ring, and by twisting it when in the ring it is locked therein. The remaining portion of the socket is then filled in with cement.

#### 5,543 of 1905.—W. E. MIKSON: *Roofing Tiles.*

This relates to separately moulded or continuously formed grooved roofing tiles which, for the purpose of resting on the roofing laths, are provided on the underside with projecting ends or supporting ribs characterised by two lips or ribs arranged under the lateral grooves bearing with a projection against the roofing lath, and being provided along the outer lateral surfaces adjoining the grooves with recesses or grooves of such dimensions, and arranged opposite each other and extending beyond the two or one of the lateral grooves inwards to such an extent that double-headed hooks for securing the tiles can be interposed from the

underside of the roofing between the ribs of two adjoining tiles placed with their recesses or grooves facing each other and brought into engagement with the bottom surfaces of the recesses or grooves of the lips.

#### 6,771 of 1905.—B. GIERE: *Stones for Building.*

The present invention relates to a special form for building stones, the principal features of which consists in their being of an angular shape, the two inner sides or surfaces of which are each provided with a projecting rib for use in securing said building stones together, and in using a specially-formed connecting or key-stone with suitable grooves or grooved top plate which are constructed to engage with the ribs of the two angular-ribbed building stones placed beside each other, so that when the said block are filled up with mortar or the like the said stones are formed. Said stones can thus be used either as stone blocks or if one is reversed and placed partly or entirely on the other they form a hollow stone.

#### 6,993 of 1905.—THE BRITISH LUXFER PRISM SYNDICATE, LTD., and E. R. BARNARD: *Frames for Holding Electro-Glazed Glass or Prism Sections, Tile Sections and the like.*

An electro-glazed partition, or casement, consisting in the use of an interior frame channel section having the base portion of the channel integral except at one corner, in combination with a corner joint formed with an overlapping tongue, and cross-bars also formed with a tongue passing through the base of the channel section.

#### 22,400 of 1904.—J. PICKERILL: *Fire-Proof Flooring.*

This flooring is made from a given quantity of coke-dust and cement. It is made in blocks of concrete to be laid on a prepared surface, and to fit on girders so as to leave a ventilation for a current of air to pass through. The floor blocks fit between the girders at the bottom of the blocks, diminishing at the top to allow wet concrete to be inserted to make the whole a solid mass, except for the spaces left for ventilation through the floors. On the floor level perforated bricks are provided to meet the air ways through the blocks for ventilating the rooms. At each end of the blocks there are two spaces left out, so that after the blocks are joined together with cement the spaces are filled in with wet concrete to strengthen the joint. At the bottom of the blocks there are two spaces left out to the steel girder flanges. At each side of the top of the blocks there is one space left out to strengthen the block with wet concrete. After the floor is finished any kind of granitic paving will adhere to it, and to make a finished ceiling underneath, any kind of plaster may be used.

#### 1,695 of 1905.—J. WOOD: *Flushing Cisterns.*

This consists of a cistern provided with a supplementary float and lever, and the end of said lever extending over the side of the cistern, in combination with a latching lever pivoted to the outer side of the cistern, and so formed and arranged as to engage and hold down the valve-operating lever of the cistern when such lever is lowered, and the said supplementary float lever designed, and the said cistern is almost empty, to tilt the said lever, and thereby release the valve lever.

#### 2,227 of 1905.—W. L. JACKSON: *Machines for Tunnelling or Cutting Earth, Rocks, and such like.*

A machine for tunnelling or cutting earth, rock, and such like, carried on a platform, which is mounted upon wheels, said machine comprising in combination a rotary cutter, connected with and driven by a hollow shaft, means for rotating the shaft, means for travelling the machine forward, a shoot connected with the hollow shaft, and a conveyor whereby the material cut by the cutter is automatically discharged at the rear of the machine.

#### 4,093 of 1905.—F. H. BRENTON and J. STANTON: *Cribbing or Shoring for Excavations.*

This invention relates to a cribbing, and more particularly to a cribbing especially adapted for use in digging graves and other deep excavating work. According to the invention the cribbing comprises in the main a series of side planks and cross stretchers. The side planks, each having secured to their inner faces, vertical metal straps, the straps of the upper planks having hooks at their lower ends, the straps of the lowest planks having eyes at their upper ends, and the straps of the intermediate planks having hooks and eyes at their opposite ends, permitting coupling of the straps and the suspension of the side planks from the upper planks, which latter have metal angle brackets secured to their ends to support the cribbing upon cross timbers. To the inner faces of the side planks adjacent to their ends are secured dove-tailed mortice boxes, to receive dove-tailed tenons on the ends of stretchers, and said tenons are strengthened by metal plates secured to the edges of the stretchers, and one of each pair of plates is made with a tenon longer than the wooden tenon at the end of the stretchers to limit the movement of said tenon through the boxes and hold

the stretchers in proper position, and the boxes are stretched to receive said enlarged tenons and neatly close the same.

#### 4,977 of 1904.—E. P. WELLS: *Reinforced Concrete Flooring.*

A method of constructing floors of reinforced concrete, consisting in placing partially finished slabs and their supporting beams in position, with joint spaces between them, and in then covering the slabs fitting the joint spaces with concrete, the whole being secured together by borders projecting from the slabs and beams into the layer of concrete.

#### SOME RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

June 20.—By PRALL & PRALL (at Dartford), South Dartford, Kent.—“South Dartford Roller Mill,” with residence, area 4 a 2 r 7 p. l. By A. PEARSON, with WHITE, BERRY, & TAYLOR (at Ipswich). £1,800

Great Dealings, Suffolk.—Freehold farm, 47 a 1 r 29 p. .... 720

By THURGOOD & MARTIN (at Guildford), Stoke-next-Guildford, Surrey.—A freehold enclosure, 3 a 0 r 2 p. f. .... 800

Enclosure with cedar bed, 8 a 1 r 9 p. f. .... 100

Five cottages and 2 a 1 r 6 p. .... 500

“Glyfield Farm,” 53 a 0 r 4 p. f. .... 3,500

A freehold estate, 27 a 0 r 21 p. .... 1,500

Part of “Park Barn” and “Guildford Park” Farms, 70 a 0 r 4 p. f. .... 2,100

Woking, etc., Surrey.—Burgham Court Farm, 114 a 1 r 25 p. f. (with the Manor of Burgham). .... 4,000

Worplesdon, Surrey.— .... 2,650

“Fishpond Meadow,” 5 a 2 r 14 p. f. .... 120

A freehold enclosure, 11 a 0 r 31 p. .... 170

Send, Surrey.—“New Barn Estate,” 1 a 0 r 4 p. f. .... 1,500

“Bendbarn Farm,” 129 a 3 r 21 p. f. .... 3,350

Freehold farmhouse and 17 a 2 r 19 p. f. June 22.—By GOSWOLD & CO. (at Paundock). .... 475

Greystoke, Cumberland.—Farmhouse and 11 a 1 r 37 p. f. .... 725

By THORNBOROUGH & CO. (at Tronbeck), Matherdale, etc., Cumberland.—Farmhouse and 40 acres, 1 a 0 r 3 p. f. .... 1,055

Three enclosures, 12 acres, f. .... 471

June 23.—By HATCH, WATERMAN, & SON (at Totterdun). .... 1,700

Tenterden, Kent.—“Upper Hunthorne Farm,” 138 a 0 r 39 p. f. .... 1,700

June 24.—By SEXTON & GRIMWADE (at Colchester). .... 1,500

Aldham, etc., Essex.—“The Hill Farm,” 141 a 2 r 0 p. f. .... 1,500

Little Bromley, Essex.—Norman’s and Rudkin’s Farms, 88 a 0 r 3 p. f. .... 1,650

By WRIGHT & SCRIBBY (at Cambridge), Longstanton, Cambs.—Market garden land, 32 a 1 r 3 p. f. .... 1,320

Market garden ground, 5 a 2 r 17 p. f. .... 345

A freehold allotment, 10 acres, f. .... 450

Two freehold fields, 16 a 2 r 17 p. f. .... 1,010

Three freehold cottages and 1 a 1 r 16 p. f. .... 200

“Hutton’s Farm,” 214 a 8 r 37 p. f. .... 5,025

Freehold house and 1 a 1 r 15 p. f. .... 300

“The Church Close,” 4 a 8 r 37 p. f. .... 225

Two freehold cottages and 0 a 1 r 35 p. f. Swavesey, Cambs.—A coppyhold, 8 a 2 r 22 p. .... 120

By EVANS & EVANS (at Stafford). .... 120

Brady, Staffs.—Freehold land, with buildings, 44 a 2 r 29 p. f. .... 1,010

Derrington, Staffs.—Freehold land, 25 a 0 r 22 p. f. .... 2,000

June 25.—By C. RAWLEY CROSS & CO. Shepherd’s Bush.—7, Ingleside-rd., n. 80 yrs., g. 10s., c. 42s. .... 885

Acton.—17 and 19, Whitbairn-gate, n. 97 yrs., g. 10s., c. 90s. .... 870

By DRIVERS’. Holloway.—9 to 17 (odd), Hertford-rd., f. y. 170l. .... 2,415

By ELLIOTT, SON, & BENTON. Marylebone.—8 and 9, Devonshire-st., n. 5 yrs., g. 120l., y. 360l. .... 600

10, Devonshire-st., n. 10 yrs., g. 50l., y. 180l. .... 740

51, Devonshire-st., n. 5 yrs., g. 50l., y. 170l. .... 460

22a, Devonshire-st., n. 20 yrs., g. 84l., y. 160l. .... 1,020

By HUMBERT & FINST. Fingest, Bucks.—Cadmore End Common, two freehold meadows, 8 a 1 r 1 p., also six cottages. .... 600

Cadmore End Common, “Botany Bay” and 1 a 1 r 5 p. f. .... 165

By KEMSLEY’S. Tottenham.—101, Northumberland-pk., n. 45 yrs., g. 84l., y. 250l. .... 220

By WHITFIELD & GREEN. Seaford, Sussex.—Steine-rd., “Denmark House,” f. y. 40l. .... 675

1 and 2, Gladstone Villa f. y. 16s. .... 250

Sutton, f. g. 15l., reversion in 83 yrs. Folkestone, Kent.—34 and 36, East Cliff, f. w. 40l. 6s. .... 410

Gravesend, Kent.—79 and 80, New-rd. (S.), f. y. 110l. .... 2,300

9, 20, 21, and 23, Parrott-st., f. y. 75l. .... 1,165

Clewer, Berks.—Hatch-lane, The Clewer Steam Laundry, f. 60l., also close adjoining, 6 acres. .... 2,140

Bethnal Green.—Chislenale-rd., f. g. 22l. 10s., reversion in 66 yrs. .... 400

11, f. 20l., reversion in 90 yrs. .... 510

Hackney.—236, 238, 244, and 246, Richmond-rd., n. 40 yrs., g. 11l., y. 200l. .... 1,840



By MORGAN, BAINES, & CLARK. Sutton, Surrey.—2 a. 4. and 6. High-st. (s.), u.t. 58 yrs. g.r. 74, y.r. 4151.	28,400	By BUCKLAND & SONS. Warfield, Berks.—"Jealous Hill Farm," 24 a. 2 r. 9 p. f. ....	26,500	By ROBINS, GORE, & MERCER. Soho.—24, Dean-st., are 1,100 ft. f., e.r. 1501. Leicester-square.—5, St. Martin's-st., u.t. 10 yrs. g.r. 1251, w.r. 834.	2,400
By MARTIN, CLARK & CO. Stratford.—77 and 79, Cambridge-rd., f. p. Buckhurst Hill.—1, 2, and 3, Prince's-ter., u.t. 68½ yrs. g.r. 94, w.r. 461.	1,400 195	By NEWICK & SONS. Newick, Sussex.—"Newick Lodge," also a cottage, area 4½ acres, f. p. Chalvey, Sussex.—A freehold occupation, 20 a. 1 r. 19 p. f. ....	1,200 1,100 850	By STIMSON & SONS. South Kensington.—27, Cathcart-rd., and 16, Hollywood-rd., u.t. 43½ yrs. g.r. 151, y.r. 1211.	115 170 150
By BUTTERS. Southminster, Essex.—"Bellbrook Farm," 45 a. 3 r. 5 p. f. p. ....	1,500	By MAY & PHILIPOT. Brixton.—24, Rayleigh-gdns., u.t. 85½ yrs., g.r. 121, p. f. ....	2,800	Battersea.—Salcott-rd., l.g.r. 62, 68, reversion in 7½ yrs. ....	990 160
By LANGRIDGE & FREEMAN (at Battle). Whittington, Sussex.—"Leford Estate," 93 a. 1 r. 51 p. f., y.r. 901. Five freehold enclosures, 25 a. 1 r. 15 p. f.	1,935 825	By RUSHWORTH & STEVENS. Hastings, Kent.—Great Combe, Little Combe, and Steeple Less Farms, 565 a. 0 r. 13 p. f., y.r. 3091.	1,700 420	84 and 85, Culver-rd., also "Crown Cottage" in rear, f. p., w.r. 701, 44. Camberwell.—29 to 45 (odd), Ivanhoe-rd., u.t. y.r. 551.	500 680
June 27.—By CURTIS & HENSON. Aboyn, etc., Aberdeenshire.—The estate of Glen Tana, area 29,200 acres.	155,000	By RUSHWORTH & STEVENS. Hastings, Kent.—Great Combe, Little Combe, and Steeple Less Farms, 565 a. 0 r. 13 p. f., y.r. 3091.	800 475	Brixton.—84 and 86, Josephine-av., u.t. 60½ yrs. g.r. 181, y.r. 1101.	880
By DEBENHAM, TOWNSON, & CO. Woldingham, Surrey.—"Church Farm," 40 a. 0 r. 30 p. f., y.r. 621, 123.	4,600	By THURGOOD & MAXWELL. Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	550	24, Sothor-rd., u.t. 62½ yrs. g.r. 61, 108, y.r. 321.	290
Sampford Courtenay, Devon.—"Higher Dorset Farm," 189 a. 1 r. 15 p. f., y.r. 301.	810	Pyrford-green, two cottages and 0 a. 2 r. 16 p. f. ....	250	9, Brading-rd., u.t. 70½ yrs. g.r. 71, y.r. 341. Abbeys Road, Essex.—"Greenhill Farm," 30 a. 1 r. 3 p. f., and c., y.r. 301.	300
Norwood.—33, Belvedere-rd., f. p. 35, Belvedere-rd., u.t. 62 yrs. g.r. 111, 138, 44, y.r. 501.	890	By THURGOOD & MAXWELL. Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	9,950	By B. & A. SWANN. Bayswater.—82, Kensington Pk.-rd., f. p., y.r. 951.	600
11, Westwood-hill, u.t. 62½ yrs. g.r. 601, y.r. 881.	140	Two cottages and 25 a. 2 r. 9 p. f. ....	1,075	Notting Hill.—7, Bichynden-st., u.t. 61 yrs., g.r. 71, w.r. 441, 45.	1,100
12, 14, and 18, Westwood-hill (a.), f. p., y.r. 6101. Woodland Hill, a block of land, area 8,000 sq. ft. ....	8,200	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	240	8, Johnson-st., u.t. 44 yrs. g.r. 61, w.r. 441, 45.	200
14 and 16, High-st. (s.), f. p., y.r. 1001. High-st., l.g.r. 54, reversion in 4½ yrs. ....	250 1,600	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	1,075	40 and 42, Freverton-st., u.t. 68 yrs. g.r. 161, w.r. 641, 88.	230
74 and 154, High-st. (s.), f. p., y.r. 1001. Forest Hill.—33, Dartmouth-rd. (s.), f. p., y.r. 251.	2,600 500	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	830 390	By WM. WESTON. Kensal Rise.—64, 66, and 70, Chamberlayne Wood-rd. (s.), u.t. 84 yrs. g.r. 421, y.r. 251.	350
29, Dartmouth-rd. (s.), with stabling, f. p., y.r. 651, 181.	1,450	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	1,010	By TRESIDDER & CO. Winsley, Wilts.—"Winsley Croft," f. p. ....	400
Wimborne.—Church-rd., l.g.r. 101, 108, reversion in 44 yrs. ....	280	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	745	By HENRY HENDRICKS (at Birmingham). Sutton Coldfield, Warwick.—Highbridge-rd., "West Partridge," f. p., 10 p. f. ....	3,575
St. Mary.—33, Bath-st., a profit rental of 801, for 13 yrs. ....	125	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	250	Halesowen, Worcester.—Aubrey-rd., two corner building sites, area 9,037 yds. f.	1,855
By C. W. DAVIES & SON. Kentish Town.—Queen's-cres., l.g.r. 61, 68, reversion in 4½ yrs. ....	140	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	250	June 30.—By BELCHER, ADKIN, & CO. East Challow, Berks.—A freehold meadow, 6 a. 3 r. 38 p. ....	315
Camberwell.—50 and 52, Ladbroke-gdns., u.t. 63 yrs. g.r. 91, w.r. 721.	580	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	2,000	"Challow Hill Farm," 62 a. 1 r. 5 p. f. ....	3,500
Brixton.—64, Geneva-rd., u.t. 61 yrs. g.r. 108, y.r. 541.	260	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	280	Letchmore Regis, Berks.—Lickleton Pk. en- closure, 88 a. 2 r. 37 p. f. ....	2,020
Stockwell.—48, Hargrave-rd., u.t. 72 yrs. g.r., g.r. 61, w.r. 321.	235	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	215	The Bablakes Pk., 65 a. 3 r. 26 p. f. ....	1,720
By JONES, SON, & DAY. West Ham.—107 and 109, Vicarage-ls., f. p., y.r. 121.	555	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	700	"The Manor Farm," 554 a. 1 r. 18 p. f. ....	5,000
Stratford.—1 and 3, Leybourne-rd. (s.), u.t. 61 yrs. g.r. 501, y.r. 1301.	890	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	7,400	Wantage, Berks.—"Harris Farm," 57 a. 3 r. 1 p. f. ....	560
Leyton.—185, Harrow-rd. (s.), l. e.r. 361. Walthamstow.—15, Grove-rd. (s.), u.t. 91 yrs., g.r. 71, y.r. 351.	830 316	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	245	By H. DONALDSON & SONS. Hoxton.—9 and 11, Northport-st., u.t. 27½ yrs. g.r. 71, y.r. 621.	400
Loughborough.—39, Smart's-ls., w.r. 191, 106. High-st., High-st. (s.), f. p., y.r. 301.	440	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	245	Poplar.—Archie-st., l.g.r. 621, u.t. 61 yrs., g.r. 371, 108.	385
Edmonton.—0, Bedford-rd. (s.), and plot of land adjoining, f. p. ....	445	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	245	Dalston.—73, 79 to 89 (odd), Richmond-rd., y.r. 301, also l.g.r. 181, 158, u.t. 40 yrs. g.r. 51.	2,565
29 and 24, Raynham-av., f. p., y.r. 541, 108. Hampden Middlebury-rd., a freehold house and shop, ar. 401.	550 600	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	42, 44, 46, 50, 52, and 54, Malvern-rd., u.t. 42 and 41 yrs. g.r. 321, y.r. 241.	1,700
By BUTLER, SON, & VINE. Holloway.—9 and 11, Dalmeir-av., u.t. 14½ yrs. g.r. 211, y.r. 1601.	315	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	31 to 39 (odd), Lavender-gt., u.t. 37 yrs., g.r. 111, 66, y.r. 1841, 136.	1,490
Crouch End.—129 to 133, Ladbroke-gdns., u.t. 63 yrs. g.r. 91, w.r. 721.	1,700	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By FOLKARD & HAYWARD. Portman Square.—9, Upper Montague-st. (s.), u.t. 101 yrs. g.r. 801, y.r. 1981.	315
143, Park-rd., u.t. 78 yrs. g.r. 481, 68. y.r. 1981.	470	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By MOORE & TEMPLE. Fulham.—45, Colinger-rd., u.t. 79½ yrs. g.r. 21, y.r. 401.	505
Norwood.—2 a. 4. and 6, Denmark-rd., f. p., 681, 108.	1,700	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By REYNOLDS & BASON. Hendon.—"The Hyde," Springfield, and 8½ acres, f. p. ....	3,500
Penge.—5, 6, 7, and 8, Challin-st., f. p., y.r. 911. Sulhurst.—11, 12, and 13, Wisbeach-rd., u.t. 69 yrs. g.r. 91, y.r. 651.	715 410	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By FARM VANEY & SON. Finbury Park.—26 and 29, Avenell-rd., f. p., y.r. 681.	1,050
Penge.—1, 2, 3, and 4, Challin-st., f. p., y.r. 911. g.r. 181, w.r. 901.	410	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Holloway.—37, Hilldrop-cres., u.t. 48½ yrs., g.r. 81, y.r. 501.	380
79 and 81, Maple-rd., u.t. 62 yrs. g.r. 121, y.r. 541, 128.	250	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By WALTER SIMMONDS. Forest Gate.—Henderson-rd., l.g.r. 801, 88, u.t. 85 yrs. g.r. 171, y.r. 501.	
34, Laur-rd., u.t. 49½ yrs. g.r. 51, y.r. 821, 108.	125	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By R. TIDY & SON. Zellington.—4, Oakend-rd., u.t. 36 yrs. g.r. 61, 108, y.r. 451.	
By WALTER SIMMONDS. Forest Gate.—Henderson-rd., l.g.r. 801, 88, u.t. 85 yrs. g.r. 171, y.r. 501.	310	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By FRANK WARMAN. Stoke Newington.—34, Lordship-pk., and 14th of an acre, u.t. 62 yrs. g.r. 801, 108, y.r. 119, 321.	
By R. TIDY & SON. Zellington.—4, Oakend-rd., u.t. 36 yrs. g.r. 61, 108, y.r. 451.	375	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	119, Bonville-rd., u.t. 72 yrs. g.r. 51, y.r. 321.	
By FRANK WARMAN. Stoke Newington.—34, Lordship-pk., and 14th of an acre, u.t. 62 yrs. g.r. 801, 108, y.r. 119, 321.	1,700	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Holloway.—144, Hornsey-rd. (s.), u.t. 37 yrs. g.r. 81, e.r. 501.	
119, Bonville-rd., u.t. 72 yrs. g.r. 51, y.r. 321.	360	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Highbury.—3, Stavordale-rd., u.t. 71 yrs. g.r. 81, e.r. 601.	
Holloway.—144, Hornsey-rd. (s.), u.t. 37 yrs. g.r. 81, e.r. 501.	265	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Dalston.—85, Graham-rd., u.t. 68 yrs. g.r. 61, y.r. 441.	
Highbury.—3, Stavordale-rd., u.t. 71 yrs. g.r. 81, e.r. 601.	475	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	St. John's Wood.—42 and 43, New-st., u.t. 22 yrs. g.r. 101, w.r. 181, 44.	
Dalston.—85, Graham-rd., u.t. 68 yrs. g.r. 61, y.r. 441.	460	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Forest Gate.—6, Godwin-rd., f. p., g.r. 361, 88, y.r. 541.	
St. John's Wood.—42 and 43, New-st., u.t. 22 yrs. g.r. 101, w.r. 181, 44.	475	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Barnesbury.—20, 22, and 38, Drummond-rd., u.t. 24½ yrs. g.r. 91, w.r. 1051, 68.	
Forest Gate.—6, Godwin-rd., f. p., g.r. 361, 88, y.r. 541.	575	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By A. CRUEL GRAYMAN (at Ipswich). Layham, etc., Suffolk.—"Water House Farm," 139 a. 2 r. 16 p. f. and c. ....	
Barnesbury.—20, 22, and 38, Drummond-rd., u.t. 24½ yrs. g.r. 91, w.r. 1051, 68.	540	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	"The Ashley Farm," 6 a. 3 r. 4 p. f. p. ....	
By A. CRUEL GRAYMAN (at Ipswich). Layham, etc., Suffolk.—"Water House Farm," 139 a. 2 r. 16 p. f. and c. ....	2,500	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Raydon, etc., Suffolk.—"The Woodlands," and 33 a. 2 r. 28 p. f. and c. ....	
"The Ashley Farm," 6 a. 3 r. 4 p. f. p. ....	235	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	"Brinilla Wood," 35 a. 0 r. 17 p. f. ....	
Raydon, etc., Suffolk.—"The Woodlands," and 33 a. 2 r. 28 p. f. and c. ....	2,000	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Eight freehold cottages.	
"Brinilla Wood," 35 a. 0 r. 17 p. f. ....	1,175	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	By WITCH & SONS (at Ashford). Biddenden, Kent.—Rice Hall, u.t. 103 a. y.r. 39 p. f. ....	
Eight freehold cottages.	935	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	"Birchley" and 45 a. 1 r. 34 p. f. ....	
By WITCH & SONS (at Ashford). Biddenden, Kent.—Rice Hall, u.t. 103 a. y.r. 39 p. f. ....	2,050	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	"Medhurst" and 18 a. 2 r. 24 p. f. ....	
"Birchley" and 45 a. 1 r. 34 p. f. ....	1,950	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Four enclosures, 32 a. 0 r. 11 p. f. ....	
"Medhurst" and 18 a. 2 r. 24 p. f. ....	860	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	Frittenden, Kent.—"Stone Court Farm," 57 a. 1 r. 37 p. f. ....	
Four enclosures, 32 a. 0 r. 11 p. f. ....	510	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	"Whiteland Farm," 11 a. 1 r. 11 p. f. ....	
Frittenden, Kent.—"Stone Court Farm," 57 a. 1 r. 37 p. f. ....	1,200	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	High Hadden, Kent.—"Bachelor Farm," 52 a. 0 r. 2 p. f. ....	
"Whiteland Farm," 11 a. 1 r. 11 p. f. ....	1,050	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410	June 28.—By HUMBERT & FRANK. Hope Bagot, etc., Salop.—"The Hope Court Estate," 416 a. 2 r. 37 p. f. ....	
High Hadden, Kent.—"Bachelor Farm," 52 a. 0 r. 2 p. f. ....	1,070	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410		
June 28.—By HUMBERT & FRANK. Hope Bagot, etc., Salop.—"The Hope Court Estate," 416 a. 2 r. 37 p. f. ....	12,400	Pyrford, Surrey.—Freehold cottage and 0 a. 2 r. 15 p. f. ....	410		

## MEETINGS.

FRIDAY, JULY 7.

Royal Institute of British Architects.—The President's

"At Home." Exhibition of Decorative Art. 8.30 to 11.

SATURDAY, JULY 8.

Northern Architectural Association.—Students' Sketch-

ing Club Excursion.

Edinburgh Architectural Association.—Annual Excur-

sion to Dunkeld Cathedral, Muriel Castle, and

Stobhill.

FRIDAY, JULY 14.

Incorporated Association of Municipal and County

Engineers.—South Wales District Meeting, to be held

at Swansea.

SATURDAY, JULY 15.

Incorporated Association of Municipal and County

Engineers.—Swansea Meeting (concluded).

## TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum (60 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 20s. per annum. Remittances (payable to J. MORGAN) should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

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## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## PRICES CURRENT OF MATERIALS.

\* \* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
£ s. d.	
Hard Stocks .....	1 10 0 per 1000 alongside, in river.
Bough Stocks .....	
Grades .....	1 6 6
Facing Stocks .....	2 2 0
Shippers .....	2 2 0
Pistons .....	1 7 0 " " at railway depôt.
Red Wire Cuts .....	1 1 0
Best Fareham Red .....	3 12 0
Best Red Pressed .....	
Reuben Facing .....	5 0 0
Best Blue Pressed .....	
Staffordshire .....	4 2 6
Do. Bulimose .....	4 7 6
Best Stourbridge .....	
Fire Bricks .....	4 0 0
GLAZED BRICKS.	
Best White and Ivory Glazed .....	
Stretchers .....	12 0 0
Headers .....	11 0 0
Quoins, Bulimose, and Flat .....	16 0 0
Double Stretchers .....	19 0 0
Double Headers .....	16 0 0
One Side and two Ends .....	19 0 0
Two Sides and one End .....	20 0 0
Splays, Chamfered, Squints .....	20 0 0
Best Dipped Salt Glazed Stretchers, and Header .....	12 0 0
Quoins, Bulimose, and Flat .....	14 0 0
Double Stretchers .....	15 0 0
Double Headers .....	14 0 0
One Side and two Ends .....	15 0 0
Two Sides and one End .....	15 0 0
Splays, Chamfered, Squints .....	14 0 0
Second Quality .....	
White and Dipped Salt Glazed .....	2 0 0
d.	
Thames and Pitt Sand .....	7 0 per yard, delivered.
Thames Ballast .....	5 9
Best Portland Cement .....	27 0 per ton.
Best Ground Blue Lime .....	20 0

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Gray Stone Lime ..... 12s. 0d. per yard, delivered. |

Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dep.

## STONE.

BATH STONE—delivered on road wag-	
gons, Paddington Depôt	£ s. d.
Do. do, delivered on road wag-	1 6 6 per ft. cube.
Nine Elms Depôt .....	1 8 6
PORTLAND STONE (20 ft. average)	
Brown Whitbed, delivered on road	
wagons, Paddington depôt, Nine	
Elms depôt, or Pimlico Wharf ..	2 1
White Basebed, delivered on road	
wagons, Paddington depôt, Nine	
Elms depôt, or Pimlico Wharf ..	2 2 3
Ancestor in blocks .....	1 1 per ft. cube, del. rly. depôt.
Beer .....	1 6
Greenhill .....	1 10
Darley Dale in blocks .....	2 4
Red Corshill .....	2 5
Clooseburn Red Freestones .....	2 0
Red Mansfield .....	2 4

## YORK STONE—Robin Hood Quality.

Scrapped random blocks 2 10	
6 in. sawn two sides	
landings to sizes	
(under 40 ft. super.)	2 3 per ft. super.
6 in. rubbed two sides	
ditto, ditto .....	2 6
3 in. sawn two sides	
slabs (random sizes)	0 11 1/2

## STONE (continued).

YORK STONE—Robin Hood Quality (continued).	
2 in. to 2 1/2 in. sawn one	£ s. d.
side slab (random s.d.)	0 7 3 per ft. spr., del. rly. depôt.
3 in. to 2 1/2 in. ditto, ditto	0 6
Hard Yone—	
Scrapped random blocks 8	0 per ft. cube.
6 in. sawn two sides,	
landings to sizes	
(under 40 ft. super.)	2 3 per ft. super.
6 in. rubbed two sides	
ditto .....	3 0
3 in. sawn two sides	
(slabs random sizes)	1 2
2 in. self-faced random	
slabs .....	0 5
Hopton Wood (Hard Bed) in blocks 2 0	per ft. cube.
del. rly. depôt.	
" " " 6 in. sawn both	
sides landings	2 7 per ft. super.
" " " 3 in. sawn both	
sides random	1 0
" " " 2 in. do.	0 5 1/2

## SLATES.

in. in.	
20 x 10 best blue Bangor	13 2 6 per 1000 of 1200 at r. d.
20 x 12 " " "	13 17 6
20 x 10 first quality " "	13 0 0
20 x 12 " " "	13 0 0
20 x 10 " " "	7 5 0
20 x 12 best blue Port-	12 13 6
madoc .....	16 12 6
16 x 8 " " "	15 17 6
20 x 10 best " "	13 7 6
20 x 12 " " "	13 5 0
16 x 8 " " "	10 5 0
20 x 10 permanent green	11 12 6
16 x 8 " " "	9 12 6
16 x 10 " " "	6 12 6

## TILES.

Best plain red roofing tiles.	
42 0 per 1000 at rly. depôt.	
Hip and Valley tiles .....	7 per doz.
Best Broseley tiles .....	50 0 per 1000
Do. Ornamental tiles .....	52 8
Hip and Valley tiles .....	4 0 per doz.
Best Ribbed red, brown, or	
brindled do. (Edwards) ..	57 6 per 1000
Do. Ornamental do .....	60 0
Hip tiles .....	4 0 per doz.
Valley tiles .....	3 0
Best Red or Mottled Stafford-	
shire do. (Peakes) .....	51 9 per 1000
Do. Ornamental do .....	54 6
Hip tiles .....	4 1 per doz.
Valley tiles .....	3 8
Best "Rosemary" brand	
plain tiles .....	48 0 per 1000
Best Ornamental tiles .....	50 0
Hip tiles .....	4 0 per doz.
Valley tiles .....	3 8
Best "Harlequin" brand	
plain tiles, sand faced ..	50 0 per 1000
Do. pressed .....	47 8
Do. Ornamental do .....	50 0
Hip tiles .....	4 0 per doz.
Valley tiles .....	3 6

## WOOD.

At per standard.	
£ s. d.	
Deals: best 3 in. by 11 in. and 4 in.	13 10 0
by 9 in. and 11 in.	15 0 0
Deals: best 3 in. by 7 in. and	
8 in., and 3 in. by 7 in. and	11 0 0
8 in., and 3 in. by 7 in. and	11 0 0
Battens: best 2 1/2 by 6 and 3 by 6.	10 10 0
Deals: seconds .....	1 0 less than best.
Battens: seconds .....	8 10 0
2 in. by 4 in. and 2 in. by 6 in.	9 0 0
2 in. by 4 in. and 2 in. by 6 in.	8 10 0
Foreign Sawn Boards—	
1 in. and 1 1/2 in. by 7 in.	0 10 0 more than
batens.	
3 in. .....	1 0 0
At per load of 50 ft.	
Fire timber: best middling Danzig	4 10 0
or Memel (average specification)	4 0 0
Second .....	3 12 6
Small timber (8 in. to 10 in.)	3 0 0
Small timber (6 in. to 8 in.)	3 0 0
Swedish balks .....	2 10 0
Pitch-pine timber (20 ft. average)	8 5 0

## JOINERS' WOOD.

At per standard.	
£ s. d.	
White Sea: first yellow deals,	
3 in. by 11 in.	24 0 0
3 in. by 9 in.	22 0 0
Battens, 2 1/2 in. and 3 in. by 7 in.	16 10 0
Second yellow deals, 3 in. by	
11 in.	20 0 0
Battens, 2 1/2 in. and 3 in. by 7 in.	17 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0
and 4 in.	15 0 0
Battens, 2 1/2 in. and 3 in. by 7 in.	11 0 0
Petersburg: first yellow deals,	
3 in. by 11 in.	21 0 0
Do. 3 in. by 9 in.	18 0 0
Battens .....	13 10 0
Second yellow deals, 3 in. by 11 in.	17 0 0
Do. 3 in. by 9 in.	16 0 0
Battens .....	11 0 0
Third yellow deals, 3 in. by	
11 in.	13 0 0
Do. 3 in. by 9 in.	12 0 0
Battens .....	10 0 0
White Sea and Petersburg—	
First white deals, 3 in. by 11 in.	14 10 0
Do. 3 in. by 9 in.	13 10 0
Battens .....	11 0 0
Second white deals, 3 in. by 11 in.	13 10 0
Do. 3 in. by 9 in.	12 10 0
Battens .....	10 0 0

## WOOD (continued).

At per standard.	
£ s. d.	
Joiners' Wood (continued).	
Pitch-pine: deals .....	16 10 0
Under 2 in. thick extra .....	20 0 0
Yellow Pine—First, regular sizes	44 0 0 upwards.
Oddments .....	32 0 0
Seconds, regular sizes .....	33 0 0
Yellow Pine oddments .....	28 0 0
Kauri Pine—Planks, per ft. cube	0 3 6
Danzig and Scottish Oak Logs—	
Large, per ft. cube .....	0 3 0
Small .....	0 5 0
Wainscot Oak Log, per ft. sup. as	0 0 8
Do. Walnut, American, per ft. sup.	0 0 7
3 in. do. do. .....	0 0 9
Do. Mahogany—per ft. sup. as inch	0 0 9
Selected, Figury, per ft. sup. as	0 1 8
Do. Walnut, American, per ft. sup.	0 1 0
As inch .....	0 1 0
Teak, per load .....	22 0 0
American Whitewood Planks,	
per ft. cube .....	0 4 0
Prepared Flooring, etc.—	
1 in. by 7 in. yellow, planed and	0 13 6
shot .....	0 17 6
1 in. by 7 in. yellow, planed and	0 14 0
matched .....	0 18 0
1 in. by 7 in. yellow, planed and	0 16 0
matched .....	0 14 6
1 in. by 7 in. white, planed and	0 12 6
shot .....	0 15 6
1 in. by 7 in. white, planed and	0 12 6
matched .....	0 15 6
1 in. by 7 in. white, planed and	0 15 0
matched .....	0 11 0
2 in. by 7 in. yellow, match	0 11 0
and beaded or V-jointed brds.	0 14 0
1 in. by 7 in. do. do. .....	0 14 0
3 in. by 7 in. white do. do. ..	0 11 6
1 in. by 7 in. do. do. .....	0 12 9
6 in. at 6d. to 9d. per square less than 7 in.	0 15 0

## JOISTS, GIRDES, &amp;c.

In London, or delivered	
Railway Vans, per ton.	£ s. d.
Rolled Steel Joists, ordinary	6 0 0
sections .....	6 15 0
Compo .....	7 10 0
sections .....	9 2 6
Steel Compound Stanchions ..	8 10 0
Angles, Tees and Channels, ordi-	
nary sections .....	7 10 0
Fitch Plates .....	7 15 0
Cast Iron Columns and Stan-	
chions including ordinary pat-	
terns .....	6 12 6

## METALS.

Per ton, in London.	
£ s. d.	
Iron—	
Common Bars .....	7 10 0
Starfordshire Crown Bars, good	
merchant quality .....	7 10 0
Starfordshire "Marked Bars	
Mild Steel Bars .....	8 5 0
Hoop Iron, basis price .....	8 15 0
" " Galvanized .....	16 10 0
(And upwards, according to size and gauge.)	
Sheet Iron, Black—	
Ordinary sizes to 20 g.	9 0 0
" " 24 g.	10 0 0
" " 28 g.	11 15 0
Sheet Iron, Galvanized, flat, ordinary quality—	
Ordinary sizes—6 ft. by 2 ft. to	
3 ft. to 20 g.	12 10 0
Ordinary sizes to 20 g. 20 g.	13 0 0
Ordinary sizes to 20 g. 24 g.	14 0 0
Sheet Iron, Galvanized, flat,	
best quality—	
Ordinary sizes to 20 g.	15 10 0
" " 22 g. and 24 g.	16 0 0
" " 28 g.	17 10 0
Galvanized Corrugated Sheet—	
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 10 0
" " 22 g. and 24 g.	13 0 0
" " 28 g.	13 15 0
Best Soft Steel Sheets, 24 in. by 36 in.	11 0 0
Best Soft Steel Sheets, 22 g. & 24 g.	12 0 0
" " 26 g.	13 10 0
Cut nails, 3 in. & 4 in. small trade extras.	9 10 0

## LEAD, &amp;c.

Per ton, in London.	
£ s. d.	
Lead—Sheet, English, 3 lb. and up	
in coils .....	16 10 0
Roll pipe .....	19 0 0
Compo pipe .....	19 0 0
Zinc—Sheet—	
Vieille Montagne .....	30 5 0
Silesian .....	30 0 0
Copper—	
Strong Sheet .....	0 10 10
Thin .....	0 11 10
Copper nails .....	0 10 10
Brass—	
Strong Sheet .....	0 0 9 1/2
Thin .....	0 0 10
Trn—English Ingots .....	0 1 4 1/2
Solder—Phumbers' .....	0 0 8
Trn .....	0 0 9
Blowpipe .....	0 0 9

## ENGLISH SHEET GLASS IN CRATES.

23d. per ft. delivered.	
£ s. d.	
15 oz. thirds .....	24.
21 oz. thirds .....	34d.
26 oz. thirds .....	34d.
32 oz. thirds .....	34d.
38 oz. thirds .....	34d.
44 oz. thirds .....	34d.
50 oz. thirds .....	34d.
56 oz. thirds .....	34d.
62 oz. thirds .....	34d.
68 oz. thirds .....	34d.
74 oz. thirds .....	34d.
80 oz. thirds .....	34d.
86 oz. thirds .....	34d.
92 oz. thirds .....	34d.
98 oz. thirds .....	34d.
104 oz. thirds .....	34d.
110 oz. thirds .....	34d.
116 oz. thirds .....	34d.
122 oz. thirds .....	34d.
128 oz. thirds .....	34d.
134 oz. thirds .....	34d.
140 oz. thirds .....	34d.
146 oz. thirds .....	34d.
152 oz. thirds .....	34d.
158 oz. thirds .....	34d.
164 oz. thirds .....	34d.
170 oz. thirds .....	34d.
176 oz. thirds .....	34d.
182 oz. thirds .....	34d.
188 oz. thirds .....	34d.
194 oz. thirds .....	34d.
200 oz. thirds .....	34d.

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 10
" " in drums	"	0 2 0
Boiled " in pipes	"	0 1 11
" " in drums	"	0 2 0
Turpentine, in barrels	"	0 3 9
" " in drums	"	0 3 11
Genuine Ground English White Lead	per ton	19 5 0
Red Lead, Dry	"	0 6 6
Best Linseed Oil Putty	per cwt.	1 12 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.		For gallon.
Fine Pale Oak Varnish	£ s. d.	0 10 6
Pale Copal Oak	"	0 10 6
Superfine Pale Elastic Oak	"	0 12 6
Fine Extra Hard Church Oak	"	0 10 0
Superfine Hard-drying Oak, for seats of Churches	"	0 14 0
Fine Elastic Carriage	"	0 12 6
Superfine Pale Elastic Carriage	"	0 18 0
Fine Pale Maple	"	0 18 0
Fine Pale Purple Copal	"	0 18 0
Extra Pale French Oil	"	1 1 0
Eggshell Flattening Varnish	"	0 18 0
White Copal Enamel	"	1 4 0
Extra Pale Paper	"	0 12 0
Best Japan Gold Size	"	0 10 6
Best Black Japan	"	0 10 0
Oak and Mahogany Stains and Stencils, will be ready on the 24th inst.	"	0 8 6
BRUNSWICK BLACK	"	0 8 6
BRUNSWICK BLACK	"	0 16 0
Knocking	"	0 10 0
French and Brush Polish	"	0 10 0

## PUBLISHER'S NOTICES.

Nat. Tel., 311, Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME LXXXVIII. (January to June, 1905) is given as a supplement with the current issue. CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also READING CLASSES (Cloth, with Straps, price 9d. each). THE EIGHTY-EIGHTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, will be ready on the 24th inst. SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

## CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, AND NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROPOSERS OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c., &c.

Six lines or under 1s. 6d.  
Each additional line 1s. 6d.  
SITUATIONS VACANT, PARTNERSHIPS, APPOINTMENTS, &c., &c. 2s. 6d.  
Each additional line (about ten words) 6s. 6d.

Terms for series of Trade advertisements, and for Portraits, and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only). Four lines (about thirty words) or under 2s. 6d. Each additional line (about ten words) 6s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY. \* Stamps must not be sent, but all sums should be remitted by Postal Order, payable to J. MORRISON, and addressed to the Publisher of "THE BUILDER," Catherine Street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on Wednesday. It is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day, those intended for the Outside Wrapper should be in by TWELVE O'CLOCK on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE should reach the Office before TEN O'CLOCK on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTS, MOUNTS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS advertising in "THE BUILDER" may have Replies addressed to the Office, Catherine Street, Covent Garden, W.C., free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. These stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN AND COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH.  
By post (carefully packed), 1s.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100l., unless in some exceptional cases and for special reasons.)

\* Denotes accepted. † Denotes provisionally accepted.

ASHBY WOULDs.—For sewerage works, Albert Village, for Ashby Woulds Urban District Council. Messrs. H. Walker & Sons, engineers, Albion-chambers, King-street, Nottingham. Quantities by engineer.—  
H. Law ... £1,400 0 0  
Cope & Raynor ... £1,135 0 0  
E. Orton ... £1,218 3 0  
A. Jewell ... £1,253 13 0  
W. H. Macey ... £1,240 0 0  
F. Malland ... £1,216 4 10  
H. H. Barry ... £1,208 14 0  
J. Walker & Sons ... £1,195 0 0  
J. H. Clarke ... £1,185 0 0  
W. Moss ... £1,159 0 0  
C. E. Cox & Co. ... £1,153 5 0  
W. J. Will ... £1,136 0 0  
H. Bennett ... £1,134 10 0  
H. Holloway ... £1,100 0 0  
H. Hasley ... £1,085 8 0  
J. J. Warner ... £1,077 0 0  
T. H. Harper ... £1,065 0 0  
Calton ... 995 0 0

ABINGDON.—For erecting a new ward block (glassed bath, for the Joint Hospital Board. Mr. J. G. T. West, architect, The Knowl, Abingdon.—  
G. King ... £2,640 0 0  
B. Willcock & Co. ... £2,325 0 0  
L. Loxley ... £2,612 0 0  
T. J. Williams ... £2,317 0 0  
W. J. Drew ... £2,499 0 0  
A. Cox ... £2,207 0 0  
T. H. Klinger ... £2,487 0 0  
A. J. Colbourne ... £2,182 6 10  
J. Woodbridge ... £2,377 0 0  
J. Buckley & Sons, Abingdon ... £2,124 0 0  
J. Smallbone ... £2,304 0 0

BELPER.—For sewers and sewage-disposal works for the village section of South Wingfield, for the Rural District Council. Mr. R. C. Cordon, Engineer and Surveyor, Dunfield, Derby.—  
W. W. Bate ... £457 19 3  
C. E. Cox & Co. ... £422 0 0  
Belington & Son ... £454 12 0  
R. Holmes & Co. ... £400 0 0  
Harris Bros. ... £449 12 0  
J. Walker & Sons ... £394 0 0  
H. Ashley ... £445 15 10  
J. & J. Warner, Micklethorpe, Derby ... £355 3 0  
G. Clarke & Sons ... £438 17 2  
Barker & Sons ... £431 13 6  
A. J. Meredith ... £430 0 0  
[Engineer's estimate, £405.]

BRENTFORD.—For laying 4,145 sq. yds. of creosoted dressed block paving, Half Acre and Boston-roads, for the Urban District Council. Mr. Nowell Parr, Engineer and Surveyor, Clifden House, Boston-road, Brentford.—

	Per yd. super.	£ s. d.		Per yd. super.	£ s. d.
T. Watson, jun.	13 2	W. Grimthorpe & Co.	10 4		
W. Neave & Sons	11 12	Acme Flooring Co.	9 3		
A. Walker & Son	11 6	Improved Wood Pavement Co.	9 2		
T. Cook Starkey	11 8	G. Wimsey & Co.	8 9		
J. Shelbourne & Co.	11 3	Hammersmith	8 9		
J. Mowlem & Co.	10 11				

BRENTFORD.—For formation and paving of a footpath on the west side of Half Acre, for the Urban District Council. Mr. Nowell Parr, Engineer and Surveyor, Clifden House, Boston-road, Brentford.—  
W. N. & H. Grey Bros. ... £223 17 0  
J. Shelbourne & Co. ... £236 0 0  
J. Mowlem & Co. ... £233 0 0  
G. Wimsey & Co. ... £275 0 0  
Co. ... £270 0 0  
Acme Flooring, etc., Co. ... £228 14 6  
T. Watson, jun. ... £240 10 0

CHESTERGATE.—For erecting new schools, Hardman-street, for the Stockport Education Committee. Messrs. Cheers & Smith, architects, Blackburn and London. Quantities by architects:—

	Keen's Cement Dadoes, etc.	£ s. d.	Alternative Tender. Glazed Brick Dadoes, etc.	£ s. d.
D. Mullaney	10,189 0 0	11,229 0 0		
W. C. Broadhurst	10,255 15 0	11,423 7 0		
W. R. Beattie	11,031 0 0	12,455 0 0		
S. Smith	11,678 4 8	12,913 8 8		
J. Broadhurst	10,595 0 0	12,220 0 0		
J. Briggs	10,350 0 0	11,710 0 0		
W. Pownall	10,428 14 11	11,681 14 6		
S. Warburton	12,400 0 0	13,264 0 0		
T. Pickles	13,031 7 3	14,404 1 9		
J. Gerrard & Sons	11,220 0 0	12,123 0 0		
F. & W. Meadows	10,895 0 0	12,095 0 0		
Bowman & Sons	13,019 13 0	14,499 0 4		
Robinson & Son	10,459 8 7	11,518 6 1		
W. Hopwood	10,600 0 0	11,600 0 0		
J. H. Wood	11,300 0 0	13,113 6 0		

EBBW VALE.—For widening and improving the road from the Great Western Railway Bridge to the County School, for the Urban District Council. Mr. T. J. Thomas, Engineer and Surveyor, Ebbw Vale.—  
W. Miles, Mount Pleasant-road, Ebbw Vale ... £1,377

FARNHAM.—For almshouses, Farnham, for the Trustees of the late G. McDonald. Mr. A. J. Steadman, architect and surveyor, South-street-chambers, Farnham, Surrey:—

	£ s. d.	Reduction if timber work in deal.	£ s. d.
W. White	£3,914 8 6		£129 0 0
W. German	3,878 17 0		128 7 0
J. Appleby & Sons	3,659 0 0		93 0 0
Haslegrave Ltd.	3,543 0 0		87 0 0
Higgs & Outthwaite	3,464 0 0		40 0 0
T. J. Hawkins & Co.	3,442 12 0		125 3 0
A. Chuter	3,321 0 0		156 15 0
Cesar Bros.	3,310 0 0		50 0 0
F. Knight	3,280 0 0		120 0 0
Godard & Son	3,259 0 0		137 0 0
W. Watson	3,165 0 0		88 10 0
Lorden & Son	3,129 0 0		84 0 0
Crosby & Co.	3,114 0 0		105 0 0
F. Milton	3,116 14 0		75 0 0
W. J. Saugess	3,106 0 0		65 0 0
Drowley & Co.	3,101 0 0		60 0 0
Kent & Hall	3,077 18 3		73 0 0
Tompsett & Co.	2,980 0 0		100 0 0
G. Kemp	2,929 0 0		75 0 0
Spear & King	2,920 0 0		94 0 0
E. C. Hares	2,858 5 3		29 15 0
Martin, Wells & Co.	2,791 0 0		81 0 0
A. G. Mardon	2,709 0 0		40 0 0

FAVERSHAM.—For taking up and relaying 976 super. yds. of wood block paving in West-street, for the Corporation. Mr. S. P. Andrews, Borough Surveyor, 20, West-street, Faversham:—

	Per yd. super.	£ s. d.
Improved Wood Pavement Co.	1 1	
Acme Flooring and Paving Co.	2 8	
P. Smith	1 6	
M. Chrisfield, Sittingbourne	1 2	

GLOUCESTER.—For erecting a model steam laundry, for the Gloucester Model Laundry Company, Ltd. Mr. J. Fletcher, Trew, architect, County-chambers, Gloucester:—  
Freeman & Jones ... £2,109  
J. Byard & Son ... £1,850  
J. Gurney ... £2,020  
T. J. Williams ... £1,777  
W. T. Nicholls ... £1,999  
J. Simmonds ... £1,765  
W. Jones, junr. ... £1,916  
[All of Gloucester.]

GUILDFORD.—For erecting brick and concrete piers to carry a girder bridge across the River Wey, at Newark, for the Rural District Council. Mr. J. Anstee, Engineer, District Council Offices, Commercial-road, Guildford. Quantities by Engineer:—  
A. G. Osenton, Tilehurst, near Reading ... £459 5 0  
[Thirty other tenders.]

GUILDFORD.—For iron and steel work for bridge across the River Wey at Newark, in the parish of Sand and Ripley, for the Rural District Council. Mr. J. Anstee, Engineer, Council Offices, Commercial-road, Guildford. Quantities by Engineer:—  
A. G. Osenton, Tilehurst, near Reading ... £79  
[Thirty other tenders.]

HOVE.—For erecting public elementary schools for about 600 children, in Portland-road and the Education Committee. Messrs. Clayton & Black, architects, 10, Prince Albert-street, Brighton:—  
H. J. Penfold ... £7,887  
H. A. C. Jay ... £7,150  
Longley & Co. ... £7,558  
Rowland Bros. ... £7,059  
Martin, Wells & Co. ... £7,435  
J. & M. Patrick ... £6,969  
Lyons & Sons ... £7,418  
Hawkins & Co. ... £6,948  
Cook & Sons ... £7,200  
Hockley & Co. ... £6,884  
Barnes & Sons ... £7,195  
Norman & Bart. ... £7,190  
Parsons & Sons ... £7,190  
Burgess Hill ... £6,551

HOVLAND NETHER.—For reconstruction and alteration of settling tanks at sewage farm, for the Urban District Council. Mr. H. G. Keywood, Engineer and Surveyor, Town Hall, Hovland Nether, near Earsley:—

	£ s. d.	M. Hall	£ s. d.
W. Craig	£311 5 0		£226 12 2
A. Firth	307 16 6	Nadin & Darwent	222 0 0
W. Waring & Sons	293 11 0	R. Holmes & Sons	214 6 10
Thornycroft & Norman	235 15 0	M. H. A. G. u. e.	204 19 0
T. F. Hague	227 18 0	Hoyland	178 5 6

[Engineer's estimate, £252 7s. 6d.]

KINNERLEY.—For alterations and additions to Kinnerley Castle, Herefordshire. Messrs. Grooms & Hettington, architects and surveyors, Palace-chambers, Hereford:—

First Contract.  
W. Bowberry ... £1,434 10 0  
W. Bowers & Co. ... £1,092 0  
Beavan & Hodges ... £1,213 0  
C. Cooke ... £1,076 0  
R. Morgan ... £1,200 0  
E. W. Wilks ... £1,031 0  
W. P. Lewis & W. Powell, Hereford ... £1,190 0  
ford ... £1,017 0  
Davies & Co. ... £1,112 0  
J. C. Vaughan ... £967 0  
[In accepting Mr. Powell's Tender, the time of completing the work has been taken into consideration.]

LEYTON.—For tar-paving the playgrounds of Norlington-road School, for the Urban District Council Education Committee. Mr. W. Jacques, architect, 2, Fen-court, Fenchurch-street, E.C. 1:—  
I. Farthing ... £260 0 0  
Walshwright & Co. ... £870 0 0  
Goddard & Co. ... £870 0 0  
D. Dowley, Ltd. ... £36 6 3  
F. G. Sheppard & J. Smart & Son ... £50 0 0  
Sheppard & Cheshire A. A. ... £505 8 6  
phale Co. ... £482 6 4  
Constable, Hart, & Co., Ltd. ... £487 16 3  
Leyton ... £476 16 6  
Chittenden & Simmons ... £473 10 0

LONDON.—For painting and other works at the Infirmary, Harrow-road, for the Paddington Guardians. Mr. E. Howley Sim, architect, 8, Craig's-court, Charing Cross, W.C. 2:—

	Painting and General Repairs.	Flower Bros.
G. F. Vigor & Co.	£1,190 0 0	48, Upper
T. Pearce	1,105 0 0	Baker-st.
G. Foxley	936 0 0	N. W. ...
W. J. Fryer & Co.	870 0 0	Woolaston
R. Iles, Ltd.	770 0 0	Bros. ...
F. Chidley & Co., Ltd.	768 4 0	F. R. Biggs & Co.

Repair of the Electric Bells and Fire-Alarms at the Infirmary.

	£ s. d.
Tamplin & Makowski, Ltd.	£250 0 0
London and Provincial Telegraphs and Fittings Co.	199 5 2
Donnison, Sillem, & Co.	184 0 0
W. J. Bishop & Co.	179 14 0
Beam Co.	170 0 0
Walsall Electrical Co., Ltd.	143 19 10
W. Wynn	120 0 0
P. W. Brook	115 13 0
Conyn, Ching, & Co., Ltd.	109 0 0
Jackson Bros.	102 5 0
E. J. Coloby & Co.	98 15 0
W. J. Fryer & Co.	97 0 0
Private Wire and Telephone Installation Co., Ltd.	91 15 0
Western Engineering Co.	89 15 0
C. & H. Turner	78 6 0
R. H. & J. Pearson, Ltd.	75 0 0
Telephone and Electrical Installation Co.	75 0 0
Holmes & Cooper	71 5 0
J. Bryden & Sons	66 0 0
Electrical Engineering and Maintenance Co.	49 0 0

TENDERS.—Continued on page 55.



(For some Contracts, etc., still open, but not included in this List, see previous issues.)

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
Underground Mains	Wishaw Electricity Committee	R. F. Cox, Engineer, 10, Russell-street, Wishaw, N.B.	July 11
Excavating, Temporary and Permanent Retaining Walls, etc.	do.	do.	do.
Car Paving	do.	do.	do.
New Lavatory, etc., at Workhouse, Torpoint	Bromley Town Council	F. H. Norman, Town Clerk, Municipal Offices, Bromley, Kent	do.
Paving Coppellall-terrace, etc.	S. Germans Guardians	F. E. Claverton, Clerk, 4, Backland-terrace, Plymouth	do.
Road Works, Town street, etc.	Cresse Town Council	G. Eaton-Sore, Borough Surveyor, 5, Heath-street, Cresse	do.
Procure Pipes	Edinburgh & District Water Trustees	W. A. Tait, C.B., 72A, George-street, Edinburgh	do.
Hatch Boxes and Expansion Joints	do.	do.	do.
500 tons of Dryland Cast-Iron Pipes	Handsworth U.D.C.	H. Richardson, Esqr. & Son, Council Hs., Handsworth, Birmingham	do.
Two Pumping Station, Goldford-road, Witton	Rathmines U.D.C.	F. Fawcett, Clerk Town Hall, Rathmines	do.
Ten Two-wheeled Dust Carts	do.	W. H. Schofield, County Surveyor, County Office, Freetown	do.
Repaving, etc., Bolton to Manchester-road, Clifton	Booth Corporation	J. H. Farmer, Town Clerk, Town Hall, Brighton	do.
Private Improvements, Works, etc., at Palmer Pumping Station	Brighton Corporation	W. F. Loveday, Boro. Surv., Town Hall, Milton-rd., Stoke Newington	do.
Soft Wood Paving, Part of Albion-road	Stoke Newington Borough Council	J. W. Webster, Surveyor, High-street, Stoke Newington	do.
Undrainable Iron Paving road Reserve	Cove's U.D.C.	H. H. Claver, Borough Engineer, 1, Dumfries-place, Cardiff	July 12
Drainage, Works, etc., at Rye-la, Walton	West Derby Guardians	G. Condy, Secretary, Pub. to B. 1, Slough	do.
Drainage Work Repairs, Public Hall, Slough	The Trustees	W. Baddo & Sons, Architect, 3, Dumfries-place, Cardiff	do.
Baptist Chapel at Llanelli	Sheffield Watch Committee	C. F. Wike, City Surveyor, Town Hall, Sheffield	do.
Repairs, Painting, etc., at Abercrombie Police Station	do.	do.	do.
Forty Houses near Tyler Arms, Blaina, Mon.	Blaina Building Club	W. Thomas, Architect, Nantyglo, Mon.	do.
Nurses' Home, Bangor Village	E. Banks Corporation Lunacy Board	H. J. Blain, B.Sc., Architect, 35, Rutland-square, Edinburgh	do.
Cleaning, Draining, and Painting, Town Hall	Twickenham U.D.C.	W. W. Pearce, Surveyor, Town Hall, Twickenham	do.
Heating and Ventilation at Town Hall	Wilby Parish Council	B. Thompson, 67, Victoria-road, Northampton	do.
Removing and Re-fixing Wind Engine and Pump	do.	do.	do.
Small Engine House	Glamorgan C.C.	P. M. Franklin, Clerk, C.C. Offices, Westgate-street, Cardiff	do.
Oil Engine and Pump	do.	do.	do.
Audit Rooms, Port Talbot Central Council School	do.	do.	do.
Repairs, etc., at Pontardawe Council School	do.	do.	do.
Alterations to Aberystwyth Council School	do.	do.	do.
Drainage, Water Supply, etc., Velindre Council Sch.	do.	do.	do.
Painting, etc., at Council Schools	do.	do.	do.
Extend. Artificial Stone-making Shed, Molewsworth-st.	Lowisham Borough Council	Surveyor's Department, Town Hall, Oxford	do.
Gravel, etc.	Elham R.D.C.	A. Hambrook Surveyor, Lyngrove	do.
Alterations, etc., Dowl. House, Maxwell-ls., Fochabers	Central Fifeburgh Radical Club	G. Gray, R.D.C. Clerk	do.
Repairing Set of Stone Steps leading to Lecture Hall	Raincliffe U.D.C.	The Secretary, 330, City-road, E.C.	July 13
Improvement of Tyngrove-park, Fennyngrove	The Guardians	W. J. Jones, Engineer, Public Offices, Pontre Rhondda	do.
Alterations, etc., at Fennyngrove Laundry, Cuckfield	Jones & Warner	E. Wange, Clerk, Bollo-rd., 3, Queen-street, Cardiff	do.
Cast-Iron Pipes, Fleur-de-ls.	South Mimms R.D.C.	C. G. Hensell, Waterworks Engineer, Municipal-buildings, Leeds	do.
Cast-Iron Pipes, Dewsbury-road Pipe Line	Dundee School Board	W. H. Manbridge, 40, High-street, Barnes	July 14
Road Improvements, Victoria Road	Edinburgh City Council	J. H. Langland, Architect, 81, Victoria-road, Glasgow	do.
Public Convenience at Dundee-street	Edinburgh City Council	Steward of the Infirmary	do.
Whitewash, etc., Union Infirmary, Topp, nr. Hove	Surry Education Committee	Jarvis & Richards, 36, Victoria-street, S.W.	do.
Alterations and Additions to Schools	Paddington Borough Council	Borough Engineer, Town Hall, Wokingham	do.
Water Paving Works	Cockermouth U.D.C.	W. Wilson, Engineer, 11, Main-street, Cockermouth	July 15
Sewerage and Sewage Disposal at Prospect	Haywood & Middleton Water Board	J. Diggle, Water Engineer, Water Board Offices, Haywood	do.
Stores	Chelms Public Libraries Committee	M. Hall, Surveyor, Harrison-road, Halifax	July 17
Repairs, etc., at Elgborough Well	Chelms Public Libraries Committee	Eric Liddell, M.C., Council Offices, S.W.	do.
Additional, etc., to Basement of Public Library	Keath R.D.C.	P. Adde, City Valuer's Office, Council House, Bristol	do.
Painting, Colouring, etc., Schools	King's Norton & Northfield U.D.C.	D. M. Davies, Engineer, Neath	do.
Electric Lighting	Monmouthshire Education Com.	A. W. Cross, Engineer, 23, Victoria-road, Manchester	do.
Partial Rebuilding Wainwright School, Cross Keys	Maldstone R.D.C.	Eric Liddell, M.C., Council Offices, S.W.	do.
Eight Dwellings, Mowder-terrace, Telford	Keeles Corporation	E. Woodhouse, Architect, 85, Moyley-street, Manchester	do.
Rebuilding of Bow Bridge, Waterbury	S. Staffordshire, Snaillpool Hos. Board	A. Lloyd Thomas, Esqr. and Arch., Church-st. ch-burg, Pontypool	do.
Granite Concrete Coping to Settling Tanks	do.	W. Ellis, Sewage Works, Peel Green-road, Pateiroft	do.
Furniture, Moxley Hospital, Bilston	do.	Engineer's Office, Town Hall, Wolverhampton	July 18
Hand Laundry Machinery	do.	do.	do.
Disinfector	East Barnet Valley U.D.C.	H. York, Surveyor, Station-road, New Barnet	do.
Iron and Barbed-wire Fencing	Stourbridge Guardians	G. F. James, Clerk, 12, Hagley-road, Stourbridge	do.
Making-up Road, Long-street, etc.	do.	do.	do.
Tar-Paving Works, Town Hall, East Barnet	do.	do.	do.
Sixteen Double-Centre Ward Stoves for Infirmary	do.	do.	do.
Electric Lighting Workhouses Buildings	Leeds Street Lighting Committee	Superintendent of Street Lighting, Spenningwell-st., Whitehall-rd., Leeds	do.
Gas Pipes and Fittings	C. Education Committee	P. Fowler, Secretary, Education Offices, Leeds	do.
Painting, etc., Schools	London C.C.	Superintending Architect's Department, 15, Pall Mall East, S.W.	do.
New Entrances, etc., to George-st. Uxbridge	Great Western Railway Co.	Office of the Engineer, Paddington Station, W.	do.
Broken Blue Guesney Granite	Brentford U.D.C.	do.	do.
Sewer, from Middleton to Slacks and Stockall	Cannock R.D.C.	W. Welburn, Borough Surveyor, Middleton	July 19
Sewerage and Sewage Disposal (Contract No. 1)	Ripton R.D.C.	H. M. Whitehead, Engineer, Penkridge	do.
Extensions to Arthur-road Schools, Beckenham	Beckenham U.D.C.	Willcox & Balke, Engineers, 63, Temple-st., Birmingham	do.
Boundary Fencing at Asylum	Newport C.C. Sanitary Committee	do.	do.
Painting of Schools, Norwood	Lambeth Guardians	Borough Engineer, Town Hall, Hereford	do.
Cast-Iron Manhole Covers	Cavan & Leitham Railway Co., Ltd.	Guardians' Offices, Brook-street, Kennington-road, S.E.	do.
Cast-Iron Pipes and Irregular	Receiv.-Gen. & Treas. of Contracts	E. B. Stewart, Secretary, 37, College-green, Dublin	July 20
Cast-Iron Pipes and Irregular	do.	W. Cassell, Valuer, do.	do.
Permanent Way, Service Line to Car Sheds, Dean-rd.	West Hartlepool Corporation	Nelson F. Dennis, Boro. Eng., Municipal-bldgs., West Hartlepool	do.
Annual Contracts	South Shields Corporation	Borough Engineer, Town Hall, Conway	do.
Private Street Works	Levensham U.D.C.	J. Jesson, Surveyor, Guardian-chambers, Tiviot Dale, Stockport	do.
Depot Buildings in Crocydon-road	Industrial Co-operative Society, Ltd.	W. Fryer, 21, High-street, Winstford	do.
Conversion of St. Peter's Sch. into Council School for 300	Hereford Education Authority	J. Parker, City Surveyor, Town Hall, Hereford	July 21
Conversion of St. Peter's Sch. into Council School for 300	Surry Education Committee	Jarvis & Richards, 36, Victoria-street, Westminster, S.W.	do.
Conversion of Electric Light Works	Beckenham U.D.C.	Council's Surveyor, Beckenham	do.

## CONTRACTS.—Continued.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
*Tramway Offices and Car Depot, Plakow .....	West Ham Borough Council .....	Borough Engineer, Town Hall, West Ham .....	July 25
*Bit of Dwelling, New King's-road, Fulham .....	London C.C. ....	Housing Section, Arch. Depart., 19, Charing Cross-road, W.C. ....	do.
*Portion of Block of Dwellings, Stepney .....	do.	do.	do.
*Electric Locomotives, Traction Maids, etc. ....	Dublin Corporation .....	Spencer Hart, City Engineer, City Hall, Dublin .....	do.
*Cast-Iron Storage Tanks, etc., at Dorothea Asy., Kent .....	Metropolitan Asylums Board .....	Office of the Board, Embankment, E.C. ....	July 26
*Making Roads, Laying Tram Lines, etc., Charlton .....	do.	Architect's Office, 22, Charing Cross-road, W.C. ....	do.
*Extension of Municipal Buildings, High-street .....	Burialland Town Council .....	Burgh Surveyor, Town Hall, Burialland, N.B. ....	July 28
*Pipe-Laying, Springfield and Great Baddow .....	Chelmsford R.D.C. ....	J. Dewhurst, Engineer, Avenue-chambers, Chelmsford .....	July 28
*Steelwork, etc., for New Public Hall, Hull .....	Hull Corporation .....	City Architect, Town Hall, Hull .....	do.
*Central Premises, Widnes .....	Runcorn & Widnes Indus. Co-op. Soc. ....	4 and 6, Church-street, Runcorn .....	July 29
*New Grammar School, Lincoln .....	The Governors .....	Leonard Stokes, Architect, 2, Great Smith-street, S.W. ....	do.
*Culvert, 180 yds. long, at Lydbrook School .....	Gloucestershire Education Com. ....	M. H. Metland, County Architect, 15, Clarence-street, Gloucester .....	do.
*Extension of Mills End Public Library .....	Stappan Borough Council .....	Borough Engineer, 15, Great Alie-street, E. ....	July 31
*Plotting Scales (Boxwood and Ivory) .....	Director-General Ordnance Survey .....	Office in Charge of Stores, Ordnance Survey Office, Southampton .....	Aug. 1
*1,800 lineal yds. of 4 ft. 9 in. diam. Circular Sewer, etc. ....	do.	W. Harpur, Borough Engineer, Cardiff .....	Aug. 2
*2,940 lineal yds. of 4 ft. 9 in. diam. Circular Sewer, etc. ....	do.	do.	do.
*1,050 lineal yds. of 4 ft. 9 in. diam. Circular Sewer, etc. ....	do.	do.	do.
*Refuse Destructor Plant .....	Merthyr Tydfil U.D.C. ....	F. Fletcher Harvey, Engineer & Sur., Town Hall, Merthyr Tydfil .....	Sept. 1
*Sinking Shaft at Bryn Navigation Colliery .....	Stockport Borough Council .....	The Colliery, Bryn, Port Talbot Railway .....	No date
*Cleaning & Decorating, St. John's Church, Pemberton .....	East Suffolk C.C. ....	J. Baynes, Fernleigh, Pemberton, Wigan .....	do.
*Alterations and Additions to County Hall, Ipswich .....	do.	A. Lewton, St. Petergate, Stockport .....	do.
*Sinking a Shaft, 380 yds. deep, Elsecar, near Barnsley .....	do.	County Surveyor, 16, Museum-street, Ipswich .....	do.
*Alterations, etc., St. Werburgh's Church, Chester .....	do.	T. Newbould (Earl Fitzwilliams's Colliery) .....	do.
*Permanent Way and Bonding (Tramways), Contract 1) .....	Edlington U.D.C. ....	E. Kirby, Architect, 5, Cook-street, Liverpool .....	do.
*Additions to House in Roundhay-road, Leeds .....	Dr. Salkeld .....	H. H. Humphries, Engineer, Public Hall, Edlington .....	do.
*Electric Light, Kilkenny .....	Kilkenny Corporation .....	J. M. Bottomley, Son & Wellburn, Architects, 13, Bond-st., Leeds .....	do.
		R. J. Gore, C.E., Town Hall, Kilkenny .....	do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Temporary Clerk (Borough Engineer's Department) .....	Woolwich Borough Council .....	2l. per week .....	July 17
*Temporary Architectural Assistant .....	Fulham Borough Council .....	3l. 3s. per week .....	No date.
*Assistant Instructor in Building Construction .....	Willesdon Polytechnic .....	7s. 6d. per evening .....	do.
*Instructor in Elementary Technical Drawing .....	do.	7s. per evening .....	do.

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. viii. x.

Public Appointments, xviii.

## TENDERS.—Continued from page 53.

LONDON.—For additions, alterations, and redecoration of the Murphy Memorial Hall, New Kent-road. Mr. A. Conder, architect, Palace-chambers, 6, Bridge-street, Westminster. Quantities by Mr. C. E. Blomfield, 40, Finsbury-square, London, E.C.:

Hudson Bros. .... £7,250 Holloway Bros. .... £5,616  
 Staines & Son .... 6,980 W. Akers & Co. .... 6,594  
 J. Chapman .... 6,230 F. & H. F. Higgins .... 6,551  
 Simpson & Co. .... 6,930 J. Smith & Sons .... 6,535  
 J. Grover & Son .... 6,882 L. H. & B. Roberts .... 6,420  
 Kirk & Randall .... 6,672 H. Young .... 6,316

LONDON.—For electric light installations, South Battersea station and Westminster (new) station, for the London County Council:—

South Battersea Station.  
 Tamplin & Ma-  
 kovski, Ltd. .... £251 0 0 F. J. Coley &  
 Co. .... £182 10 0  
 O. Clark & Co. .... 199 17 6 R. Dawson, Ltd. .... 182 10 0  
 W. H. Johnson .... 195 0 0 A. H. Marshall,  
 Durell & Co. .... 199 15 0 270, High-road,  
 Barlow & Young .... 185 0 0 Leytonstone\* .... 185 10 0

Westminster Station.  
 Tamplin & Ma-  
 kovski, Ltd. .... £236 0 0 F. J. Coley &  
 Co. .... £235 0  
 O. Clark & Co. .... 230 10 0  
 W. H. Johnson .... 274 0 0 A. H. Marshall,  
 Durell & Co. .... 266 11 0 270, High-road,  
 Barlow & Young .... 220 0 0 Leytonstone\* .... 196 10

LONDON.—For improvements to School, South Lambeth-road, Kennington, for Board of Education:—  
 [Preliminary plans of a scheme of improvements have been prepared and approved by Board of Education as follows: Providing a hall about 51 ft. by 28 ft. for each department; new classroom for each department (boys, 48; girls, 48; infants, 50); two new staircases and entrances for boys' and girls' departments; and two new entrances for infants' department; lavatory for boys' department; cloakrooms, teachers' and head teachers' rooms, and stockrooms for each department; redividing, restappling, etc., certain classrooms in all departments; rebuilding boys' and girls' offices, and division wall between the playgrounds; and forming a new heating chamber and coal cellars in basement. Heating by low-pressure hot-water apparatus. The revised accommodation, on the completion of the improvements will be: Boys, 372; girls, 356; infants, 390; total, 1,118; being a net loss of 54 places.]

J. Grover & Son, £15,984 Lawrence & Son, £14,404  
 W. Downs .... 15,944 Treasurer & Son, 14,383  
 F. & H. Higgins, 15,882 J. & M. Patrick, 14,270  
 Pattman & Fother-  
 ingham, Ltd. .... 15,723 W. Johnson & Co.,  
 Ltd. .... 14,151  
 Lathley Bros. .... 15,483 J. Appleby & Sons, 14,089  
 Kilbey & Gayford, 15,350 W. Smith & Son, 14,088  
 Clarke & Bracey, 15,118 J. Marland &  
 Sons, 14,959  
 J. Greenwood, Ltd., 14,778 J. Garrett & Son, 13,773  
 W. King & Son, 14,587 R. Triggs, 92, The  
 J. & C. Gwyer, 14,846 Chase, Clapham\* 13,886  
 H. L. Holloway, 14,846  
 [The estimate of the architect (Education) for the work amounts to £14,284.]

LONDON.—For repairs to the Southwark station of the London Salvage Corps. Mr. Arthur F. Briggs, architect, 9, Queen Victoria-street, E.C.:

Mansfield & Son .... £965 Trollope & Sons and  
 Falkner & Sons .... 843 Colls & Sons .... £840  
 Ashby & Horner .... 841 W. Houth\* .... 780

LEYTON.—For cleansing, painting, repairs, and improvements to schools, for the Education Committee of the Urban District Council. Mr. W. Jacques, architect, 2, Pen-court, Fenchurch-street, E.C.:

	Cleansing, etc., Davies-lane. Exterior.	Cleansing, etc., Mayville-road. Exterior.	Cleansing, etc., Kirkdale-road. Interior.	Improvements Newport-road School.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
R. Athey .....	176 10 0	183 17 6	253 1 6*	—
Higgs & Co. ....	150 16 1	176 17 5	253 19 5†	—
H. Bonneau .....	198 0 0	190 0 0	530 0 0	—
H. R. Brown .....	210 0 0	168 0 0	408 0 0	—
A. E. Clark .....	—	209 0 0	295 0 0	—
F. J. Coxhead .....	192 0 0	205 0 0	529 0 0	93 0 0
A. G. Crisp .....	214 0 0	226 0 0	—	119 0 0
Scott Penn .....	208 18 0	254 15 0	379 0 0	—
Franks & Simons .....	189 10 0	184 10 0	325 0 0	—
Gibbings & Co. ....	204 1 3	180 17 7	417 7 3	—
Gregar & Son .....	275 0 0	187 0 0	397 0 0	117 0 0
H. C. Horswill .....	—	—	—	99 0 0
J. T. Linton .....	199 0 0	163 0 0	—	67 0 0*
W. J. Maddison .....	289 0 0	204 0 0	415 0 0	135 0 0
W. Manders .....	201 12 6	150 3 6*	335 18 6	—
J. J. Quarterman .....	140 0 6*	150 0 0	360 0 0	—
Simmons & Co. ....	—	—	—	—
W. H. Swann .....	178 0 0	167 0 0	310 0 0	—
Viger & Co. ....	195 0 0	210 0 0	330 0 0	—
H. Wilson .....	—	—	242 5 0	99 3 0
Woolaston Bros. ....	150 0 0	165 0 0	327 0 0	140 0 0

LONDON.—For making-up the carriageways of Inglethorpe-street and Parfrey-street, Fulham, for the Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.:

	Inglethorpe-street.		Parfrey-street.	
	Roadway.	Footway.	Roadway.	Footway.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
H. J. Greenham .....	619 0 0*	311 0 0	696 13 7	356 2 6
Harvey Brothers .....	819 17 0	Alternative— 201 9 11 232 2 6 201 9 11 168 15 6	—	Alternative— 201 16 2 241 5 7 210 7 10 176 b 3
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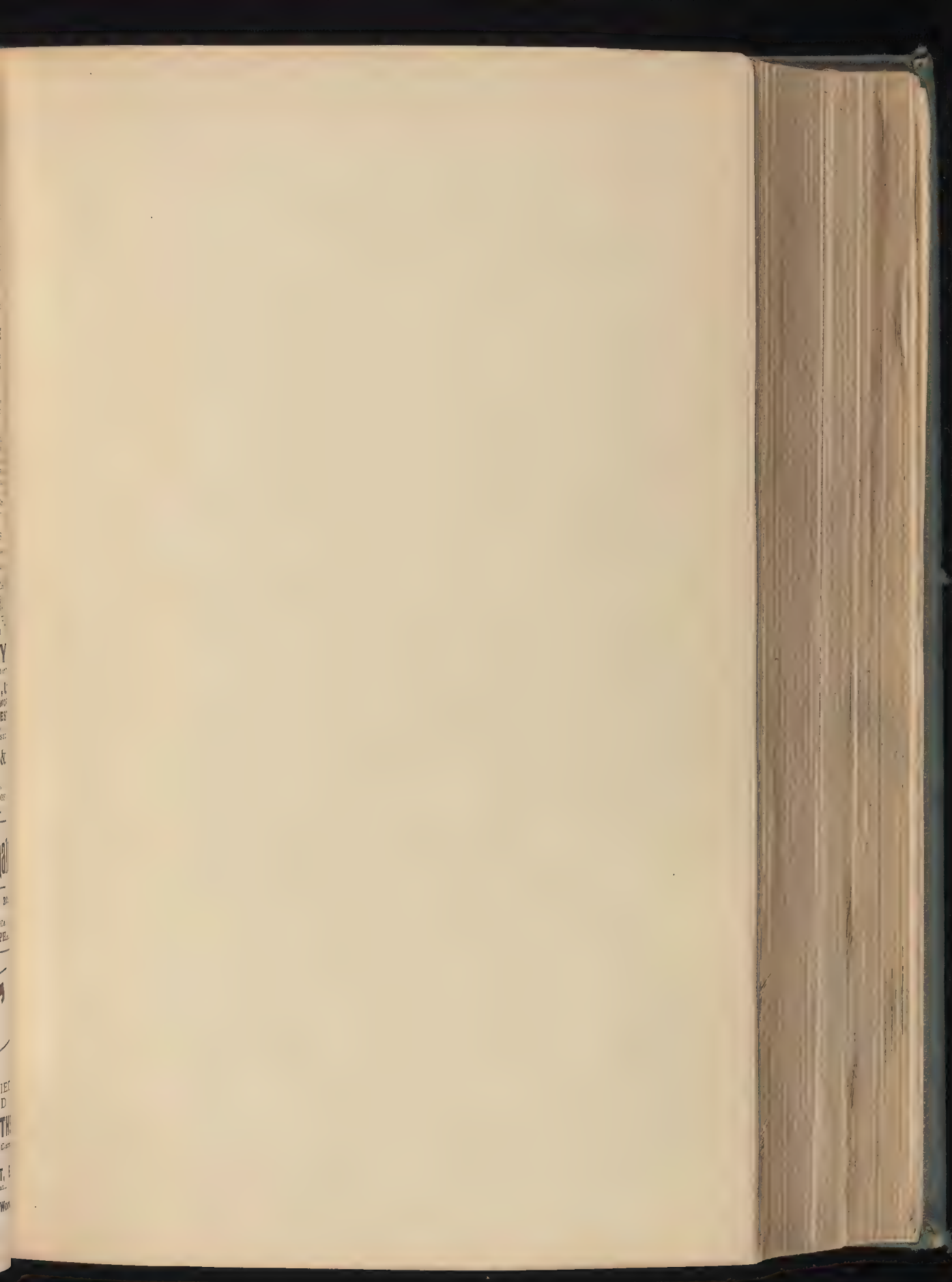
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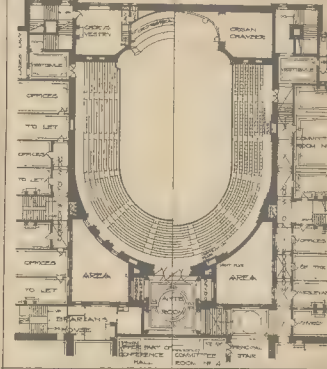
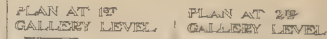
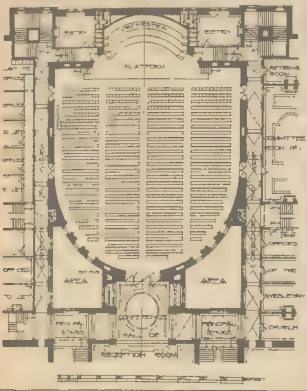
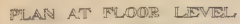
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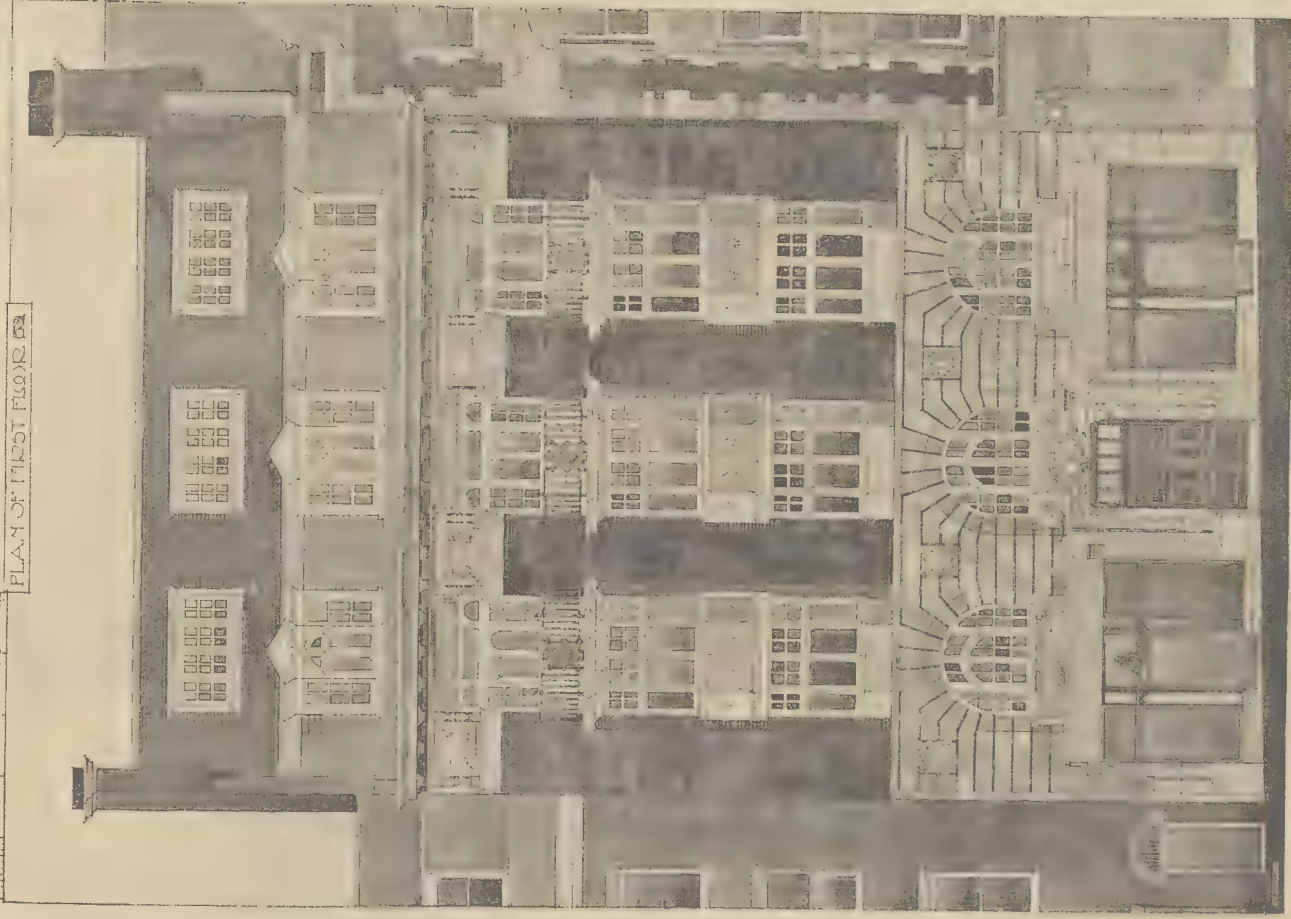


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"ARDMILLAN": THE COURT-YARD MR. E. TURNER POWELL, ARCHITECT





# The Builder.

VOL. LXXXIX.—No. 8298.

JULY 15, 1905.

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Cottage Homes, Croydon.....	Mr. J. Hatchard Smith, F.R.I.B.A., Architect.
Dog and Doublet Inn, and Solom's Wood, Surrey.....	Mr. E. Guy Dawber, F.R.I.B.A., Architect.

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## Antique and Modern.



SOME few years ago a remarkable group of sculpture was exhibited at the Paris Salon under the title "Antique et Moderne"; an illustration of it was published in the

Builder of July 15, 1899. The sculptor represented the spirit of the antique by the seated figure of a noble-looking man of middle age, draped in classic fashion, and gazing calmly upward as if in contemplation of the Heavens. The modern spirit was represented by a nude figure of a young woman poring over a book placed on her knee, with one hand pressed to her forehead as if in perplexity. The fancy of representing the antique figure fully draped and the modern one nude, which was rather the contrary of what one might have expected, was probably due more to a desire for sculptural contrast than to any symbolical intention. The group was evidently intended to indicate not merely the contrast between ancient art and modern art, but that between the whole spirit of the antique mind and culture, as compared with modern. The ancient spirit contemplated and admired: the modern spirit pores and dissects.

Though this contrast applies to the whole of life, ancient and modern, it is perhaps more remarkable in art than in any other class of production; and less understood. Greek sculpture and archi-

tecture and ornament were produced under conditions and with aims totally different from those with which we are familiar in modern life. They belong to another world. Young men and women in blouses and aprons sit and copy the casts of Greek sculpture at the Slade School and other admirable institutions of the kind; but what relation is there between their minds and their habits of life, and these works which they draw and model? Do they even know why they draw and model from them?

It is perhaps some such reflection as this which has induced Professor Percy Gardner to produce a book to expound the spirit of Greek art.\* As he observes, the value of Greek literature is much better understood in this country than that of Greek art, "for the simple reason that we are a literary nation and not an artistic nation." Whether his title, "A Grammar of Greek Art," is well chosen may be a question. A "grammar" of a subject suggests a rather more precise and technical exposition of methods than we find here. We quite agree that just as the poetry and prose of the Greeks is expressed in a particular language, the words and grammar of which must be studied by those who would understand the literature, so works of Greek architecture and painting also are composed in what may be called a particular artistic language. "The words of that

language are the strokes of the brush and the chisel"; so far we are within the region of grammar; but the author goes on—"these are put together in order to embody Greek ideas in ways which are distinctive and not like those adopted by any other people; certainly unlike those of modern art. The object of the present work is to set forth, as simply and directly as possible, what these ways are." This is surely going quite beyond what is generally understood by "grammar." A French grammar gives us the framework and construction of the French language, but it has nothing to do with expounding the quality of French literature. "The Spirit of Greek Art" would better have described Professor Gardner's book, though no doubt "A Grammar of Greek Art" is a better bookseller's title.

The object, at any rate, is to bring home to the general reader a clearer sense of the meaning of Greek art, and the aim with which it was produced. And his first chapter, on "the General Character of Greek Art," is a most useful one at the present time, for it combats entirely and conclusively the heresy which has been set up by some recent critics, that Greek art is realistic, so that a man who models a horse just as he sees it is doing as the Greeks did. Realism is the endeavour to represent what you see exactly as you see it. There is no such realism in the sculpture of the greatest period of Greek art. The aim of the Greek sculptor (as probably of the Greek painter; if we knew enough of his work) was to found upon the observation

\* "A Grammar of Greek Art." By Percy Gardner, Litt.D., Lincoln and Merton, Professor of Classical Archaeology in the University of Oxford. London: Macmillan & Co., 1905.



of nature something higher and more perfect than nature generally is; as the German critic (Denneker) quoted by Professor Gardner said of the Parthenon pediment sculptures—"They are as if founded on nature, yet I have never had the good fortune to see such nature." Greek sculpture aimed also at showing that which was permanent and typical in nature, not that which was peculiar and accidental. But "the idealism of Greece differed from that of modern times because its range of ideas was far narrower and its methods more simple." The individualistic element characteristic of most of modern art is not found in Greek sculpture; and the proof of this, as Professor Gardner says (or we might rather say the illustration of it), is found in the fact that, in judging of Greek statues, it is much easier to assign to them a date and a school than to attribute them to an individual sculptor. Some Greek archaeologists, no doubt, will question this conclusion, but we believe it is correct; we have always felt a scepticism as to the attribution of special works (and even special fragments) to individual Greek sculptors, of which we hear so much among recent archaeologists.

It is somewhat difficult to realise the distinction which ancient critics drew between the quality of *ἥθος* and *πᾶθος* in sculpture, or at least to realise what they intended by the former quality, which was attributed to Pheidias among others. Ethical quality in the modern sense of the word can hardly be said to have existed at all in Greek art, which had no "moral"; indeed, what we should call a moral element would probably have seemed to the Greeks something with which art had nothing to do. "Liddell & Scott" gives the secondary meaning of *ἥθος* as "custom, usage, habit," just like "mores" in Latin, to which our modern meaning of the word "moral" came to be attached. Probably the real meaning was that the quality of *ἥθος* in a statue represented that which was most central and typical in life; the *πᾶθος* of the later sculptors lay in the representation of a special feeling which was not universal and typical. The distinction can be recognised in modern works, though we should not define it in the same words. Perhaps one of the most essentially Greek works of sculpture since the Greek period is Donatello's St. George. There we have that quality of simplicity of conception and action which belonged to Greek sculpture, and the quality of *ἥθος* both in the ancient and in the modern sense. The ideal of the Christian knight prepared to combat the powers of Evil is a conception quite outside of the Greek mind, but it is expressed with a reticence and reserve which prevents it from interfering at all with the truly Greek qualities of repose, balance, and symmetry.

In recent sculpture, both in France and England, we are not without examples of work which is allied to Greek sculpture in its aims, if not equal to it in achievement. Wherever there is simplicity of motive and symmetry (in the true and original sense of the word) in design, we see the influence of the Greek spirit at work. But the modern conditions of work, and the modern spirit generally,

are not favourable to this simple and abstract quality in sculpture. For (as we see in Donatello's St. George) it is in the spirit in which the work is executed, not in the choice of an "antique" subject, that the Greek quality in sculpture is illustrated. Thus Gibson's Venus and Diana figures are not Greek in spirit, they are but feeble imitations; and the most Greek thing that he produced was his Hunter and Dogs, a subject which might in itself have been modern, but which is treated in the antique spirit. As to the modern conditions which interfere with this abstract aim in sculpture, there is a remarkable passage in Professor Gardner's work, which is worth quoting at length:

"There is also a marked contrast between the conditions under which the ancient and the modern sculptor work. In our days the sculptor ordinarily works from a single model, and the works exhibited at the Royal Academy show that the models accepted by modern sculptors are often of a very poor type, ill-nourished and ill-trained. Among a people predominantly urban, and living under unhealthy conditions, the admiration of robust beauty in man and woman is apt to give way to what is fashionable or smart. The danger of physical degeneracy hangs low over all the nations of Europe, our continual competitions, our restless travellings, our reckless sacrifice of all that restrains, in our endeavors to reach certain ends, make a gospel of rhythm and moderation seem to us dull and poor. It does not spur our jaded energies, or rouse us with a stimulating appeal. And yet, as it seems to me, unless the English race return in some measure to the artistic ideals of Greece, they are in the long run doomed. Overpowering ugliness of surroundings, physical degeneracy, nervous exhaustion leading to sterility, all these have, in spite of the efforts of a few, steadily gained upon us in recent decades; and the road which they mark leads to destruction."

In short, the feverishness and restless aims of modern art are the reflection of the character of modern life, just as the severe restraint and simplicity of Greek art were the reflection of a simpler and more wholesome ideal of life. This warning as to the close relation between the character of life of any epoch, and the character of its art, is in accordance with the whole scope of Professor Gardner's book, which is to show that Greek art of all classes—whether architecture, sculpture, or drama—was based on the same principle of a broad simplicity in general conception, and a conscientious attention to perfection and symmetry in detail; taking the word "symmetry" in its original signification, that of a carefully studied relation of the parts to each other and to the whole, nothing being suffered, for the sake of a special effect, to overweight or interfere with the general design. And this idea of the close relation between the nature of the life and the nature of the art of a people is one to be seriously considered in the present day. We live in an age of experiments and eccentricities in art, which tends to make it an additionally disturbing influence instead of a discipline to our minds. Life and art react on each other; and the adoption by artists of more sober and less eccentric ideals might even render art a corrective to some of the weaknesses of modern life, instead of being, as it is too often at present, a mere reflection and encouragement of them.

In no art more than in architecture do we see the defection from the antique ideal, the necessity for a more severe and restrained spirit. In regard to the obvious qualities of Greek architecture,

(which means practically Greek temple architecture, since that is almost all we know), Professor Gardner writes well and forcibly. He fully realises the significance of that study of rhythmic proportion of parts which was obvious to the Greek architect, of an importance which it is difficult for us now to fully understand. The subject of proportions in temples, as the author remarks, is in fact one which is "almost bottomless." We have learned something about it, but we do not know how much more there may be which we have never learned and never shall learn. What is unquestionable, from what we do know, is that the Greek architects, and in all probability cultivated Greeks generally, must have had a refinement of perception in regard to small details of architectural design which we do not possess now, or such refinements as they studied and carried out would hardly have occurred to the architect and would have been thrown away upon the spectator. There must have been, in their comparison of lines and proportions, something partially though not precisely analogous to our perception of harmony or discord in regard to sounds; and unless this perception could be revived it is impossible for us to see Greek architecture as its authors saw it.

That is one reason, perhaps, why the attempt to revive Greek architecture in England a century or so back proved as complete a failure as Gibson's attempt to revive Greek sculpture in figures of Venus and Diana; even without considering the fact that we attempted to do in stone what the Greeks required marble for. The additional objection, that the Greek temple is no model for what we require, may be pushed too far. We do not see why the general plan and design of a Greek temple, if we could settle on an effective method of lighting it, might not be a very suitable model for a modern place of worship. But all these considerations are quite apart from the real question, what can we learn from the study of Greek architecture? Its real lesson to us is that of reserve, simplicity, and scholarly study of every detail. In that last element lies, above all, the intrinsic difference between the antique and the modern spirit in architecture. The outbreak of eccentricity in modern architecture, just after the collapse of the Gothic revival, has to some extent given way to a growing feeling in favour of symmetrical design and planning, and Renaissance models. But where, even so, do we see anything like the care and thought bestowed by the Greek architect in elaborating comparatively simple details so as to give them the highest possible finish and expression? The modern architect may reply, and with justice, that he is not allowed time for that. But however the blame for it may be apportioned, that is the essential difference between the Greek and the modern spirit in architecture. Simplicity with perfection was the aim of the Greek. Imperfection carried off by picturesque multiplicity is the modern aim. To get the antique spirit we need to come to the position of rejecting every detail that is not necessary and that is not perfect, in itself and in its relation to the whole.



## NOTES.

**The Proposed Shakespeare Memorial.** The Shakespeare Memorial Committee, at their meeting last week, came to a series of recommendations with most of which we are more or less in agreement. They wish that the memorial should be "an architectural one, including a statue"; they had much better have said, "including a bust or a statue," leaving it open to the sculptor to give the head only, avoiding the *crux* of the realistic figure. They propose that the London County Council should be requested to appropriate a site for the memorial, if possible on the south side of the Thames and near the site of the proposed County Hall, and also that an application should be made for a site in one of the Royal Parks, by way of having two strings to the bow. We should think the latter preferable; there is something appropriate in the south bank of the Thames site, no doubt, in view of Shakespeare's theatrical connexion with that district; but a site in one of the parks would give a much better chance for a fine effect. The Committee ought at any rate to bear in mind that they must decide on the site before arranging the competition for the designs; the design must be made for the site. The proposal that the competition should be open to the whole world is likely to be criticised; we might surely think that Shakespeare should be commemorated by the work of English artists. In one point the Committee is remarkably English in its constitution; there is not a single artist in it, except one or two amateurs. In France two or three of the leading artists of the day would certainly have been on such a Committee—it would have been deemed incomplete without them. We should have thought that at all events the Presidents of the Royal Academy and of the Institute of Architects might have been invited to form part of the Committee; and unless this is done French artists (if the competition is to be international) will not have confidence enough in the Committee to compete. Another very English incident is that Sir Alfred Lyall, who is a member of the Committee, took the trouble to write to the *Times* to purge himself of the discredit of having voted for a work of art; he alone having voted against the proposal for "an architectural memorial including a statue." Sir Alfred Lyall is a typical example of the best class of English public man—talented, upright, and self-sacrificing in the cause of his country; but the typical English public man cannot endure art, or the proposal to spend money on art.

**The Verdict for the plaintiff** *Grout Western in the case of Davies v. the Great Western Railway Company.* The Great Western Railway Company is perfectly justifiable on the evidence. A saddle tank engine had been attached, at the last stoppage, in front of an express train engine, in order to assist it up a steep "bank." The tank engine was derailed, producing an accident with fatal results. The company set up the theory that the derailment was caused by the breaking of a connecting-rod through a hidden flaw, but could not support it by evidence. Conflicting

evidence was given as to speed; the plaintiff and others maintaining that the speed at the time of the accident was exceptional, the employees that it was only thirty-five or thirty-six miles an hour. Evidence as to speed in such cases is always difficult to obtain; the evidence of ordinary travellers is worth little, because hardly any of them have ever taken the trouble to test speed with mile-posts and watches; and the evidence of employees is not disinterested. We think it probable, however, on the evidence, that the speed was considerably higher than the company admitted. The point is, that to couple in front of an engine built for speed one built rather for power than speed, with a top-heavy tank and a shorter wheel-base, and drive them together at a high speed, is a proceeding opposed to common sense, and is courting disaster. When the incline was reached no doubt the pull of the tank engine would have come into play; but we have not the slightest doubt that when the accident occurred the tank engine in front was not pulling, but was being pushed by, the faster engine in the rear, and in such a case any unusual lurch or unsteadiness would lead to the front engine being pushed off the rails by the one behind it. The moral is that whenever two engines of different quality are attached to a fast train, the superior and steadier one should be put in front, when it will keep the other steady; and that to put the inferior engine to lead the train is a blunder which may prove, as in this instance, a fatal one.

**Steam Traffic on Roads.** *The case of the Attorney-General v. Scott, on which we commented in our issue of July 16th, 1904, has been appealed (see current Law Reports) and the judgment of the court below has been affirmed.* The defendant was the owner of a quarry, and he used traction engines to haul the stone from his quarry to a neighbouring railway station, and in so doing used a section of road repairable by the Monmouthshire County Council. The action was brought by the Attorney-General at the relation of the County Council to restrain the defendant from using his traction engine on the roads so as to cause a public nuisance. The defendant was the holder of a licence under the Locomotive Act, 1898, and there was no allegation that the plant was improper or that the traffic was improperly conducted, the claim simply being that the frequency of the traffic caused the roads to get into a dangerous state and thus constituted a nuisance, and there was no question as to expenses for extraordinary traffic under section 23 of the Highways and Locomotive Act, 1878. Section 13 of the Locomotive Act, 1861, which has not been repealed, provides that no one shall use a locomotive engine so as to cause a nuisance, and in this case it was alleged that the traffic did cause a nuisance. The defence was that the traffic was not the cause of the nuisance, but that it arose from the neglect of the County Council to properly repair and maintain the road. The case has been the cause of much litigation. The plaintiff in the first place obtained an interim injunction, and on this the

defendant appealed, but the court held that, as a *prima facie* case of nuisance had been made out, the defence at that stage did not avail to prevent the interim injunction from being granted, and incidentally the court decided that the powers granted to the local authorities by the Locomotive Act, 1898, to regulate locomotive traffic by by-laws had not taken away the right to proceed for nuisance under section 13 of the Locomotive Act, 1861. At the trial of the action the judge found that the condition of the road was partly due to the traction traffic, partly to haulage by horses and carts, partly to the ordinary traffic, and partly to the weather, but primarily and chiefly to the failure of the County Council to maintain it in a fit state, and that thus the blame wholly attached to them since the traffic was such as ought to have been expected, and he held that the action failed. This decision on the facts has been confirmed by the Court of Appeal.

**The Ventilation of Tubular Railways.** So far as can be judged by the senses, the directors of existing tubular railways appear to have given up the ventilation of their tunnels as a bad job, and the condition of the atmosphere in these subways grows worse and worse, or, to put matters in the most favourable way, remains exceedingly objectionable. As we have pointed out on previous occasions, the systems in question were designed without any competent assistance by ventilating experts, and to place them upon a proper footing now would involve far more outlay than the companies are likely to incur unless forced to do so by Parliament. Various expedients have been suggested from time to time, and some of these have been tried without satisfactory results. One of the most likely proposals of the kind is contained in a pamphlet of which we have recently received a copy. The author proposes that foul air ducts should be formed between and outside the lifts in each well, and that suitable valves and flaps should be provided so as to enable the lifts to act as pumps for forcing foul air up the ducts, fresh air being supplied by way of the staircase well, which would be fitted with swing doors to prevent short circuiting. The general idea of the scheme is good, but we think that as propounded its effect would be limited to the stations, and that the bulk of the fresh air admitted would be ejected without doing anything to improve the condition of the tunnels. The whole problem is a difficult one, requiring for its solution the best expert advice, as well as a considerable expenditure of money.

**Heavy Traction Traffic.** *When the order of the Local Government Board was issued with reference to heavy motor traffic we pointed out in our issue of January 14 that such extreme weights unsupported on rails might cause not only inconvenience but even injury to the owners of house property.* A correspondent in Saturday's *Times* gives evidence which shows our fears were abundantly justified. Not only are the amenities of life interfered with, but actual structural damage is sustained



by buildings, a loss which falls upon the owners without redress. Such inconvenience and loss must be submitted to in communities where the benefit of the larger number has to be considered at the expense of the few, but this is the exact converse case; that the very few may carry in one load what might equally well be made two loads the comfort, health, and property of the larger number have to be ignored. We can only ask, is it reasonable?

**The London County Council Steamers.** An experimental trip on one of the London Council's new Thames steamers has not impressed us with very much satisfaction at the result of an enterprise which was heralded with such great promises of a service far superior to what had been seen on the Thames before. The deck seating is adequate and well arranged, but in other respects there is not much evident superiority to the old "Citizen" line. The boats are not nearly fast enough; they are passed by ordinary screw tug-boats of smaller size. Why it was decided to have paddles, which are so much more in the way than screw propellers, it is difficult to understand. The general result, however, is that on the Thames we are still quite behind the fast and frequent service of the screw steamers on the Seine at Paris.

**Bedding Stone Masonry.** One of the most important rules for observance by the mason is that all stone consisting of layers or "beds" should be cut so that the beds may be parallel with the horizontal joints. Then the principal pressure will act in a direction perpendicular to the natural strata of the material. So far as our knowledge extends, this essential condition is generally insisted upon by architects and engineers in Great Britain. It seems to be somewhat neglected in the United States, the most recent example being afforded by Holy Trinity Church, in Brooklyn, a Gothic building of large size and considerable architectural merit. Unfortunately, its construction involved the serious defects that the stone selected was not particularly suitable for resisting climatic influences, and was laid with the natural beds in a vertical position. The results have been that the walls and spire have suffered serious disintegration, which will have to be made good at a cost of something like 20,000*l.*, a somewhat heavy price to pay for the ignorance of the architect, or his neglect to include a necessary clause in the specification.

**Electric Earthing.** In the *Journal* of the Institution of Electrical Engineers published last week there is an important paper by Mr. W. W. Lackie on the "earthing" of electric light systems. We are glad to see that electrical engineers are at last seriously considering the problem, and that testing the insulation resistance of a network is now part of the regular duties of the staff at a central station. Mr. Trotter, of the Board of Trade, has been indefatigable in educating station engineers on the importance of regulating the pressures of their mains to earth, and

his model, described in this paper, of Mr. Alexander Russell's static method of illustrating what happens in practice will be understood by those whose theoretical knowledge is limited. Mr. Lackie points out the difficulty of obtaining a good earth. This difficulty is very familiar to those who have set up lightning rods, and it is interesting to learn how engineers surmount it. The paper is mainly concerned with electric lighting in Glasgow, and, as the pressure is 100 volts between the outer mains and 250 volts for each lamp, very special precautions have to be taken against shock and fire risks. We were surprised to read that during the years 1902, 1903, and 1904 there were no less than thirty-three fires which were undoubtedly due to defective electric light installations. Although there are 11,000 installations, we think that this number is much too high. Fifteen of the fires were due to the melting of gas pipes by a current of electricity. We agree with the author in thinking that lead gas pipes should not be used in the same building as electric wires. We are also in agreement with most of his conclusions, but they will not be welcomed by those engineers who are advocating cheapening the cost of distribution. It is stated that, owing to the adoption in Glasgow of the maximum permissible voltage, consumers get light much cheaper than if the old 100-volt pressure had been retained. They undoubtedly get electric power more cheaply, but, judging by our tests of the efficiency of 250-volt lamps, they certainly pay as much for the light and considerably more for the lamps.

**Dock Extension at Liverpool.** THE Mersey Docks and Harbour Board have passed the scheme for an enlargement of the Liverpool Docks at an estimated cost of something over four millions. Meanwhile, London looks on, whilst Liverpool, Dover, Antwerp, Rotterdam, and other continental ports vie with each other in improving the accommodation which they offer to ship-owners. When the new works at Liverpool are completed ships 1,000 ft. in length will be able to enter the docks; a length not yet attained, but which must be regarded as within the bounds of probability. In addition to increased size and depth of docks, the warehouse accommodation will be improved, double-story sheds 150 ft. wide being part of the proposed plan. Not only ports convenient for call, but suitable for the housing when not at sea of immense steamers are now necessary, and for many years to come the dock accommodation at Liverpool will check the advance of rivals which, however convenient they may be—as Dover and Plymouth—as ports of call, have not the first-class dock system of Liverpool. Meanwhile, the Thames Conservancy proposes only to deepen the river and to double the rates on shipping!

It is stated that the Paul's Cross. testamentary dispositions of the late Mr. H. C. Richards, K.C., M.P., include a bequest of 5,000*l.* to the Dean and Chapter of St. Paul's for the rebuilding and upkeep of Paul's Cross in memory of

his brother and grandmother. In April 1879, the late F. C. Penrose discovered the foundations of the cross in the churchyard on the north side of the cathedral, towards the east end. The original cross, having been destroyed by lightning in 1382, was rebuilt of timber with a leaden conical roof upon a structure of stone by Thomas Kempe, who was Bishop of London in 1448-49. It formed the scene of public recantations, penances and denouncements, of the proclamation of royal marriages and of naval and military victories, etc., and of the preaching of the Sunday sermons in the forenoon, which were generally of a polemical or political nature, and inspired by the Government of the time being. It seems that the name of "Paul's Cross" first occurs in 1259, when Henry III. commanded the Mayor to cause the attendance there of youths in the City to take an oath of allegiance to him and his heirs, Kings of England. The cross, with others in London and Westminster, was pulled down in 1643 by an order of Parliament. There is a good view of it, *temp.* James I., in the possession of the Society of Antiquaries, reproduced by Wilkinson, and another in Henry Farley's "St. Paul's Church her Bill for the Parliament," 1621.

**The Japanese Armour Exhibition.** THE loan exhibition of old Japanese arms and armour at the rooms of the Society of Painters in Water-colours, is a fine one, but with the exception of the suits of armour it does not show us anything with which we are not already familiar. There are a number of the well-known finely-curved swords with their straight handles elaborately decorated, but in such a way as not to interfere with grasping nearly all of them without guards, for the flat circular sword-guards, perforated in various designs, seem to be regarded as entirely separate objects, a number of which are exhibited in separate cases. Some of the helmets are very curious and effective in design; some are grotesque masks with immense sham moustaches; for in the day when these things were worn it would seem to have been the duty of a Japanese warrior as it is now of a Chinese, to "look fierce" as a preparation for fighting. On the helmets exhibited shows the same construction, in successive flat rings of metal rivetted together, which attracted notice in the horsemen's helmets in Mr. Rochegrosse's picture of the visit of the Queen of Sheba to Solomon; only the outline of the whole is different. The modern fighting dresses, shown in a separate case, are, in their simple practical character, a remarkable contrast with the barbaric pretentiousness of the old armour. We have seen it remarked that the design of the ancient Japanese arms, in spite of their beautiful decoration, is entirely subservient to practical purposes; which seems rather nonsense. Swords of the sabre shape which have no guard for the hand, in a cut-and-thrust *mêlée*, other than the mere edge which is efficient only against a rapid thrust with the point, are certainly not well-designed weapons; nor are muskets where the greatest thickness of the steel is at the trigger, and the shoulder-but



is the thinnest part of the whole; nor is the portentous stirrup, beautifully damascened outside and finished with red lacquer inside, a piece of furniture that would recommend itself to a modern rider. The beauty of ancient arms lies in surface decoration; the beauty of modern arms lies in finish and fitness, and it may be questioned whether it is not the higher beauty of the two, though a little unobtrusive surface decoration would be quite allowable.

**The Bucks Archaeological Exhibition at Aylesbury.** AN interesting exhibition, which was opened by Lord Rosebery in a characteristic speech, was held last week at Aylesbury to celebrate the Jubilee of the Bucks Archaeological and Architectural Association, a society which has done much excellent work in arousing an interest in and preserving local antiquities in this county. The exhibition contained some very interesting objects, such as the portrait of Cromwell, lent by Lord Carrington, and that of his daughter Elizabeth, lent by the Trustees of the Chequers Court estate. A number of prints of old buildings recalled very well the appearance of the county in the XVIIIth century. Among these were two small prints of Burke's house at Beaconsfield, a historic mansion which was destroyed by fire after his death, and of which engravings are now the only evidence. The collection of large photographs by Mr. C. E. Keyser of Norman doorways, many of which have been reproduced in archaeological journals, was also specially noticeable, but the exhibition suffered somewhat from a want of space and of systematic arrangement, the wall space being very limited. It is to be hoped that such local shows as this will be continued in other centres, for they draw people's attention to archaeological matters, and thus tend to produce a spirit favourable to the preservation of antiquities of all kinds in the locality.

**A Collection of Old Wedgwood.** THERE is at present on view at Mr. Charles Davis's Galleries, 147, New Bond-street, the collection of old Wedgwood formed by the late Lord Tweedmouth. The collection is an exceptionally fine one, and will be a revelation to many people who have not had an opportunity of studying Wedgwood's productions. Continental and provincial museums are more favoured in respect of Wedgwood than the Metropolis; it is to be hoped that the new buildings at the Victoria and Albert Museum may some day be the home of a collection of Wedgwood worthy of the nation. Wedgwood is probably the one ceramic art in which we are supreme and unassailable. The prominent position of Wedgwood is due partly to his invention of the body known as "jasper," partly to his success in enlisting other great artists—such as Flaxman—to his service, and, lastly, and principally in our opinion, to the attention he gave and the importance he attached to form. There are at the present day inventors as patient and laborious as Wedgwood and artists as accomplished as Flaxman, Davaere, Harkwood, and the rest; but there are, unfortunately, few, if any, modellers and designers at the present day who

realise the primary importance of form as did Wedgwood. No amount of beautiful colour or thoughtful ornament can conceal or overcome the initial error of bad form and lack of good proportion either in a vase or a piece of architecture. This is what Greek art taught Wedgwood, and his productions are no mere re-productions; here and there is a classical exercise admirably performed, but the majority of the work shows the originality of genius. Exquisite as are the urn-like vases, such as Nos. 57 and 58 in the catalogue, the jardinières (Nos. 74, 81), and the caskets (No. 82), the box (No. 134), the plaques (Nos. 37 and 21), are more important works of art; they represent a lifetime spent in overcoming the difficulties of inventing a material and in closely studying the greatest period of art—a combination of activities that has always proved most favourable to the production of art.

**University Degrees in Architecture.** ON Saturday, the 8th inst., the first students to take a B.A. degree in architecture graduated at the University of Liverpool; one (Mr. H. H. Hill) obtaining Second Class Honours, the other two (Mr. H. Thornton and Mr. F. Thorpe) obtaining a Pass degree. Though the architectural school at the University has been in existence some ten years, till three years ago, when these students started their course, no one had attempted to take a degree; it is hoped now that there will be many more. The major portion of the examination consisted in the students making (as nearly as possible under the conditions of actual work) a complete scheme for a Students' Club for the University, for which an actual site was given them. For this design they had a clear month, with access to the library, museum, etc. In addition, each student before sitting for the examination had to submit a complete set of measured drawings of an approved building, and a thesis on it and cognate work. The buildings selected were—Gandon's Custom House, Dublin; Gibbs's Senate House, Cambridge; and Wren's Orangery, Kensington. These it is hoped will be published soon in a University Sketch Book on the lines of the Architectural Association Sketch Book.

#### CONGRESS OF FRENCH ARCHITECTS.

The annual Congress of French architects took place last month from the 18th to the 21st of June, being held partly at Caen and partly in Paris. A well-known Paris architect who attended the Congress was kind enough to send us the following short report of it, of which the concluding portion did not arrive till too late even for last week's issue. Though it is not usual for us to give a report so long after date (as everyone knows, French papers are very indifferent in the matter of punctuality of reports), we prefer to put a *résumé* of the proceedings of the French Congress on record in our columns. Forty members of the Congress, accompanied by some ladies, left Paris on Sunday, June 18th, meeting at Lisieux another contingent of architects from Caen. Four hours were devoted to visiting some of the old half-timbered houses which make Lisieux so picturesque, also the cathedral of St. Pierre, the church of St. Jacques, the Tribunal Civil, the episcopal palace (which contains a remarkable gilded chamber of the Renaissance period), and the Jardin de l'Etoile.

On Monday, the 19th, the business of the

Congress commenced in the Salle des Sociétés Savantes at Caen, under the presidency of M. Auray, architect and deputy-mayor of Caen, supported by M. Bartaumiex, the Vice-President of the Société Centrale, and MM. G. Olive and G. Rozet, secretaries of the Société Centrale and of the Congress.

Some notices of the architects of Caen were read by M. Auray, and M. Olive furnished almost a biography of M. Auray *père*, one of the most distinguished architects practising at Caen in the latter half of the XIXth century; and M. Lucas, of Paris, read a paper on "La Conservation des Monuments du Passé." Leaving on one side the recent discussions in Parliament on the separation of the Church and State, he commenced by referring to the study of the subject at the archaeological congress at Bonn in 1868; a study taken up again from time to time and brought to a point at the congress of the "Association Littéraire et Artistique" of Marseilles last year, and referred also to the work of A. de Caumont, who at Caen itself had founded, in 1833, the French "Société Archeologique," the seventy-third congress of which was being held that week, in the district of l'Oise, under the presidency of M. Eugène Lefevre-Pontalis. "Le Droit de l'Auteur sur son Œuvre," which both artists and lawyers in France had accepted as the real basis of property in intellectual work; and "Le Domaine Public Payant," which presupposed a small contribution from everyone who visited or who published an illustration of any work which had become public property—these were the two principles which M. Lucas wished to see applied in the case of all ancient monuments, as governing the principle of conservation and providing funds for repair. After arguing that it was not only a matter of honour but of utility for a nation to preserve the monuments which were important pages in its history, he urged his colleagues of the Société Centrale and of the provincial architectural and archaeological societies to unite in endeavouring to obtain from the Government authority to make a charge in respect of visits to or publication of ancient monuments, and to apply the revenue thus obtained towards keeping such monuments in repair.

M. Georges Harmand, advocate, at the sitting at Paris on the 24th, took up the same subject from the lawyer's point of view; and at its final sitting the Congress passed unanimously a vote expressing the view that had been formulated by M. Lucas at the meeting of the 19th; their vote supporting the principle of contributions from visitors and illustrators towards the expense of the preservation of ancient monuments. This vote will be communicated to the Minister of Public Instruction and Fine Arts, by the hands of the President of the Société Centrale and of the Under-Secretary of State for Art.

After the morning sitting on the 19th, the afternoon was devoted to visits to the museums of Caen, the churches of La Gloriette, Saint-Etienne-le-Vieux, and Saint-Etienne (l'Abbaye aux Hommes); the Lycée Malherbe, installed in the ancient buildings of the Abbaye aux Hommes; the churches of Saint Nicolas and Saint-Sauveur; some of the old houses in the city; and lastly to the Hôtel de Ville, in connexion with which there was an art-exhibition to be seen.

The 20th was devoted to visits, by train or carriages, to various buildings or places of interest—the church of Ouistreham (restored by M. Ruprich-Robert); the church of Langrune, with its remarkable tower of perforated masonry, or masonry of Ardennes, the church of Bernières; the abbey of Ardennes, now converted into farm buildings, and the Renaissance châteaux of Creully, Fontaine-Henry, and Lasseon. The day was finished by a dinner presided over by M. Nénot, President of the Société Centrale and of the Congress.

Wednesday, June 21, was also a day of promenading; in the morning at Caen, on the banks of the Orne and in the Sadi-Carnot-avenue; in the afternoon, an excursion to Bayeux and Balleroy. At Bayeux the visitors made their first halt at the Palais de Justice, installed in the chapel of the ancient bishop's palace, dating from the commencement of the XVIth century, and



which still possess some ancient windows in the apse, now transformed into a Council Chamber. Then came the Hôtel de Ville, another part of the same ancient palace, but rebuilt in the XVIIIth century, and which contains the Musée Doucet. At the Cathedral of Notre Dame was seen the Romanesque crypt and remains of a Romanesque arcade of the XIIth century; the nave and the two towers of the western façade, the latter clothed with a Gothic ornamentation at the end of the XIIIth century; the chapter-house of XVth century; and the central tower, dating from the end of the XIVth century, but unfortunately crowned, during the Second Empire, with a metal cupola which is quite out of keeping with the rest. Visits were subsequently made to some ancient houses and to the museum to see the well-known tapestry. Before returning to Caen the party visited the Château de Balleroy, a work of François Mansard, and decorated with paintings by Miguard; a château which has preserved its ancient appearance untouched. The party were received by the present owner, the Marquis de Balleroy.

The work of the Congress was resumed at Caen on Tuesday, the 22nd; but the unavoidable absence of M. Frantz Blondel, of Versailles, who was one of the Committee for dealing with the subject of the establishment of district schools of architecture in France, prevented that part of the programme from being fully gone into. M. Dubuisson, of Lille, a former President of the Société Régionale des Architectes du Nord, read a paper on the subject "Expropriation dans un but de Salubrité Publique," a subject which was taken up again at the meeting at Paris on the 24th, and led to the passing of a resolution demanding the intervention of the architectural societies with the Government, to urge the passing of a law for "Expropriation par Zones," on the lines of the existing Belgian law on the same subject.

On the afternoon of the 22nd the party concluded their proceedings at Caen by visits to the churches of Saint-Pierre, Saint-Gilles, and the Abbaye-aux-Dames, to the Hôtel d'Escoville and the Hôtel Mondrainville, and one or two other buildings of interest, and in the evening returned to Paris by a special train put at their service by the railway company de l'Ouest.

The morning of the 23rd was reserved for the report of the "Caisse de Défense Mutuelle," now arrived at its twentieth year of existence. M. Nénot, as President of the Société Centrale, occupied the chair. The Report stated that during the past year more than fifty cases, old and new, had been considered by the Committee, in six of which those concerned had been assisted from the funds of "Caisse." Since its foundation, the Caisse has paid forty-seven thousand francs in assistance to architects engaged in legal proceedings, and in spite of a serious loss from a bank failure, has still a fund of twenty-three thousand francs in hand.

On the afternoon of the 23rd some serious questions were discussed in regard to the amendment of the law respecting the Responsibility of Architects, and the law in regard to party-walls, "servitudes," etc.

Since the appointment last year, by M. Valli, Garde des Sceaux, of a special Committee to study the question of the revision of the Code Civil, the French architectural societies have not been idle; Committees have worked and delegates have been appointed to represent the Societies before the Ministerial Committee. At the present meeting the discussion—in which the chief speakers were M. Genouat, delegate of the "Association Provinciale des Architectes Français," and M. Harmand, advocate of the Cour de Paris—was important and significant, and concluded with a resolution in favour of a general combination of the Architectural Societies to present a joint memorial to the Government in regard to the modifications desired in the Code Civil.

At the meeting on the afternoon of the 24th the annual distribution of "recompenses" took place, under the presidency of M. Henri Havard, Inspecteur-Général des Beaux-Arts. Among the recipients were architects, archaeologists, jurists, authors of studies on architecture, ancient and modern; contractors, working-men, and apprentices representing the "personnel du bâtiment," etc.

Among them may be mentioned specially the "medaille d'honneur" conferred on M. L. Lenoir, architect, of Nantes, in recognition of a long and honourable career; the silver medal awarded to M. Hénard (Paris) for his study on the improvements required in Paris at the present moment; a silver medal to M. Fernand Lapeyrère, architect, of Paris, the author of a study in regard to the improvement of Bordeaux similar to that of M. Hénard on Paris. Two other special medals were awarded, not at the afternoon meeting, but at the dinner in the evening at the Hôtel Continental, presided over by M. Dujardin-Beaumetz, Under-Secretary of State for Art; when M. Nénot presented the gold medal of the Société Centrale to M. Guadet, "en consécration de sa noble carrière et en souvenir de son beau livre 'Éléments et Théorie de l'Architecture';" and the silver medal of the Société to M. Chas. Lucas, in recognition of the great services which he had rendered to the Société Centrale and to the Caisse de Défense Mutuelle. After this, the chairman, in responding to the toast in his honour proposed by M. Nénot, promised, at the close of an eloquent speech, to do his best, in his official position, to give the art of architecture its due place and the satisfaction of its legitimate demands. After other formal toasts, the proceedings of the Congress came to an end with the close of the banquet.

#### THE LIÈGE INTERNATIONAL EXHIBITION.

ALTHOUGH not to be compared with the Paris Exposition of 1900, the International Exhibition of Liège may justly be characterised as one of the most noteworthy undertakings of the kind which have been organised within recent years. The idea was first mooted in the year 1897, but so great were the obstacles to be surmounted by the promoters that the realisation of their scheme has only recently become possible. From one point of view the delay has done good rather than harm, for the national fêtes and other functions which this year commemorate the seventy-fifth anniversary of Belgian independence will have the effect of conducting very largely to the success of the exhibition.

As the industrial capital of the country and in the very midst of the mines, iron-works, and engineering establishments which give Belgium an important position among the commercial countries of the world, Liège offers a most suitable site for the holding of a world's fair. Situated in the valley of the Meuse, and built along the banks of that river, the town is of such configuration as to facilitate access to the various entrances of the exhibition, an operation which is rendered still more easy by the excellent services of electric cars running past the principal railway-station.

The total area covered by the grounds and buildings is about 170 acres, the greater part of which is situated at the confluence of the Meuse and the Ourthe, and the remainder in the Parc de Coïnte, on the picturesque plateau of the same name overlooking the town. This portion of the exhibition is also accessible by a service of electric cars. The central site is divided into four parts by the Meuse and the Ourthe and by La Derivation—a new channel cut for the latter river. The old bed of the river formerly swept round the present exhibition grounds, on the east side of the Meuse, but has now been drained and filled up. This has made necessary the building of several bridges, by means of which all parts of the exhibition are placed in communication.

On the western bank of the Meuse is the Quartier de Fragnée, with a monumental entrance of semi-circular plan at the rond-point of Fragnée. On the eastern side are a quartier formed by the Parc de la Boverie and the Jardin d'Acclimatation, and the Quartier du Vieux Liège, the first two bounded on the opposite side by La Derivation and the latter by the Ourthe, while the two quarters are separated by a weir. Beyond the Ourthe and La Derivation is the Quartier de Venes, which is the great centre of industrial and engineering exhibits.

While dealing with the topographical aspect of the exhibition we may con-

veniently draw attention to one or two of the bridges mentioned above. Le Pont de Fragnée crosses the Meuse at a point where that river is 170 metres wide. The bridge is of the three-binged type, and includes three steel spans, with masonry piers and abutments, the central span being rather longer than those at either side. The arch ribs of each span support the platform above by means of vertical members, and compensate for the somewhat narrow proportions of the bridge the foot-walks are carried by cantilever brackets. The light and graceful steel construction was executed by the Société John Cockerill from the designs of M. Demany, the architect of the bridge. Some fine sculpture executed by the Belgian artist M. Victor Rousseau deserves special mention, but we are bound to say that the effect of the columns at the entrance is anything but happy. Another bridge in this vicinity is the Pont de Retinne, crossing the Ourthe. This work is not of sufficient interest to demand detailed description, but is important as providing a continuation of the route beyond the Pont de Fragnée.

Another bridge rendered necessary by the diversion of the river Ourthe is the Pont Mativa, connecting the Parc de la Boverie with the Quai Mativa. In connexion with the construction of this bridge there were circumstances which deserve to be stated. The executive committee of the exhibition considered it essential that a structure of the kind should be provided at this point, and accordingly solicited the assistance of the Ponts et Chaussées. After examination of the site, however, the engineers of the department came to the conclusion that the time available was quite inadequate for the design and erection of a bridge. The exhibition committee were not discouraged by this decision, and placed themselves in communication with a Belgian firm in Paris, having relations with M. Hennebique, who undertook to complete a concrete-steel bridge in time for the opening of the exhibition. Work was commenced in November last, and finished in the early part of this year, at a cost of about 4,400, or some 2,000, more than that of similar works executed by masonry by the administration of the Ponts et Chaussées. The length of the bridge between abutments is 260 ft., including a river span of 180 ft. and two shore spans of 32.8 ft. each. The soffit of the central span is segmental, having a rise at the crown of about 12 ft. From the structural standpoint the bridge was considered as two cantilevers with unequal arms, the shorter arm at each shore end balancing the long river arm by the aid of the load furnished by the abutment. As the width of the bridge proper is only 18 ft., the side-walks are carried by cantilever brackets projecting 7.4 ft. on either side, thus making the platform 32.8 ft. wide. The arch ribs forming the central span are 2.46 ft. thick at the haunches, and diminish to 1.97 ft. thick at a distance of about 40 ft. from the crown. At this point the road platform joins the bridge in monolithic construction. The platform has a uniform thickness of 7.9 in. up to the junction with the ribs, the central joint construction being 9.87 in. thick at the two ends and 9.05 in. thick at the centre. The platform, of concrete-steel, forms a tension for each cantilever arm, the ribs acting in compression as struts. In those parts of the bridge where the platform is separated from the ribs beneath three parallel vertical struts of concrete-steel 7.85 in. thick are provided. The roadway is paved with asphalt, and the side-walks are covered by artificial stone. One specially interesting feature of the Mativa bridge is that the foundations were formed by mechanical compression of the soil—a comparatively new process. The piers and abutments are supported on groups of concrete-steel piles driven into the ground, which was compressed by the method mentioned. By continuing the reinforcement of the piles into the concrete of the piers and abutments, and by repeating the same treatment in the work above, the whole structure was firmly tied together and literally rooted into the ground. One other bridge recently built is of the suspension type, connecting the Quai de la Boverie with the Quai Mativa.

The visitor desiring to make the most of



his time among machinery and industrial products in the exhibition will find it best to take a tram right up to the main buildings in the Quartier de Venues. So varied are the products shown in the Halles de l'Industrie and the Halles des Machines that a thorough inspection might easily be extended over a fortnight or more, leaving the evening of each day for examination of the pavilions scattered over the other quarters. In the following notes, however, we shall follow the course taken during our recent visit, and assume the entrance to be made at the northern end of the Jardin d'Acclimatation, close to the Pont de Commerce, on the eastern side of the Meuse. Inside this entrance the visitor will find the lines of a narrow gauge railway running through the garden and the Parc de la Boverie, crossing the Pont Mativa, passing the main entrance to the principal buildings, and terminating near the Halles des Machines, in the Venues quarter. This railway was laid down by the Decauville Company, of France, and the rolling-stock consists of petrol locomotives and *char à banc* carriages. Resisting the attractions of this line, we enter the pavilion of the Great Eastern Railway, containing models of their steamers and other exhibits relating to traffic. In an adjacent pavilion the Syndicat des Aménagements show examples of gas and electric lighting apparatus, plumbing, hammered iron, and woodwork.

Four buildings devoted to the products of French colonies in Africa and Asia contain much that is of interest, and close to the Parc de la Boverie entrance gates is the pavilion of Norway, built of pine and covered with Norwegian slates, this exhibit being more instructive to professional men than the four mentioned above. A little way beyond is the Canadian pavilion, where, in addition to agricultural produce, will be found specimens of minerals, building stones, and timber.

The Palais des Beaux-Arts is a substantial structure of stone, in the style of the XVIIIth century, and after the close of the exhibition will be used by the municipality for art exhibitions, concerts, congresses, and other gatherings. It is no part of our intention in this article to deal with artistic matters, but we may briefly mention the fact that the contents of the Palais des Beaux-Arts include four classes of works:—(1) Paintings, water-colour and other drawings; (2) carvings of various kinds; (3) prints; (4) architectural drawings and models. The works exhibited include examples by the leading artists of many different countries, and, in spite of the fact that the interior offers a floor space of 2,500 square metres and a wall space of 625 metres long, temporary extensions have become necessary to provide accommodation for the large number of exhibits sent. Near by is the Pavillon de l'Art Ancien, a structure of heterogeneous design, parts of the façades respectively representing the old Hôtel de Ville of Liège, the old Château des Prince-Évêques de Liège, (now the offices of the John Cockerill Company), and the fronts of old Liégoise houses. The interior contains an invaluable collection of masterpieces lent by the German Emperor, the Count of Flanders, numerous churches, and others, the examples of ancient Liège furniture being wonderful samples of cabinet work. The Bulgarian pavilion derives its chief interest from the fact that it was built from the designs of a well-known architect in Sofia. The Montenegrin and Serbian pavilions, designed respectively by Signor Carbonare, of Venice, and M. Danief, of Liège, are other architectural studies. The pavilion of the Liège Municipality should by no means be passed by. It is designed in the old Mosan style, and contains exhibits by the departments of public works, education, and *l'état civil*. That of the first-mentioned service is particularly instructive, and relates chiefly to sewage systems, waterworks, and architecture. An exhibit in this part of the grounds that should not escape notice is a small pavilion of the construction *démontable* type, made by M. E. Gillet, of Paris. The building in question is fitted as a temporary hospital for colonial use, but similar structures are supplied for occupation as dwelling-houses, barracks, stores, and offices.

Passing over the Pont Mativa, we enter the Quartier de Venues. The first duty of the conscientious visitor is to explore the triangular space in front of the main buildings. This will not take long, for only two or three pavilions need be entered. The first is one occupied by the Compagnie Internationale des Wagon-lits, who show three very fine sleeping-cars and one of indifferent quality. Although the announcement is made that these vehicles are open to inspection, they were most religiously locked on the occasion of our visit, and no one was in attendance to give information. Next door to the carriage-shed is the Palais Française de l'Agriculture, where a good assortment of agricultural implements and apparatus of various kinds will be found. Behind the Salle des Fêtes on the left is the Pavillon du Petit Outillage, in which are displayed tools produced by small makers, one of the most praiseworthy exhibits being steel saws by M. Alex. Ballon, whose name is well known in Belgium. In front of the principal entrance to the halls are the small pavilions of the Vieille Montagne Company, the Solvay Works, and one devoted to the cream separators of the Melotte Company.

Notwithstanding the fact that the main buildings cover an area of more than 100,000 sq. metres, they are very poorly built. The outer walls are of timber, with vertical strips of wood nailed over the joints. Some parts of the façades are improved by imitation masonry of the kind usual in exhibition buildings, and at the time of our visit the work of decoration was still in progress. The only façade having any architectural pretension is that in which the main entrance is situated. Here we have, in the centre, the Entrée Monumentale des Halles, and at either side two other entrances, the whole façade forming a connected series of buildings, which serve to hide the mean appearance of the galleries behind. The monumental entrance has a hall of horseshoe shape with a painted ceiling, and groups of sculpture near the front. The arched opening is flanked by side towers, and over the entrance-hall is a massive-looking rectangular tower, on the four turrets of which statues stand in uncomfortably perilous attitudes. The design as a whole is open to criticism from a constructional point of view, but it certainly goes a long way towards giving an imposing effect to the principal façade of the Halles de l'Industrie.

Entering the first hall, we find a main corridor extending from front to back in which are exhibited bronzes, decorative materials, furniture, and glass, all of Belgian production. On the left hand of the corridor the whole of the space is allotted to French industries, the products displayed being chiefly silks, drapery, millinery, and wines. Turning to the German section, on the right hand of the central corridor, we come to a most instructive exhibit by the Syndicate of Westphalian Coal Mines. This organisation shows a working model illustrating a novel method of unloading coal from vessels and delivering it into railway wagons. The coal is sucked up through tubes lowered into the hold of the ship or lighter, and discharged into hoppers above the railway line. A powerful air-pump is employed for the purpose of drawing the coal through the discharge pipes. Another model shows the effect of a freedamp explosion, and represents a system of life-saving apparatus, in which the principle of the diver's dress is utilised. Other models illustrate steel-work for the support of workings in place of the usual timbering, and various types of steam and electrically-driven mining pumps.

The British industrial section covers less than half the space occupied by German exhibits, and cannot be regarded as a satisfactory representation of our national industries. Among the chief exhibitors are:—The Hull and Barnsley Railway Company, The Horsfall Destructor Company, of Leeds; The Glenboig Union Fireclay Company, The Linotype Company, Messrs. Jeyes (sanitary compounds), The Hallé Automatic Firearms Syndicate, Messrs. Eley Bros., and other well-known firms. There are other British exhibits in the Halles des Machines, to which reference will be made later. The remaining portion

of the first building is taken up by sections allotted to the United States, Japan, China, Peru, and Italy, and by an International section, comprising the miscellaneous products of some thirteen countries in all parts of the world. The two main buildings are separated by the Chemin de fer du Nord Belge, which passes on a viaduct over the passage leading from one hall to the other. This line terminates in the Gare de Longdoz, and it is worthy of note that a special station has been provided close to the exhibition buildings for the convenience of visitors.

In the second group of halls there is a broad corridor forming a continuation of that in the first building. Here Belgium displays objects relating to the decoration of public buildings and dwelling-houses, electric-lighting apparatus, metallurgy, and coal mining. Several of the large colliery companies and syndicates exhibit interesting models and drawings. For instance, the collieries of the Liège district show models of automatic tipping plant, similar to that used in gold mining, of various systems of washing and screening coal, and of an ingenious coal-loading plant devised by M. Poppe, of Ghent. The Mariemont and Bascoup Collieries, whose output is more than one million and a quarter tons a year, exhibit various models of their mechanical plant, and the Levant du Flénu Colliery show a drawing of an elaborate screening apparatus capable of dealing with 300 tons of coal an hour, dividing the coal into fragments of different sizes, and regulating the proportions of the final mixture in accordance with requirements. These exhibits, and others devoted to miners' tools, iron and steel, bronze and metallurgical products generally, are thoroughly deserving of inspection.

On the left hand of the main corridor about half the area is allotted to the industrial exhibits of foreign countries, but, with a few exceptions, these are merely of general interest. The remaining area on the left is taken up by the Belgian Halles de l'Industrie, the subjects covered being hygiene, social economy, public assistance, and education. Passing to the right hand of the main corridor we enter another group of Belgian exhibits relating to civil engineering, navigation, the manufacture of firearms, carriages and motor vehicles, chemical industries, and sundry arts, sciences, and manufactures that need not be enumerated in detail. The remaining portion of the exhibition buildings is devoted to the Halles des Machines, which form the chief centre of attraction for engineering visitors.\*

#### MAGAZINES AND REVIEWS.

THE *Burlington Magazine* includes an article by Mr. Laurence Weaver on "Some English Architectural Leadwork." The subject has become almost a commonplace one of late years, after long neglect; but Mr. Weaver's article contains a good many interesting suggestions, and is illustrated by good examples. Mr. Robert Dell contributes an article on "A Tudor Manor-House: Sutton Place, by Guildford"; a house which the writer claims, not without reason, to be not an ordinary Tudor house, but to have a style of its own. As he remarks, the stepping of the gables at the ends of the two wings is not an ordinary English device of the period, though it became common in Scotland. Mr. Dell suggests that Tudor architecture might be made a starting-point for a genuine architectural development. The idea has been broached before, but is worth consideration, especially in respect of domestic architecture on a large scale—what may be called mansion architecture. The illustrations of "A Seventeenth Century Wall-paper at Wotton-under-Edge," on which Mr. A. G. B. Russell writes a comment, are curious and interesting; it is a paper of Chinese origin, and apparently not a repeating pattern, but a continuous design. This being so, however, there is no advantage in having it on paper at all; it had better have been painted direct on the plaster. The excuse for papering walls (not in itself a very hygienic practice) is that by repetition printing it produces a rich effect by a comparatively cheap method. If the repetition is given up, the whole *raison d'être* of wall-paper vanishes.

\* To be continued.



The *Architectural Record* (New York) is almost entirely taken up, in the current number, by illustrations of dwelling-house interiors. There is one article on Parisian interiors, the illustrations of which are not attractive, being all marked by a kind of artificial and ultra-modern elegance which is not that of the best and purest taste. Among the large number of illustrations of American interiors there are a good many that are interesting as suggestions, the most original apartment being the ball-room in the Morse House, of which Mr. Ogden Codman is the architect. The following remarks from the first article in the issue, on "The American Country Estate," are of interest as showing the American view of the situation at present. The article is by Mr. Herbert Croly:—

"The 'palatial' period of American domestic architecture is already on the wane. The newer houses, while they still proclaim loudly their owner's opulence, indicate the influence of better ideas of propriety, architectural and social; and it may be confidently expected that the future movement will run in the same direction.

While, however, the 'palatial' house is losing some of its noisier improprieties, it is not the houses of the very rich, which constitute the best contemporary achievement of American domestic architecture or its best hope for the future. These houses receive most attention, because they are most spectacular, and because their proprietors are frequently the popular American heroes of the day; but they are not intrinsically the most interesting. Their owners frequently want a good thing, and their architects are skilful; but both good intentions and skill tend to be vitiated by the fact that whatever else the houses express, they must inevitably express superabundant wealth. Americans do everything with their wealth except to 'forget it.' The result is that there is too much of everything—too much gilt, too much furniture, too much upholstery, too much space, too many styles, and most of all, perhaps, 'too much ceiling.' These houses and grounds require is not a negative refinement, but a thoroughgoing simplification."

The *University Review* contains an article by Professor Reilly, of the University of Liverpool, on "The Training of Architects." The article is written *à propos* of the recent establishment of Board of Architectural Education. The article, which is a very serious and considerate one, in which no words are wasted, should be read as a whole. The following suggestion as to the value of the working out of ideal architectural schemes on a great scale we quote concisely:—

"If the Board's scheme is adopted, it is suggested that the student's entire work in the shape of drawings and schemes of all kinds which he has accomplished during the four years of his course, be collected and reviewed, and a certificate awarded on the strength of it. It is further laid down that such drawings must include one project on a large scale, to be completed with detail drawings, specification, and analysis. This is an excellent departure. The value to an architect of sitting down, at least once in his life, to produce some piece of grandiose planning, where expense and other worrying restrictions of actual work need not be considered, and of trying to design architecture that may have some element of the sublime in it, is difficult to over-estimate. A breadth of view wherewith to judge all subsequent work, a knowledge of the relative value of the masses of a composition as compared with their details, and in general, the big way of looking at things which so distinguishes contemporary French work, are among the advantages to which such an exercise may lead."

We may also note the writer's suggestion as to one important but indirect effect which might follow the formation of Architectural Schools within the Universities—viz., the stimulus that might be given to scientific research into the whole field of building materials. "In the laboratories of engineering, physics and physical chemistry, which bulk so largely at the Universities, it should be possible to resolve many of the problems pertaining to such ordinary materials as Portland cement and concrete, which the architect has to face in actual work, but for which at present he has very insufficient scientific data to go upon."

In *Technics*, Mr. John B. C. Kershaw, continuing "The Theory and Practice of Steam Generation," considers the chemical aspect of the combustion process, and describes methods adopted for promoting chemical action in the furnaces and combustion chambers of steam boilers. Some of the difficulties in the way of reforms in boiler design intended to ensure and maintain perfect combustion, and therefore to prevent the production of smoke, are clearly indicated in the following passage:—"Boiler users, however, are wedded to the present type and design, and, so long as a long-suffering public allows them to produce black smoke without imposing unduly heavy penalties,

they will prefer to make the smoke and pay the fines, rather than to adopt the obvious remedy. As for boiler-makers, they likewise are conservative, and stick to the design they have been making for nearly half a century. So long as they can sell their boilers, and as their customers are satisfied, they are unwilling to modify or alter their design." This likely to modify or alter their design." This is a very fair statement of the case, and we should heartily welcome more stringent legislation, which would really benefit steam users and the public alike. Lieutenant H. J. Jones, in Part IV. of "Armoured Concrete," discusses the Hennebique, Koenen and Hatt methods of calculating the amount of reinforcement required for a concrete-steel beam. The writer points out what he terms the irrational assumptions made in the first two of these methods, but does not show very clearly that the third is more rational. The fact is that general assumptions have to be made in connexion with all formulae for computing the proportions of concrete-steel beams, and in the present state of knowledge the most reliable are the more complicated equations. The practical value of this article would have been much greater if the writer had given examples showing the application of the rules stated. The long series of articles on "The Elements of Chemical Engineering," by Dr. Grossmann, has now drifted into a description of such "chemical" apparatus as Galliot, way boilers, fuel economisers, gas engines, dynamos, and electric motors. So long as the author kept to a reasonable definition of the title his articles were interesting and instructive, but he is now occupying space that we should imagine might be more usefully employed. Mr. W. W. F. Pullen contributes a short article on "Chimney Draft," in which he makes clear the principles underlying the design of boiler chimneys for use with natural draught.

To the *Fortnightly Review* Mr. Frederic Harrison contributes "A Morning in the Galleries," consisting of an imaginary conversation between three persons—the writer, Sir Visto, "rather a testy amateur of the old school, who had seen all the galleries in Europe and often dined with the R.A.'s," and Mr. Van Dyke, "one of the young lions of the New Gallery." The conversation begins over the too-celebrated "Lycids," which Mr. Van Dyke praises with effusion, and sneers at "those old Philistines at Burlington House who rejected one of the purest masterpieces of our time." "But is it beautiful?" asks Mr. Harrison, in his innocence. "Beautiful?" was the answer, "we don't go in for beauty nowadays; we want truth, not beauty. Art has nothing to do with beauty." They were joined by Sir Visto, who sees in it only "a scraggy youth in an ungainly attitude." After some more sparring they adjourn to the Royal Academy, where we recommend a reader to follow them. There is not only a great deal that is exceedingly amusing in the article, but a great deal also of really clever and trenchant criticism on modern art.

In the *Westminster Review* "Louise M. Richter" (we know not whether Miss or Mrs.) writes a short article on "Watts and Whistler: their Antitheses and Analogies." The former are certainly more evident than the latter, nor can we see any reason in grouping the two names, except from the temptations of alliteration. The writer finds "a great attraction" in the scarecrow figure of Whistler himself, "easel in hand" (since when have painters held their easels in their hands?), in the picture called "The Artist's Studio." We agree that the portraits of his mother and Carlyle show that "much more would have been within Whistler's reach than he cared to attempt." That was just his fault; he would not take his art (or anything else) seriously, but preferred mystifying the public with eccentricities and half-finished suggestions. The mere idea of bracketing his name with that of such a great, serene, painstaking artist as Watts, shows that the writer's critical sense is entirely out of gear.

In the *National Review* Viscount Turnour, in the course of a paper headed "Some Further Impressions of Eton," speaks strongly in regard to the sanitary defects still existing in this essentially national and historic school. The first administrative reform required at Eton, he says, is that of hospital accommodation. In the old houses there is no provision for isolation in the case

of infectious disease except a notice on the door of the sick boy's small room that no other boy is to enter it; not to speak of the consideration that "a small stuffy room, some eight feet square, looking in many cases on to a blank wall, is not an ideal place for a nurse to nurse a boy back to health after an illness of even a trifling nature, especially in hot summer weather." And as the pulling down of all the older schoolhouses and re-building them cannot be contemplated, Lord Turnour suggests that a hospital with properly planned wards should be built, to which boys who were seriously ill should be sent. A great deal, apparently, remains to be done also in bringing the school, or some parts of it, into even ordinary sanitary conditions:—

"A great deal still has to be done to render the older houses more inhabitable. Narrow passages, dark, sunless rooms, indifferent sanitary accommodation, and difficulty of escape from fire, even as rope ladders have been provided and bars removed from windows, are the too prominent features of many Eton houses. In one house which I am acquainted with the lavatories, whose general aspect would make a Battersea councillor shudder, are in far too close proximity to the dining-room and kitchen, while a drain from the scullery discharges its contents there into an open gutter. Destructive criticism, however, is always easier than constructive reform, and the governing body have grappled with the housing problem in quite a robust manner (for them), and are pulling down where it is possible, old insanitary houses, and erecting palatial new buildings, actually equipped with bathrooms! It must, however, be a great many years before all the bad houses are demolished, and meanwhile parents have a right to demand that the building in which their boy is housed should be in a proper sanitary state, as nearly as possible conformable with the laws of modern hygiene."

In the *Cornhill* Mr. E. H. Pember, K.C., indulges us with, "Some Personal Reminiscences of Lord Grimthorpe," who was just a personage, no doubt, to appeal to the legal and unesthetic mind. He amusingly admits that Lord Grimthorpe "was sometimes rude." As a public man, was he ever anything else? In regard to the reference to the restoration in St. Albans, as to which Mr. Pember exhibits the usual English ignorance and indifference. He is good enough to admit that "a larger gift of artistic invention would have enabled him in certain not unimportant details to do it somewhat better." It would be interesting to know what are the details which Mr. Pember thinks might have been done "somewhat better"; interesting also to know what are Mr. Pember's qualifications for expressing an opinion on an architectural design. What Mr. Pember cannot see, when he speaks of Lord Grimthorpe having carried out all the restoration himself, "alone he did it," is that it is just that which is the cause of complaint against him. Having no artistic knowledge or culture, he chose to pull about a great national monument in his own way without asking any better advice, out of sheer obstinacy and egotism, and because he wanted to pose as an architect. But you cannot get one Englishman in a thousand to see that. The general notion is that of course if Lord Grimthorpe found the money he had a right to do as he liked—as if he had bought St. Albans!

In *Harper* Mr. W. D. Howells, in No. IV. of his "London Films" articles, gives us an interesting study of "American origins" in London, a pilgrimage to places where those who afterwards founded America had formerly lived in London, or to churches where monuments to them are to be found; an article which should be interesting to Londoners as well as to Americans.

*Scribner* contains an article on "Le Nôtre and his Gardens," by Miss Beatrix Jones, with illustrations by Mr. Peixotto. Little is generally known about Le Nôtre, even by those who know and admire his great works in garden architecture. It is interesting to learn from Miss Jones's article that Le Nôtre, although he was employed all his life in schemes for the display of royal and aristocratic wealth and profusion, retained always the character of a simple and unambitious gardener. When, at the age of sixty-two, Louis XIV. created him a Chevalier of the Order of St. Michael, and suggested that he should adopt a coat of arms, he replied that he had one ready made—"three snails surrounding a square" and surmounted by a cabbage-leaf." He worked in the Tuileries gardens under his father till he was thirty-nine, and then first



made his reputation by laying out Vaux-le-Vicomte for Fouquet, the Chancellor, who on the completion of the work invited the King to a fête in order "to show his master that he was not as well housed as one of his subjects." Fouquet was too successful, the King sourly remarking that the house was more magnificent than either of his palaces of Fontainebleau or St. Germain, and that it was too much for a mere subject to own. Fouquet was arrested and his estate confiscated not many days afterwards. It is the same story as that of Wolsey and Hampton Court, only that when Henry VIII. made a similar criticism on Hampton Court, Wolsey had the tact to reply that he had only carried out the palace to have the opportunity of presenting it to the King. Several illustrations of Vaux-le-Vicomte are given, as well as others of the better known work at Versailles and elsewhere. In referring to Chantilly reference should have been made to Le Nôtre's grand flight of stone steps, perhaps the finest bit of effect there.

In the *Century* Mr. Whiteing continues his article on "The Châteaux of France," with some fine illustrations of Chambord, Chantilly, and Azy-le-Rideau. An article on "The Secession Movement in German Art," by Mr. Albert Kinross, is of some interest as a sketch of recent developments in German art. The "secession" was from the academical influence towards freedom and nature. In Germany "the academies are dead," says Mr. Kinross, and it may very likely be so, but it is so much the fashion at present to rail against all academies of art that one must not accept the statement too readily. Among the most important of the secessionists was Menzel, a painter we have always thought much over-rated; it seems to have become the fashion everywhere to praise him extravagantly; but he was really a very remarkable executant entirely destitute of poetic feeling. This was not the case apparently with Böcklin, another prominent artist of the secession; his picture of "The Island of the Dead," of which a plate is given, is a very remarkable piece of romantic conception.

In the *Nineteenth Century* Mr. St. Clair Baddeley writes an article upon a curious and out-of-the-way subject—"The Sacred Trees of Rome." None of these survive of course to the present day, and their precise sites are apparently only traditional; but the subject touches on the boundaries of many interesting questions of ancient superstition. Why, for instance, were the shorn tresses of the vestal virgin hung on the sacred lotus-tree? The article suggests many other questions, and is well worth reading.

In the *Antiquary* the Rev. J. B. McGovern concludes his paper on the always interesting subject of "The Round Towers of Ireland," in reference to which title, by the way, he notices the mistaken view that these towers are altogether peculiar to Ireland; mentioning the two in Scotland, at Abernethy and Brechin, the latter of which at once suggests the Irish towers. Still, they are no doubt incomparably more numerous in Ireland than in Great Britain. Mr. McGovern offers no certain conclusion of his own as to the original use of the towers, but he gives a very useful summary of opinions and possibilities, and perhaps has the advantage over some other writers in not pretending to any positive conclusion, rebuking one adventurous person who says "we now know that the round towers were bellries attached to Christian churches" with the remark that we "know" nothing except that the towers were used as bellries by early Irish Christians; but whether that was their first use and object is another matter altogether. Our own persuasion (we cannot say conviction, for we have none) is that in their origin the towers were places of retreat and defence, even as towers were in the early times of modern Italy. Miss Escombe contributes to the same issue an article on the small church of All Saints, Compton.

An article in the *Pall Mall Magazine* gives a sketch of artistic Bohemia under the title "Studio Land in Paris."

**FACTORY BELFAST.**—A new factory has been erected in the vicinity of Dublin-road and Hardcastle-street, Belfast, for Messrs. T. J. Somerset & Co. Messrs. J. & R. Thompson were the contractors for the work, the architect being Mr. J. W. Roome.

#### THE ARCHITECTURAL ASSOCIATION PRIZE DRAWINGS.

The most successful all-round work shown at the annual exhibition of the Architectural Association students' drawings this year is that by Mr. Alick Horsnell. Mr. Horsnell seems to be the sole competitor for the Association travelling studentship, a circumstance which is to be regretted. It is dull for the Association and also for the competitor. The work shown, however, is a model of what a student should set himself to do. In our opinion, the requirements for the travelling studentship are admirable. They call for all-round development. Success in obtaining the prize does not imply that the winner is a good designer or a good draughtsman only, but that he has shown capability as a student of architecture. Architecture, as every architect knows, comprises many activities and knowledge in many departments of life besides drawing and design. It is, therefore, essential that a student should approach his work in a catholic spirit and be thorough in every branch of it as opportunity arises. Mr. Horsnell has measured old buildings, both Gothic and classic, with carefulness and some success. Not only are the drawings of the objects measured good drawings in themselves, but they have served the good purpose of initiating the student into right principles of design. It cannot be too often insisted upon that the right study of old work is the bed-rock of design. Here and there the walls of the exhibition-room are marred by the designs of those students who think they know better, who make the mistake of fancying that the study of other people's work is a form of cribbing, and that what is effective at the present day is originality. Originality must be based upon a firm foundation. It is, in fact, necessary to know what other people know about building before giving attention to being original. Mr. Horsnell's designs comprise a grammar school and a police-station. In subjects such as these there is no limit to imaginative scope, but the imagination should be put into the plan, not the elevation. The possibilities and combinations that reveal themselves in planning are a revelation to the student who faces the problem in earnest, and with a properly-arranged plan the elevations solve themselves with little difficulty. Mr. Horsnell's one weakness, which will give him ever-recurring trouble if he does not master it, is drawing ornament; both the large and small scale drawings show carelessness in this respect. Some day, perhaps, the Architectural Association will be able to form classes for drawing from the life, an invaluable aid to drawing architectural ornament and in learning proportion.

The silver medal and 10 guineas is this year offered for the design for a seaside cottage hospital, with very disappointing results. No one seems to have really solved the problem or to have produced a design that one would care to see carried out. "Nero" shows the best plan, and realises that the important part of a hospital are the internal arrangement of wards, operating-room, lavatories, and staff offices, etc. Even so the kitchen and scullery, though rightly placed, are totally inadequate for the work required of them. The most astonishing design is that of "Briar-meade." "Briar-meade" has done what every student should do; he has mastered the principles of drainage. That being done, however, it is sufficient to have the drainage question at the back of your mind when planning a building; it is not desirable to lay out the lines of your drains first and plan your building around them. "Cranleigh," on the other hand, errs by giving prominence to a drainage system showing, not complete ignorance, but the most pernicious faults; in other respects this design has defects, but many merits. The Banister-Fletcher Bursary attracts one competitor; Mr. P. Herbert Keys sends a fine set of drawings in six strainers of Morden College, Blackheath. The details are very carefully shown; and when, as in this case, they are treated as working detail drawings, it is better not to repeat contours of mouldings or balusters. It is a pity that such strong line drawings should have been coloured. If colour is desired, it is best to use indelible waterproof brown ink for lining-in with.

A good deal of interest attaches to the exhibition of class designs, which show much good work, and promise well for the future.

#### ARCHÆOLOGICAL DISCOVERIES.

**DORCHESTER.**—A Roman mosaic floor has just been discovered at Dorchester. During the past few years several finds of this character have been made. The latest relic of the Roman settlement at Dorchester has been found in the heart of the borough, on the site of a new school-room in Durngate-street. The floor is about 12 yds. square, and, as far as it has been disclosed, is in a perfect condition of preservation. The design is unusually elaborate, vases, serpents, leaves, etc., entering into the scheme. The tesserae are small and of four colours in quite unusual combination—red, blue, white, and yellow. The floor is probably the best of the many that have been found in a town so rich in Roman remains.—*Times*.

**DOVER.**—While excavating in the Market-square at Dover for the foundation of a new building an interesting archaeological discovery was made, the ruins of the east end of an ancient church being disclosed. They have been traced as part of the ancient church of St. Peter, which, in the XIIth century, was connected with the Priory of St. Martin.

#### FIRE PROTECTION IN LONDON.

SIR HENRY AUBREY FLETCHER'S Select Committee of the House of Commons commenced their consideration of the clauses of the London Building Acts (Amendment) Bill on Thursday of last week, the preamble of the Bill having been passed by the Committee on the preceding Tuesday.

The following is a summary of the principal clauses as amended:—

Clause 96.—On this clause, which provides that the Act shall apply to all buildings in which more than twenty persons reside, Sir Ralph Littler, K.C. (for the City Corporation), asked that the clause should be struck out entirely. He contended that clause 105 was sufficient.

Lord Robert Cecil, K.C. (for the associated land-owners), asked that "forty" should be substituted for "twenty."

After a long discussion, the Chairman said that the Committee had agreed that the figure should remain at twenty.

Ultimately, on the application of Mr. C. C. Hutchinson (for the General Storekeepers and others), the Hon. J. D. Fitzgerald (for the promoters) agreed that the clause should be amended as follows:—

(1) "Every new building (not being a dwelling-house to be occupied as such by not more than one family) in which sleeping accommodation is provided for more than twenty persons, or which may be occupied by more than twenty persons, shall be provided with such means of escape therefrom in case of fire as can reasonably be required under the circumstances of the case."

The Committee agreed to this form of wording of subsection (1).

Among the amendments to the clause which had been submitted by the County Council was a provision that the Council should have power to refuse to approve of the plans of such means of escape at any time within two months after the deposit of the plans.

Lord Robert Cecil, K.C., said that the proposed delay of two months was excessive. He asked that the Committee should limit the period to three weeks.

The Hon. J. D. Fitzgerald said that the Council did not wish to delay the approval of plans.

Mr. Freeman, K.C. (for certain bankers and mercantile houses), suggested that the period should be one month; and after considering the matter the Committee agreed to this, providing that during the recess the period should be extended to two months.

On Friday, July 7, the Committee considered the question of appeal under clause 96, which was raised by Lord Robert Cecil, and, after a lengthy discussion, decided that no appeal should be granted under this clause.

On clause 97, which provides that "From and after the first day of January, 1907, the owner of any existing building which is, etc., etc., shall, within six weeks after being required in writing by the Council so



to do, deposit at the County Hall plans showing the extent and height of such building in its several parts and the means of escape therefrom in case of fire, etc.," Mr. H. H. Collins (District Surveyor for the Eastern Division of the City of London) was called. He said that, in his opinion, the clause was much too elastic. It imposed a far more onerous obligation than the sending in of plans for new structures.

After further discussion, the Committee agreed to the clause.

The question of the number of persons provided for in clause 96 again came up, Lord Robert Cecil suggesting that "two families" should be substituted for "one family."

The Committee rejected the amendment. Mr. Pembroke Stephens, K.C. (for the Royal Institute of British Architects), asked that the clause should be limited to the floors above the ground floor, and offered to call evidence.

The Chairman of the Committee intimated that they did not wish to hear any evidence, and the matter was allowed to drop.

The Committee then considered an amendment moved by Mr. Talbot, to the effect that industrial dwellings should be exempted from the operations of the clause, and ultimately refused to grant any such exemption.

On Monday last the question of whether there should be a single arbitrator or whether the existing Tribunal of Appeal should be retained was considered by the Committee.

Mr. Freeman, K.C. (for the bankers, etc.), said that one of the reasons why his clients so strongly desired to have the Tribunal of Appeal instead of a varying arbitrator was that they might have continuity of decision. The questions which came before the Tribunal of Appeal were of the most important character, and in the Tribunal they had this distinct advantage: they had three distinct trained minds; they had an experienced architect, an experienced surveyor, and an experienced barrister. Speaking from the landowners' point of view, the Tribunal had been a very satisfactory Tribunal, indeed, and they were perfectly content that the machinery which had worked so well since 1894 should be applied to the present Act.

Lord Robert Cecil said that he concurred in everything that his friend Mr. Freeman had said. There was one aspect of the case that appeared to him to be of importance. If they had a regularly established Tribunal, always capable of being got at, there would be a considerable increase in the speed of the decisions.

Mr. Castle, K.C. (for the district surveyors), supported the claim for the Tribunal, and

Mr. Lewis Coward, K.C. (for the City companies), also supported the retention of that authority.

Mr. Moon (for the Surveyors' Institution) observed that if arbitrators were appointed it would be found that there would be a great divergence of opinion. A court always controlled proceedings better than a single arbitrator.

Mr. Pembroke Stephens (for the Royal Institute of British Architects), said that he thought that there had been a little misconception about the Tribunal. An idea seemed to have got about that the Secretary of State had said, or implied, something like dissatisfaction with the Tribunal; but this was a mistake. The Secretary of State had said that he was not prepared to undertake the duty of fixing the fees of the arbitrator, and thought that a scale of fees should be provided in the Act itself; and the Secretary of State had further said that the proposal to submit differences to the decision of a single arbitrator appeared to be a better mode of procedure than that laid down in the Factory Act, which empowered each party to appoint its own arbitrator, and in cases of difference an umpire in addition. "The method has been found in working to be somewhat cumbrous and expensive," said the Report of the Secretary of State. Learned counsel pointed out that that was only a comparison of the present proposal with the machinery of the Act of 1901; not a word was said about the Tribunal of 1894.

The Hon. J. D. Fitzgerald then addressed the Committee on behalf of the London County Council. He said that the Council was not asking the Committee

to reverse the decision of 1894. The question was not decided in 1894, and therefore came up now entirely on its merits. By the Act of 1894, the Tribunal, which had come into existence under a previous Act, was re-modelled, but by no means all the was re-modelled, but by no means all the questions arising under the Act were submitted to it. Dangerous structures were referred to arbitration. He asked the Committee to consider the nature of the Tribunal, and how the three gentlemen who constituted it had all to attend on the same day. Further, it was impossible in a Tribunal of that kind, in which two members were surveyors or architects in actual practice, that they should not have in their actual practice to deal with the very questions which arose before them as judges afterwards, and it was very unsatisfactory that persons who were advising their clients one day should be sitting as judges the next day to decide the very same point.

The Chairman: That does not necessarily follow.

Mr. Fitzgerald: It does not necessarily follow, but it follows probably.

Mr. Batty Langley (a member of the Committee): Would not the arbitrator be in the same position? He would be a professional man.

Mr. Fitzgerald: You would have the whole of England to choose from, and it is perfectly well known that there are surveyors of the highest eminence who do not practice in London.

Continuing, counsel said that he desired to avoid anything like a personal question, but it so happened that one of the existing members of the Tribunal of Appeal was the surveyor to one of the petitioners against the Bill—the surveyor to the Goldsmiths' Company.

Mr. Lewis Coward, K.C., protested that this was an attack upon the City companies, but

Mr. Fitzgerald said that it was nothing of the kind. All he intended to show was that when two gentlemen who were in considerable practice in London were appointed on the Tribunal such a case as he had mentioned could not be avoided.

After hearing Mr. Moon for the Surveyors' Institution,

The Committee decided in favour of the Tribunal of three, and, in reply to the Chairman, Mr. Fitzgerald said that he should like to think over the question of whether the Council would retain the existing Tribunal.

Having consulted with his clients, learned counsel said that it had been proposed to have a special Tribunal appointed by the Secretary of State.

After some discussion between the various counsel,

The Chairman said that the Committee decided that the Tribunal was to be the same as now exists.

Clause 97a (1) was then agreed to:—"Where any building which is used or adapted to be used as a shop projects for a distance of 7 ft. or more beyond the main front side or rear of any building of which it forms part, and in which any persons are employed or sleep, the projecting portion of such shop shall be provided with a roof constructed of fire-resisting materials no less than 5 in. thick, and such reasonable means of escape as the Council may require shall be provided for such building."

On the question of the skylights, etc., in such roofs, it was agreed that fireproof glass should come under the schedule, and the words limiting the extent of such skylights to one-tenth of the whole roof were struck out.

On Tuesday the Committee decided to adopt an amendment submitted by the London County Council to clause 97a, so that subsection 5 should read:—"The provisions of this section shall extend and apply as well to existing as to new buildings."

Clause 105 was then agreed to:—"(1) (a) Every existing building other than a dwelling-house occupied as such by not more than two families and (b) every new building shall, if having more than two stories above the ground story or if exceeding 30 ft. in height, be provided (unless and except so far as the Council otherwise allow) with either—

(a) A dormer window or a door opening in a suitable position approved by the district

surveyor on to the roof with proper access thereto; or

(b) A trap-door covered with copper or zinc, and hung on hinges so as to admit of the same opening to the fullest extent, and furnished with a counter-weight so as to ensure that the same shall open automatically when unfastened, and also with a fixed hinged step-ladder leading to the roof; or

(c) Other proper means of access to the roof, and with a sufficient parapet or guard-rail where necessary to prevent persons slipping off the roof. Any dormer window or trap-door provided under this subsection shall only be fastened in such a manner as to ensure access to the roof being always readily available from the inside of the building."

The clause also contains provision that the district surveyor shall serve notice requiring conformity with the provisions of the section.

#### THE BRITISH ASSOCIATION OF WATERWORKS ENGINEERS.

A CONGRESS of the British Association of Waterworks Engineers was opened at Hastings on the 29th ult., when about 200 members and friends assembled at the Town Hall. The Mayor, in welcoming the visitors, thanked the Association for having selected Hastings for their annual meeting.

Mr. F. J. Bancroft, B.Sc., the retiring President, then congratulated Mr. F. H. Palmer, Borough and Water Engineer, Hastings, upon his election as President of the Association for the ensuing year.

Mr. Palmer then took possession of the chair and proposed a vote of thanks to the retiring President. This was unanimously carried, and, after formal business had been transacted, the newly-elected President gave his inaugural address. In this Mr. Palmer treated a variety of subjects. He spoke of the desirability of frequent analysis of water supplied to the public, of filtration, the study of geology, the unsatisfactory state of the law relating to underground water, the immense waste of water in almost every town, the installation of waste meters, the sale of water by measure, etc. In Hastings, he said, waste meters had been installed and found that thorough inspections of fittings made, with the result that the consumption was not more than 20 gals. per head of the population for all purposes. A return given by Mr. T. Duncanson, C.E., in 1894, gave the consumption of a few large towns as follows:—Bradford, 38.40 gals. per head; Winchester, 24; Birmingham, 26; Glasgow, 52; St. Helens, 36.41; Swansea, 27; Liverpool, 27; and London, 31.—The President having been thanked for his address, the company adjourned to the Albany Hotel, where they were entertained by the Mayor to lunch.

The meeting at the Town Hall was resumed at 3.30. The subject of the first paper was "The Relationship between Capital, Working Expenses, Revenue, etc., of Waterworks Undertakings," by Mr. G. O. H. Kloppe, of London. The paper consisted of a number of ideas as to the rating of premises for water, and the suggestion that all premises, houses, shops, etc., should be supplied by meter. Upon this there was a keen discussion. It was pointed out that if certain classes had to pay for their water the sanitary condition would get into a rather hopeless state. If such a system were adopted small rated houses would have to pay double, treble, and, in some cases, quadruple for their water compared with what they pay now, or, in other words, highly-rated property paid at the rate of considerably more than they used, and they had to pay for the poorer property.

The next paper read was "Extensions at the Wallasey Waterworks," written by Mr. J. H. Crowther, and read by the Secretary. It dealt principally with a description of the works. The third paper was by Mr. E. Dewar, A.M. Inst. C.E., on "Steel and Concrete Construction at the Antwerp Works." In the evening Mr. H. F. Cheshire (Borough Analyst) gave a lecture, with numerous experiments, on "Oxidation and Corrosion." Mr. Palmer was in the chair, and mentioned that this subject was of particular interest in Hastings, where they were greatly troubled with corrosion. The iron in the water of the Borough corroded and rotted the iron pipes as quickly



as any water, and they consequently had a great deal of trouble with the pipes.

On the second day of the Congress, Mr. E. Devonshire, A.M.Inst.C.E., of London, read a paper giving an elaborate description of the construction of a covered reservoir recently completed by the Antwerp Waterworks Company at their new pumping station at Layhagen, which cost 4,476l. The water capacity of the reservoir, including the culvert, was slightly over 7,600 cubic metres or 1,672,000 gals. The cost, therefore, worked out at 2l. 15s. 9d. per 1,000 gals. capacity. The reservoir was commenced on May 15th, 1904, and finished six months later.

An interesting discussion followed. Mr. Matthews, of Southampton, thought the main points in the paper were the extraordinary lightness of construction, and the marvellous cheapness of the reservoir. He could not call to mind any reservoir which had been built at such a low figure, and in so short a time, holding as it did about a million and a half gallons of water.

The Secretary (Mr. Percy Griffith) and others wanted to know how far the low price was governed by the method of construction, and how far by the cost of labour in Belgium as compared with this country.

One speaker took up the cudgels for the profession, asserting that this should not go out to the world as a typical price for a reservoir of this kind. All the conditions in Belgium were so different.

The author of the paper admitted that the low price of this reservoir was considerably governed by the labour in Belgium—the foreign labour. With English trades unions they could not get concrete renderings at anything like the price quoted by the Belgian contractor.

At the conclusion, Mr. Saintry, of Windsor, moved a vote of thanks to the Mayor and Corporation. They were also greatly indebted to the Corporation for the use of the Town Hall.

Mr. Stigöes, of Dover, seconded, and the motion was carried unanimously. Similar compliments were paid to the President for his arrangements for the reception and comfort of the Association, also to the authors of the papers and the officers and Council of the Association.

After luncheon the engineers visited the Fishham pumping station, the West Hill, Newgate, and Fairlight reservoirs.

The annual dinner was held at the Albany Hotel in the evening.—*Sussex Daily News*.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 8,830l. for electric light installation; Bermondsey Borough Council 6,796l. for electric light installation; Camberwell Borough Council 1,156l. for street improvements; Finsbury Borough Council 2,636l. for street improvements; and Lewisham Borough Council 2,500l. for purchase of land for depot.

**Claybury Asylum: Hot-water System.**—The Asylums Committee recommended:—

(a) That the estimate of 5,100l. submitted by the Finance Committee, being the amount required in respect of the rearrangement of the system of hot water supply at the Claybury Asylum, be approved.

(b) That expenditure not exceeding 5,100l. be authorised in respect of the rearrangement of the system of hot water supply at Claybury Asylum.

(c) That the expenditure of a sum not exceeding 200l. on maintenance account in connexion with the rearrangement of the system of hot water supply at the Claybury Asylum be sanctioned.

**Tramways.**—Mr. Allen Baker, in reply to questions, said unfortunately there was not sufficient power available to increase the electric tram service between Brixton and Waterloo. If there was sufficient power, the committee could utilise at least an additional sixty cars.

The Council adopted a recommendation from the Highways Committee that the sum of 15,500l. should be expended in placing covers on 150 of the Council's electric cars. An estimate of 19,000l. was also adopted for the construction, for the underground conduit system of electric traction, of the tramways from the existing lines in Theobald's-road, and the tramway subway, to the Strand.

#### Unemployed Workmen Bill, 1905.—The Parliamentary Committee reported as follows:—

"We report that, at the request of a number of Metropolitan Borough Councils and London Boards of Guardians, and under the authority given to us by the Council on June 6 (p. 2,317), a conference was convened at the County Hall on Monday, July 3, 1905, to consider the provisions of the Unemployed Workmen Bill now before Parliament, the object being to secure uniformity of action being taken with regard to such Bill. Delegates were appointed by the Council and the City Corporation, and by twenty-two of the Metropolitan Borough Councils, and by twenty-eight of the Boards of Guardians to attend the conference, and of these fifty-two authorities, forty-nine were represented at the meeting.

The resolutions which were passed at the conference are as follows:—

(1) That this conference is of opinion that, whilst legislation on the subject of the unemployed is urgently needed and should place the cost on national and not on local funds, it is desirable that the Unemployed Workmen Bill, 1905, should be substantially amended.

(2) That this conference is of opinion that the Unemployed Workmen Bill, 1905, should be made compulsory throughout the country, as well as in London.

(3) That this conference objects to the provisions of the Unemployed Workmen Bill, 1905, in so far as they create thirty additional authorities in London, thus adding to the existing complications of local administration in the metropolis, and in so far also as they confer a power of rating, although limited, upon an indirectly elected authority.

(4) That the words 'farm colonies' be omitted from the Bill, and that the words 'labour colonies' be substituted therefor, and other consequential alterations made in the Bill.

(5) That a copy of the resolutions passed at this conference be sent to the Prime Minister and the President of the Local Government Board, and that this conference do now adjourn.

(6) That the figures of the voting be also sent to the Prime Minister and others to whom the resolutions are sent.

The authorities concerned have been informed that the decisions at which the conference arrived have been communicated to the Prime Minister and the President of the Local Government Board."

**London Building Acts (Amendment) Bill, 1905; City of London (Means of Escape from Fire) Bill, 1905.**—The same committee reported:—

"We report that the Select Committee of the House of Commons, presided over by Sir Henry Aubrey-Fletcher, Bart., has, after an inquiry extending over fourteen days, found the preamble of the City Bill not proved, and the preamble of the Council Bill proved so far as it relates to means of escape from fire.

The decision will entail the omission from the Bill of clauses 101 (separation of buildings with fire-resisting materials); 103 (prohibiting cavities being left between boarding and paneling and walls); 104 (as to the construction of lift shafts); and 106 (providing for the prevention or spread of fire in connexion with windows and openings). The committee is now sitting to consider the amendments to the remaining clauses of the Bill proposed by the Council and by the opponents."

**The Avenue Theatre.**—On the recommendation of the Theatres and Music Halls Committee plans, submitted by Messrs. Blow & Billerey, showing a proposal to reconstruct the auditorium at the Avenue Theatre, were agreed to.

The Council, having transacted other business, adjourned.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

**Clapham.**—A two-story building on land at the rear of Nos. 20, 22, 24, and 26, St. John's-road, Battersea, with external walls at less than the prescribed distance from the centre of a roadway leading out of the south side of St. John's-hill (Mr. E. S. Barr for Messrs. Hillier & Parker).—Consent.

**Lewisham.**—That an order be issued to Messrs. Owen & Ward, sanctioning the formation or laying out of a new street for foot traffic only, to lead out of the east side of High-street, Lewisham, to the north side of Limes-grove (for Mr. W. Stephens).—Consent.

**Hackney, North.**—Buildings on a site on the north side of Manor-road, Stoke Newington, between Nos. 4 and the Great Eastern Railway (Messrs. Turner & Holditch for Mr. F. Matthews).—Consent.

#### Lines of Frontage and Projections.

**Lewisham.**—One-story shops upon part of the forecourts of Nos. 5, 7, 21, 23, and 25, Rushey-green, Catford (Mr. A. L. Guy for Mr. C. Atkins and Mrs. Duffin).—Consent.

**Finsbury, Central.**—Buildings at Nos. 2 to 5, and Nos. 12 to 20 (inclusive), White Lion-street, Pentonville (Mr. T. H. Watson for Captain F. T. Penton).—Consent.

**Marylebone, East.**—The retention of an iron

and glass shelter over the entrance to the Wharncliffe Rooms, Hotel Great Central, on the east side of Harwood-avenue, Marylebone-road, St. Marylebone (Messrs. J. W. Singer & Sons, Limited, for the Fredericks Hotels, Limited).—Consent.

**Paddington, South.**—The retention of a projecting pent roof at No. 2, Frederick-mews, Connaught-square, Paddington (Messrs. F. Kidner & Son).—Refused.

**Wandsworth.**—A house on the western side of Braxted-park, Wandsworth, to abut also upon the northern side of Baldry-gardens (Mr. F. E. Boulting).—Refused.

#### Width of Way.

**Hampstead.**—Retention of an iron fire-escape staircase at the Hampstead Hospital, Haverstock-hill, Hampstead (Messrs. Young & Hall for the council of the hospital).—Consent.

#### Width of Way and Frontage.

**St. Pancras, North.**—That the application of Mr. G. H. Greatback, for an extension of the period within which the erection of a building upon the site of Nos. 9, 11, 13, 15, and 17, Highgate-road, St. Pancras, to abut also upon Greenwood-place, was required to be commenced, be granted.—Consent.

**Hackney, North.**—Five houses with bay windows on the northern side of Harrington-hill, Hackney, to abut also upon Ivy-terrace (Mr. W. Stone for Mr. J. L. Siggins).—Refused.

**Width of Way, Line of Frontage, and Space at the Rear.**

**Kennington.**—A workshop on the northern side of Richmond-terrace, Clapham-road, Kennington, westward of No. 90, Clapham-road, (Messrs. J. A. J. Woodward & Sons for Mr. C. Blatchford).—Refused.

**Width of Way, Line of Frontage, and Construction.**

**City of London.**—An iron, brick, and concrete gangway connecting the second floors of the premises of the Standard newspaper on the east and west sides of Shoe-lane, City (Messrs. Young & Hall for the proprietors of the Standard newspaper).—Consent.

#### Formation of Streets, etc.

**Bethnal Green, South-West.**—That an order be issued to Mr. A. P. Stokes, refusing to sanction the adaptation of a street for foot traffic only of a way known as "Reuben-street," out of the east side of Brady-street, Bethnal-green, the formation of a street for foot traffic only out of the south side of such "Reuben-street," and the erection of buildings at No. 108, Brady-street (for Mrs. E. Seward and Mr. R. W. Seward).—Refused.

#### Space at Rear.

**Strand.**—A modification of the provisions of section 41 of the Act, with regard to open spaces about buildings, so far as relates to the proposed erection of an addition to the Café Monico, Piccadilly-circus (Mr. W. J. Kemp for Messrs. G. & B. Monico).—Consent.

#### Working Class Dwellings.

**Norwood.**—A deviation from the plans approved for the erection of blocks of working class dwellings on a site on the western side of Brixton-hill, Norwood, northward of No. 176, so far as relates to the position of the three rear blocks (Mr. R. Robertson for the Housing of the Working Classes Committee).—Consent.

**Means of Escape From the Top of High Buildings.**

**Paddington, South.**—That Mr. B. S. Jacobs be informed that the Council has considered the drawings submitted by him on behalf of Messrs. Lewis & Co., showing the means of escape in case of fire, proposed to be provided in pursuance of section 63 of the Act, on the seventh (top) and sixth stories of Block C, Moscow-court, Moscow-road, Bayswater.—Consent.

**Alterations to Buildings and Means of Escape at Top of High Buildings.**

**City.**—Uniting Nos. 18 and 20, Bishopsgate-street Within by an opening at the first floor level (Mr. C. J. Jones for the Bank of Scotland).—Consent.

The recommendations marked † are contrary to the views of the local authority.

**RESTORATION OF THE CHURCH, MARTINTOWN, DOBESHIRE.**—It is proposed to carry out some necessary works of repair at this church, Mr. C. E. Ponting, F.S.A., of Marlborough, the Diocesan Architect, has, at the request of the Building Committee, made a thorough examination of the church, and he reports that there is a good wagon roof under the present dilapidated plaster ceiling, and it is hoped that sufficient funds will be raised to open up this roof and to recover the outside, which is in a very bad state of repair. The north aisle is in a dangerous condition, as the wall is 13 in. out of the perpendicular, and the foundations are very unsafe. The beams of the roof in this aisle are in many places without any support, and the pillars of the cornices are out of the true. These dilapidations require immediate attention. The whole of the roof will have to be recovered, and the north aisle will require to be under-pinned.—*Dorset County Chronicle*.



## ARCHITECTURAL SOCIETIES.

**MANCHESTER SOCIETY OF ARCHITECTS.**—On Saturday, July 1, the members of the Manchester Society of Architects visited two recently-built houses at Knutsford. Bexton Croft, for Mr. D. Macpherson (Mr. M. H. Baillie Scott, architect), is a simply-designed house, built with a keen appreciation of the value of the picturesque. The external grouping is very delightful, particularly the entrance front as seen from the road, and the garden is nicely treated. Internally one occasionally feels a little doubt whether the "quaintness" is not too insistent; but the general charm of effect overcomes the doubt. Woodgarth, for Mr. George Wragge (Messrs. Thos. and Percy Worthington, architects), has great architectural charm, and possesses a quiet quality of picturesqueness which is very pleasing. The happiest bit of grouping is the garden front, close to the edge of an old sand-pit, containing a tennis lawn and a circular pergola. Internally the general restraint adds to the decorative value of the coloured modelled plaster, tiles, and metal-work. Afterwards some sketches were made of Bexton Hall, a simple old red-brick farmhouse, with a certain stateliness in its symmetrical front crowned by a large octagonal lantern, and approached through an enclosed forecourt. The Society has also made an evening visit to Oldham to see additions to two houses for Mr. William and Mr. James Dronsfield (Mr. J. Henry Sellers, architect). In their breadth of effect and refinement of detail these are very successful. The gatepiers to one house seemed to be a natural outcome of the site in their sturdy massiveness, while internally in both houses there was much interesting design in marble mantelpieces and wood inlay to furniture and flooring.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—The annual excursion of this Association took place on Saturday last week, when a party of members and friends travelled by saloon carriage to Dunkeld. After being served with lunch at the Birmah Hotel, the party proceeded to Dunkeld Cathedral, where the Chapter House was visited by special permission of the Duke of Atholl, and under the leadership of Mr. Charles McLaren. The members were then driven to Murthly Castle, permission having been granted by Mr. Steuart Fotheringham. In the absence of the factor, Mr. W. A. Rae, the architect on the estate, Mr. Duncan, acted as leader. After looking at the new castle, an unfinished Jacobean edifice of great size, a walk through the gardens took the party to the old castle and the St. Anthony's Chapel. After leaving Murthly the drive was continued to Stobhall, which was visited by permission of Lord Ancaster. Mr. George T. Ewing, architect, acted as leader over this group of buildings, which consist of castle, chapel, priest's house, and dovery house. The members were entertained in the dovery house, and then walked down the banks of the Tay, past the Linn of Campsie, across the ferry, and thence to Stanley Railway-station, where train was taken to Perth. On arrival at Perth dinner was served at the Station Hotel. Mr. Harold O. Tarbolton, the President, occupied the chair, and at the conclusion of the dinner proposed votes of thanks to those who had contributed to the day's enjoyment by granting permission to visit, or acting as leaders. Mr. Colin B. Cowrie, hon. secretary, was also thanked for the satisfactory nature of the arrangements which he had made for the excursion.

**DEVON AND EXETER ARCHITECTURAL SOCIETY.**—On Saturday last week members of the Devon and Exeter Architectural Society visited the new Britannia Royal Naval College at Dartmouth. On arrival the party was entertained at luncheon at the Castle Hotel by the architect of the building, Sir Aston Webb. The loyal toast having been honoured, the President (Mr. B. Priestley Shires), in proposing the toast of "Our Host," said many remembered the pleasant time nearly two years ago they spent with Sir Aston Webb in inspecting one of his interesting works. Sir Aston Webb was then kind enough to say he would be pleased to show the members over the works in their more completed form. That promise had never been lost sight of by them, and that day it was their privilege to visit the college a second time. One and all were delighted to

hear that the honour of knighthood had been conferred on him, and that he had also been presented with the Royal Gold Medal for 1905, given by King Edward VII., upon the recommendation of the Royal Institute of British Architects. Sir Aston Webb, in response, said it gave him great pleasure to respond, and to redeem his promise to show the members over the college a second time. He felt it to be a good thing to have the friendly criticism of his brother architects on his work. The party then proceeded to the college, which was inspected under the guidance of Sir Aston Webb, who pointed out the main features and details of his work, is now nearing completion. The building is situated on an eminence overlooking the harbour. It is about 800 ft. long, and has in the centre a large hall for the school, in the cadets, with classrooms on each side, in which they will carry on the chapel. At one end of the large dining-hall. The hospital is separated from the main college, with doctor's residence, and there is also an open swimming bath, workshops, etc. After the inspection the members were entertained at tea by Sir Aston Webb in the large dining-hall of the college. At the conclusion the President (Mr. B. Priestley Shires) accorded Sir Aston Webb a very cordial vote of thanks. The members then dispersed.

## Books.

*The Annual of the British School at Athens.* No. X. Session 1903-1904. London: Macmillan & Co.

The splendid work carried out by the British School at Athens during the 1903-04 session is summarised in the very interesting Annual before us. Founded in 1886 to give British students of Greek archaeology and art the opportunity of pursuing their researches in Greek itself, with command of the means which the recent great advances of the science have rendered indispensable, the school has met with the success which it deserved. As its prospectus observes, "Athens is now an archaeological centre of the first rank. The architecture of Greece can nowhere else be studied to such advantage." With the command of an adequate library and "the advice of a trained archaeologist residing on the spot," it might well be expected that discoveries, both numerous and important, would be made, and the present Annual, with its essays and illustrations, is clear proof that such is indeed the case. Moreover, the work done is by no means confined to the environs of Athens, more than one paper in the volume before us treating of discoveries in Crete.

Some sixty pages are taken up by Dr. A. J. Evans's account of the excavations at Knossos. "The fifth campaign on the palace site of Knossos," he says, "had a two-fold object:—(1) the continued exploration of the palace itself; (2) the further investigation of dependencies lying beyond what may be called the inner enclosure." It was found necessary to carry the excavations to a depth in some places of about 14 metres. The great interest of the palace lies in the fact of there being remains of more than one structure on the same spot. A "later palace" was superimposed upon the ruins of earlier buildings, and as a result of the work of Dr. Evans and his colleagues there appear to be "five distinct phases of culture that separated the initial stage of the later palace from the latest neolithic deposit." In addition to work in the palace itself, a "Minoan" roadway paved with fine slabs has been traced running westwards for a distance of over 230 metres. As the pavement lay at a depth of about 20 ft. below the surface, it will be understood what difficulties Dr. Evans and his workers had to overcome. The discovery of a Minoan cemetery and royal tomb must also be laid to Dr. Evans's credit. In the palace itself a quantity of fragments representing the artistic and architectural work of several periods have been unearthed; fragments of painted stucco, *pithei* or jars, some "knobbed," some painted, pieces of miniature frescoes, clay sealings, all have been found. Dr. Evans, moreover, sees a religious element in most of the wall decorations, and, from the very varying character of the

remains and the position in which they were discovered, has been enabled to sketch a rough history of the different palaces. His essay, with the accompanying diagrams and illustrations, makes very interesting reading.

Mr. Tod contributes notes on a series of inscriptions recording "the victories won by teams of Spartan ball-players." We are told that "the competitors took part, not as individuals, but as representatives of divisions of the Spartan State." These tests took place annually, and were not deemed regarded with that interest which is accorded at the present time in England to our modern athletic pastimes.

Grotesques and their probable charms against the evil eye are considered in a paper by Mr. Wace, who contributed some interesting information on the same subject in last year's annual. Some of these grotesques are in bronze, others in terra cotta, and the nature of their origin is somewhat obscure. Some came from Egypt, some from Asia Minor, others from South Russia, Greece proper, and Italy. The terra-cotta figures are superior in artistic qualities to the bronzes. It seems reasonable, in view of certain of their characteristics, to agree with Mr. Wace in thinking that the majority were used as charms. Many of these "figurines" the author would regard as caricatures. The subject of belief in the evil eye in antiquity is an interesting one, and suggests, perhaps, an explanation of certain points at present not wholly understood.

A third Eteocretan fragment, in the form of the "Neiker Inscription," is treated of by Mr. Conway, and this is followed by a paper in German on old Egyptian agriculture implements from the pen of Dr. Schäfer. To this latter is appended a short note on the Mystica Vannus Iacchi, by Miss Harrison of Cambridge.

Two articles on south-western Laconia, one geographical, the other dealing with the various inscriptions which have been brought to light, allow Mr. Forster to summarise briefly his work in that district. Numerous discoveries have been made in and near the town of Gytheion, and, as the author remarks, "the existing inscriptions" are numerous enough to show that throughout the last three centuries B.C. and the first two centuries A.D. Gytheion still maintained some of the prosperity which it had enjoyed as the port of a dominant Greek State. The later histories of many Greek towns, such as was Gytheion in its prime, are of great interest to others beside archaeologists; and the most insignificant inscription is a find of value, inasmuch as it may add a link in the chain of reconstruction.

The director of the school, Mr. R. C. Bosanquet, contributes a short note on the monastery of Daou. Mr. Dawkins, who is an earlier part of the volume continues his notes from Karpachos in a discussion concerning its dialect, also writes on further excavations at Palaikastro, in Crete. The section on nomenclature makes clear a number of points which might otherwise be missed by the average reader. Here, as at Knossos, vases of the "Minoan" or Cretan bronze age, as well as geometric ware, rock-crystal, clay doves, and other probable appurtenances of religious ceremonies have been found. Mr. Curdell adds a note on the "larnax-burials"—troughs of clay, of which some resemble nothing so much as a modern foot-bath. Within these troughs have been found human remains.

The Annual also contains a report of the proceedings at the opening of the Penrose Memorial Library at Athens. Beside numerous illustrations, there are also included four plates, one of which is a key-plan of Palaikastro by Mr. Heaton Comp. the holder of the architectural studentship of the school and the designer of the Penrose Library. The Annual reflects every credit on its editor.

*A Handbook for Superintendents of Construction, Builders, and Building Inspectors* by H. G. RICHY, Superintendent of Construction U.S. Public Buildings; Author of "Richey's Guide and Assistant for Carpenters and Mechanics." First Edition. Third Thousand. New York: John Wiley & Sons. London: Chapman & Hall, Ltd. 1905.

This book is primarily addressed to the superintendent of construction, a term which may



correctly indicates the duties of that useful functionary than the familiar designation "clerk of works." But a large proportion of its contents will be found equally useful to the architect and the builder, especially as handbooks on building construction represent a department of technical literature to which comparatively little attention has been paid in this country. We do not mean, of course, that there is any lack of excellent treatises on this subject, but rather of those compendious yet convenient-sized books—such as are published for different branches of engineering—which can be carried in the pocket or kept on the desk for daily reference. Mr. Richey appears to possess personal qualifications for the authorship of many subjects considered in his handbook, for, with the eclecticism of the American, he has been a carpenter, a contractor, and an architect, and now occupies a Government appointment as Superintendent of Construction for United States Public Buildings. Moreover, his own knowledge has been supplemented by reference to several standard works, a list of which is given immediately after the Preface. As the handbook comprises nearly 700 pages of closely-printed letterpress we cannot dwell in detail upon its contents, and further, as the material selected consists of facts rather than opinions there is not much occasion for criticism beyond a few brief comments upon the manner in which the author has realised the excellent intention of his work.

The sequence of treatment is distinctly good, and the subjects included fall naturally into three main divisions which, however, are not indicated by Mr. Richey. In the first division he deals chiefly with the foundations, shells, and floors of buildings, in the second with interior fittings, and equipment, and in the third with familiar geometrical problems, engineering formulae, and miscellaneous data.

Part I. contains a good epitome of foundation work as practised in the United States and detailed particulars relative to building stones, but the latter are of no practical service to British readers. In Part II., the paragraphs on "Stone-cutting" and "Stone-setting" deserve special notice, as also does a paragraph on "Bricklaying" wherein the author shows that he is well acquainted with various sins of omission favoured by indifferent workmen in the United States, and we are sorry to say, not unknown in this country. Several pages in this Part are devoted to the building regulations of American cities and are only interesting on this side of the Atlantic for purposes of comparison.

Part III. is quite a complete little treatise on lime, cement, mortar, and concrete, and the information appears to be generally up-to-date. This part also contains an excellent *résumé* of modern fire-resisting floor construction, including brief accounts of some systems of concrete-steel as applied to such work, and concludes with a summary of suggestions from various sources relative to the fire protection of buildings, among these being an extract from the address delivered by Mr. John R. Freeman to the National Board of Fire Underwriters, New York. Part IV. deals first with such matters as lathing, plastering, and carpentry, then with sheet metal work, painting, glazing, and paper-hanging; next with constructional iron work in some detail, and finally with electric wiring and heating systems. This Part, like the rest of the book, has been compiled in a very conscientious manner, and, with the exception of certain local data, ought to be extremely useful to architects and building contractors. Part V., commencing with various geometrical problems occurring in connexion with architectural drawing, describes and illustrates the elements of architecture, and gives numerous mathematical and other useful tables; Part VI. being of similar character.

Being printed on thin paper, the book is by no means bulky, the type is large and clear enough to be read with perfect ease, and the numerous illustrations are, without exception, of the kind most acceptable to practical men. Taken as a whole, Mr. Richey's handbook is an excellent production and one which might well serve as a model, if some British architect could be induced to write a similar manual for the benefit of the building profession.

*Houses for the Working Classes.* By Sydney White Cranfield and Henry Ingle Potter, A.A.R.I.B.A. Second edition, revised and enlarged. London: B. T. Batsford. 1904. The illustrations are the principal feature of

this interesting volume. They are contained on twenty-six plates, measuring about 15 in. by 11 in., and include ground-floor and first-floor plans of fifty-two different varieties of houses, ten elevations, a bird's-eye view of some of the houses arranged in terraces, and some details. There are a few houses with a separate tenement on each floor, but nearly all the plans are of two-storied houses. The plans are arranged in groups, three in each group being on similar lines, but differing in detail. It is somewhat strange that no cellars are shown. In many towns the simple plans in group B are most commonly adopted, but the coal-place and "pantry" (or larder) are placed in the basement. In nearly every case the elevation differs from the plans to which it is supposed to refer. Thus in Plate II. the windows of two adjacent houses are grouped together, whereas, according to the plans, such an arrangement could not possibly be adopted; in Plate V. the windows in the elevation differ from the corresponding plans and two of the doors are shown in different positions; Plate VII. shows a two-storied bay, with eaved sides and small windows over the doors, while the plans show a square bay of one story and no windows over the doors; in Plate XIV. the elevation shows a projecting gable, but the corresponding plans give no indication of any projection above the ground floor; and in Plate XXI. the elevation of J2 contains only one chimney-stack, although, according to the plans, three are required. These discrepancies may not be of great importance, but they are somewhat confusing, and it would have been better if they had not been allowed to appear. The plans themselves are ingenious and suggestive, and many are really excellent. In nearly every case the position of the fireplace has been carefully considered, but that in the living-room of A3 is an exception. A tabular statement is given, containing a list of the different plans, with the sizes of the principal rooms, the cubical contents, and cost per cubic foot; the authors estimate that the houses can be built by contract in the London district at prices ranging from 55d. to 64d. per cubic foot, and "in the provinces at a considerably lower rate." The illustrations are clear and well drawn, and the volume reflects great credit on the author and publisher.

#### COMPETITIONS.

**TECHNICAL INSTITUTE, ROCHESTER.**—Mr. Frank T. Bagallay, F.R.I.B.A., of 50, Berners-street, London (nominated by the President R.I.B.A.), has been appointed assessor in this competition.

**BYRNMAW SEWERAGE SYSTEM.**—At a meeting of the Byrnmau Urban District Council held on Friday last week the report on the four selected schemes for the disposal of the sewage for Byrnmau was received from the assessors (Messrs. S. H. Cowper Coles, F.S.I., and W. L. Roach, A.M.I.C.E.). On their recommendation the premium of 20l. was awarded to Mr. Walter J. Lomax, A.M.I.C.E., of Bolton and Westminster, for the best prepared scheme. The estimated cost of the works, including 15 per cent. for contingencies and fees, is 4,184l.

**MITCHELL LIBRARY, GLASGOW.**—The design for the new Mitchell Library, to be erected in North-street on the site belonging to the Corporation immediately adjoining St. Andrew's Halls, was selected at the meeting of the Town Council on the 6th inst. The successful competitor is Mr. W. B. White, architect, 219, St. Vincent-street, whose design was placed first in order by the assessors—Mr. A. B. McDonald, the City Engineer; Mr. John Keppie, President of the Glasgow Institute of Architects; and Mr. F. T. Barrett, the librarian. The principal frontage of the building will be to North-street, with the main entrance near to the north end. The style is Renaissance, based on English examples of the XVIIIth century. The principal reading-room will be on the ground floor. It will measure about 120 ft. by 50 ft., and will be lighted entirely from the roof.

**LEYS SCHOOL, CAMBRIDGE.**—Messrs. Drew-Bear, Perks, & Co. ask us to mention that the steelwork in this building, mentioned in our last, was carried out by them.

#### METROPOLITAN ASYLUMS BOARD.

THE usual meeting of the managers was held on Saturday, last week, at the offices, Victoria Embankment, W.C.

**Milfield.**—On the recommendation of the Finance Committee it was agreed that application be made to the Local Government Board for an Order authorising the managers to incur an expenditure not exceeding the sum of 2,950l. in connexion with the adaptation of Milfield for treatment of a special class of children.

**South Eastern Hospital.**—The Works Committee recommended, and it was agreed, that application be made to the Local Government Board for their sanction to the Managers inviting tenders from eight selected firms for the execution of the necessary works in connexion with the installation of electric light, telephones, fire-alarms, etc., at the South-Eastern Hospital, and to the Managers entering into a contract for the execution of such works without, in the first instance, advertising for sealed tenders.

The Hospitals Committee submitted a lengthy report dealing with an examination by Dr. Cameron into the question of return cases of scarlet fever and diphtheria, and stated that the Board's medical superintendents had submitted important recommendations to which consideration would be given. One of the recommendations was "That at one hospital, say the South-Eastern, now in course of rebuilding, two or more wards be divided by glass partitions into separate rooms, and that scarlet fever patients be treated therein on the system of complete isolation during the whole period of detention, so far as that may be found practicable; and that the effect of this procedure on the occurrence of return cases should be carefully observed."

The Committee recommended, and it was agreed, that, subject to the approval of the Local Government Board, the proposed division of two of the new wards at the South-Eastern Hospital into separate rooms, in accordance with the scheme prepared by the architects, Messrs. T. W. Aldwinckle & Son, be approved, and that the Works Committee be requested to take the necessary steps for carrying out the work.

**MASONIC HALL, BALLYMONEY, IRELAND.**—The ceremony of laying the foundation stone of the Vowless Masonic Hall was performed recently by Mr. Wm. Moore, K.C., M.P. The building has been erected from designs prepared by Mr. Albert M'Master, C.E.

**INSURANCE OFFICES, LIVERPOOL.**—The new offices of the State Fire Insurance Company, in Dale-street, Liverpool, have now been completed. The premises are late Gothic in style, and were designed by Mr. W. Aubrey Thomas. The furnishing was carried out by Messrs. Waring & Gillow, Ltd.

**CHURCH, WHITEHEAD, BELFAST.**—The new church erected at Whitehead was opened on the 8th inst. The style of the building is early XIVth century Gothic. The two main entrance doors are grouped under a deeply-recessed and moulded arch, over which rises the main gable window, with geometric stone tracery and mullions. The interior dimensions of the building are 62 ft. long by 50 ft. wide. The gallery extends over the entrance vestibule. The tower, when completed will be 78 ft. above the roadway. The heating of the building is by Musgrave's small bore system, and the artificial lighting plant was erected by the Rosco Acetylene Gas Company, under the supervision of Mr. R. J. Blakely, J.P. The glazing and leaded lights were supplied by Messrs. Clokey & Co., and the gates by Mr. George Jones. Under the supervision of Messrs. J. J. Phillips & Son, architects, Belfast, the building contract was carried out by Mr. Thomas M'Millan, Belfast.

**VILLAGE INSTITUTE, NEWBOROUGH.**—At Newborough, Anglesea, on the 30th ult., the Frichard Jones Village Institute and Cottage Homes were formally dedicated to the public. The site of the institution is on the main road leading from Newborough to Gaerwen. Besides the institute, there are six cottages, three on each side. The principal rooms of the building are arranged on two floors. The principal entrance is in the centre of the main front, and opens directly through glazed swing doors into a hall, on the left of which is the library, with counter and public space for borrowers. Behind the library, opening out of the central hall, is the reading-room. The library is fitted up with bookcases to take 6,500 volumes. On the right of the entrance hall is a large smokers-room, at the rear of which is another reading-room, and behind the staircase are retiring-rooms, lavatories, etc. On the first floor is the assembly-hall, committee-room, ladies' reading-room, cloakrooms, storerooms, and caretakers' living-room, with bedrooms above. The building is in the English domestic style, the ground floor story being of grey granite, with Ruabon stone dressings, the upper part finished half timber. The six cottages or almshouses are one-story high, and are erected to harmonise with the institute. Each comprises a living-room, parlour, bedroom, etc. The work has been carried out by Mr. Hugh Hughes, contractor, of Newborough, from the designs of Mr. Rowland Lloyd Jones, architect, Carnarvon.



## Illustrations.

## SCULPTURE: "THE FINE ARTS."

**T**HIS is a bas-relief in bronze, by Mr. Alfred Drury, exhibited in the Lecture-room at the Royal Academy, and intended to form part of a memorial to Queen Victoria to be erected at Wellington, New Zealand.

## COMPETITION DESIGN FOR WESLEYAN HALL, WESTMINSTER.

We give this week the perspective view of Mr. W. Flockhart's fine design submitted in the second competition for the Wesleyan Hall at Westminster, with a small-scale reproduction of one of the plans as a key to the treatment of the exterior design.

The following extracts from the architect's Report will assist in explaining his intentions in the design:—

"In designing the great hall I have been very careful to observe the wish you have expressed that everyone should be able to see the speaker, and that the floor of the hall should be free from all obstacles, and I feel pretty certain that the form and dimensions I have adopted in my design (based as these are upon the harmonic proportions found to exist in halls of similar character which have proved to be acoustically satisfactory) would result in this instance in a hall in which everyone could hear well as well as see. I have also been very careful, as I believe, to ensure that all rooms, halls, corridors, and staircases would be adequately lighted and ventilated, by direct skylight or by lateral windows opening to the outer air.

From the principal entrance hall in Princes-street access is given to every portion of the building, and I think it will be found that the approaches to the various halls and rooms are abundantly adequate and easily found.

I have arranged these so that it will be possible to hold meetings in the different sections of the building simultaneously, and admission could be given to each individual section without interference with another part, and inasmuch as there are separate exits from each portion, people could leave this building freely and without meeting with any interruption from other portions or sections.

All these exits are taken direct out into the surrounding streets, and I may be excused if I call special attention to the arrange-

ment of these exits as indicated on the plans submitted, as much time and care has been expended in arranging them in an easy and direct manner with a view to the safe and comfortable use of the building and to meet the requirements of the London County Council, whose officials I have consulted in formally in this matter, and I believe I am correct in stating that no difficulty would be met with in obtaining the County Council's licence for the use of this building in the manner contemplated.

With reference to warming and ventilating the building, I stated in my original report that I was rather inclined to favour a natural system as against an artificial or forced one, but, in giving this matter further consideration, and with particular reference to the large hall, I am inclined to think that no system other than that known under the name of Plenum, or some similar artificial arrangement whereby fresh air is warmed and forced into the hall under pressure, would be a satisfactory one, and I would suggest that the large hall, the smaller hall, and the tea-rooms should be so warmed and ventilated. I have shown on a plan an arrangement of fresh-air intake and warm-air ducts under the basement floor, and which will supply warmed air to the various rooms indicated to be warmed by this system. This air would be drawn from a source some height above the ground-level at the north-west corner of the building, and would be warmed by being passed over and between batteries of pipes, heated by hot-water or low-pressure steam, and forced by means of large fans into the channels or ducts under the basement floor, and communicating by flues built in the wall leading into the various sections of the building. Supplementary smaller coils would be placed at the foot of these warm-air shafts to supplement the main batteries as required. Other and separate channels or flues would be taken from the lower level of the various rooms and led up into ventilators placed in the roof at a high level of the building."

The architect gives the estimated cost of the building as 121,911*l.*; taking the tea-rooms at 9*d.* per cubic foot; front part of basement at 10*d.*; entrance hall, committee-rooms, conference-room, staircase, etc., at 1*s.* 6*d.*; reading-room, library, and small hall at 1*s.* 2*d.*; large hall at 9*d.*, or at 10*d.* per sitting; secretaries' flat and church offices, etc., at 10*d.*, and offices for letting purposes at 1*s.*

## THE COTTAGE HOMES, CROYDON.

These Cottage Homes are to be erected for the Croydon Union on a site facing Pawsen's-road, adjacent to the workhouse grounds. The buildings have been designed by Mr. Hatchard Smith, of London, who obtained the first premium in a recent competition. They will be constructed of stock bricks covered with rough-cast, having red brick plinth. The roofs will be tiled with Reading tiles. The ground-floor rooms will have wood block flooring, the upper floors 14-in. deal flooring. The entrance-hall and passages will be paved with mosaic. The walls of porch, lobby, lavatories, and bath-rooms will have glazed brick dados. All joinery will be of deal, painted.

## "DOG AND DOUBLET INN," AND "SOLOM'S WOOD," SURREY.

THESE two houses, shown for convenience on one sheet, are built from the designs of Mr. E. Guy Dawber. Both drawings are exhibited at the Royal Academy. The following is the architect's description of them:—

## DOG AND DOUBLET INN, ETC.

These buildings are now in course of erection around the village green at Sandon. A club and gymnasium, with reading and billiard rooms, has been already built on the opposite side, and these cottages and the inn will thereby complete the formation of the green.

Local materials, oak timbering, and rough-cast, etc., are being used, and the inn will have a courtyard opening on to a garden at the back, the idea being to keep the whole group as simple and unpretentious as possible, and depend upon grouping and proportion for effect.

The entrance lodges to the park have been built some year or two, and are close to the cottages shown in the sketch, so that the whole will form one scheme.

The work is being carried out by the estate workmen, under the supervision of the clerk of works.

## "SOLOM'S WOOD."

This house is now being built, the walls of grey Croyborough bricks, with red dressings to the angles and windows, and rough-cast and tiled roof.

The gardens and terraces, etc., and entrance-lodge are also in hand. The builders are Messrs. Jones & Son, of Sutton.

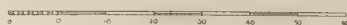
COTTAGE HOMES  
CROYDON

GROUND FLOOR PLAN



FIRST FLOOR PLAN

SCALE OF FEET



## BOOKS RECEIVED.

TRANSACTIONS OF THE SOCIETY OF ENGINEERS: 1904. Edited by Perry F. Nursey, Secretary. (E. & F. N. Spon.)  
HYDRAULIC POWER ENGINEERING. By G. Croydon Marks. Second Edition. (Crosby Lockwood & Son.)

REPAIRS, AND HOW TO MEASURE AND VALUE THEM. By George Stephenson. Fourth Edition. (E. T. Batsford. 3s.)

MODERN LIGHTNING CONDUCTORS; A Supplement to the Report of the Lightning Research Committee. By Killingsworth Hedges, M.Inst.C.E. (Crosby Lockwood & Son. 6s. 6d.)

## The Student's Column.

STEAM BOILERS AND PIPES.—III.  
SELECTION OF BOILER TYPE (continued).

**E**AST week we discussed two main factors governing the selection of a boiler type. We have now to consider the last of the three factors enumerated on p. 44.

(3) The probable ratio of steam output to working and other expenses ought always to be taken into account by the architect as the responsible adviser of the purchaser.

The word "probable" is used advisedly in the foregoing sentence. As a matter of fact, the ratio in question depends far less upon the type of boiler than upon the efficiency or inefficiency of those to whom the management of the plant is committed, the manner in which the boiler is installed, and the extent to which appliances and apparatus for the saving of fuel are applied.

Let us first deal with the relative desirability of different boiler types. For this purpose we may refer again to the series of investigations by Professor Kennedy, Mr. Bryan Donkin, Professor Unwin, and Professor Déry.

As usual in boiler tests, the results recorded by these observers give the quantity of coal consumed per hour as well as other data, of which some are contained in Table II. This it is quite easy to make a comparison of the fuel consumption per pound of water evaporated or per horse-power developed per hour.

For the purpose of arriving at a comparable estimate of the annual cost of fuel for the boilers mentioned in Table II., it is necessary to assume the working conditions to be the same for each installation.

Let us assume the boilers to be in active use for eight hours daily, the fires being banked up at night. Making no deduction for Sundays and other holidays, this basis would give  $365 \times 8 = 2,920$  working hours, or, for the purpose of simplifying computation, say, 3,000 working hours a year.

Adopting this assumption for the twelve boiler tests in Table II., and, taking the cost of coal at 15s. per ton, the annual coal bill for each installation can readily be calculated, as given in column 7 of Table III.

Next, using the values in column 12 of Table I., for the total cost of the various installations—assuming interest on capital expenditure to be at the rate of 4 per cent. per annum, and repayment of capital to be completed in thirty years—the annual charge

in respect of interest and sinking fund can be ascertained for each boiler, as given in column 8 of Table III.

Attendance and maintenance are items upon which no light is thrown by the tests to which we refer, and will be mentioned a little later.

From the expenses given in Table III. the annual cost of fuel and the other charges can be computed per pound of water evaporated per hour or per horse-power developed. The latter basis has been adopted for the calculation of Table IV. Examining the figures in columns 3 and 4 of this table, and those in column 5, representing the sum of these values, it is possible to obtain a general idea of the respective merits of the various installations.

Taking averages, it will be seen that, so far as concerns fuel economy, the watertube boiler comes at the head of the list; Cornish tubular, Cornish, and Lancashire boilers next; and locomotive boilers last. The averages are a little altered by the interest and sinking fund charges, but only in the respect that the Cornish and Cornish tubular types appear to equal advantage.

It must be admitted that the number of tests quoted is too small to justify any sweeping conclusions. Still, so far as they extend the results are valuable for the reason that they are comparable one with another, which certainly cannot be said of numerous published tests by independent observers, owing to the variable methods adopted, the different qualities of coal used, and other causes of divergency.

The cost of attendance is an item that depends very much upon individual circumstances as well as upon the type of boiler employed.

In a general way, it is safe to say that Cornish and Lancashire boilers involve less trouble than watertube, vertical, and tubular boilers. Further, it may be said that Cornish and Lancashire boilers, being of very simple character, do not demand skill of so high an order as most other types. Hence the cost of attendance is comparatively low for Cornish and Lancashire boilers.

It is also the case that, owing to the large volume of water contained in boilers of these types, the time actually spent in stoking is less than that required for watertube, vertical, and tubular boilers. Still, this circumstance is not necessarily a source of economy, because it does not always follow that periods of leisure enjoyed by the fireman will reduce the wages bill. A particular example of this is furnished by an establishment where only one man is required in the boiler-house.

The number of boilers in an installation, the nature of the steam demand, and the character of the establishment wherein steam generators are used are factors directly affecting the cost of management, and there will naturally be a great difference between the charges for attendance in a commercial undertaking and a poor-law institution, where part of the labour can be provided free of expense.

We have seen that Cornish and Lancashire boilers are fully equal to other types in efficiency, and if space permits their employment they are to be preferred for all ordinary work. For some special purposes the watertube type possesses clear recommendations, although, as shown by Table I., it occupies

nearly as much space per pound of steam produced as a Lancashire boiler.

Among the advantages claimed for the watertube boiler are rapidity of circulation and steaming, uniformity of temperature, reduced liability to explosion, and the limitation of explosions to one or more tubes.

But in these boilers the pressure of steam is subject to considerable fluctuations, and ebullition may become excessively violent unless thoroughly efficient and skilled attendance is provided.

The question of maintenance is another matter to be borne in mind when choosing a boiler type. Here, again, everything points to Cornish and Lancashire boilers as the most easy to clean and as requiring the fewest repairs.

Watertube boilers are of complicated construction, the tubes are liable to leak and

TABLE IV.—FUEL, INTEREST, AND SINKING CHARGES PER HORSE-POWER FOR BOILERS IN TABLE III.

No.	Type of Boiler.	Fuel.	Interest and Sinking Fund.	Total.
		£	£	£
1	Cornish .....	3.20	0.81	4.01
2	" .....	4.48	0.48	4.91
3	Lancashire .....	4.12	1.05	5.17
4	" .....	3.94	0.67	4.61
5	Cornish Multitubular .....	3.82	1.19	4.91
6	" .....	3.69	0.83	4.02
7	Locomotive .....	4.25	0.47	4.72
8	" .....	4.22	0.95	5.17
9	" .....	3.82	0.87	4.10
10	" .....	4.29	0.41	4.70
11	W'trtube (De Naeyer) .....	3.58	0.49	4.7
12	" .....	3.73	0.53	4.26

burst, and, although makers point out that repairs can be very speedily executed, experience certainly indicates that they are frequently required. In an establishment like an electricity-generating station, for instance, or in a factory where skilled mechanics are always available, it may be possible to effect such repairs as become necessary without much trouble. In public institutions and buildings where the staff is not qualified to undertake repairs in a satisfactory manner the case is quite different. Further, considerable delay and consequent inconvenience may be caused by the failure of one or two tubes in boilers used in country districts, especially if new parts have to be ordered from the makers.

As for the various types of tubular boilers, it should be noted that these generally require careful watching, and that in default of this such boilers are exceedingly apt to develop faults, causing stoppages of work.

All tubular boilers, including those which represent combinations of the Cornish or Lancashire types with the multitubular form of construction, are difficult to examine and keep in order owing to their cramped design, and the renewal of tubes is an operation necessitating skilled labour, which cannot always be furnished by the regular staff of the establishment in which such boilers are employed.

Taking all things into account, we are justified in the statement that, so far as concerns the ratio of steam production to working expenses, the Cornish and Lancashire types are the most suitable for general adoption.

*Influence of Management on Boiler Efficiency.*—As we have had occasion to refer to the question of attendance in this article, the present is an appropriate place to make a few remarks on the importance of efficient supervision of the operations conducted in the boiler-house. Steam users generally desire to secure economical results, although they frequently fail to take the measures necessary for arriving at this end. In many public institutions we have known the management of steam boilers to be entrusted to firemen having very shadowy notions as to the treatment most likely to result in economy of fuel, and in more than one case we have known the care of a boiler to be vested in a labourer having no previous experience, and having no one to whom to look for instructions and guidance.

Economy of coal can only be effected if steam users will take the trouble to investigate what goes on in their boiler-houses

TABLE III.—RATIO OF STEAM PRODUCTION TO ANNUAL EXPENSES (WITHOUT ATTENDANCE AND REPAIRS).

No.	Type of Boiler.	Dimensions.		Water Evaporated per hour.	Horse-power at 30 lb. of steam per h.p.	Annual Expenses per Horse-power.		
		Length.	Diameter.			Fuel.	Interest and Sinking Fund.	Total.
		ft. in.	ft. in.	lb.		£	£	£
1	Cornish .....	30 0	5 9	1,497	48.9	156.98	39.62	201.60
2	" .....	18 9	5 0	1,104	70.1	313.88	30.37	4.9.25
3	Lancashire .....	21 0	7 0	1,277	42.4	175.67	45.08	135.85
4	" .....	21 0	7 0	2,360	79.0	811.47	45.18	421.65
5	Cornish Multitubular .....	9 7	4 4	444	14.8	56.62	16.08	137.70
6	" .....	19 0	7 0	3,920	130.7	482.10	43.50	590.60
7	Locomotive .....	6 0 <sup>1</sup>	3 0	876	22.4	95.54	10.70	171.24
8	" .....	6 0 <sup>1</sup>	3 0	385	11.2	58.42	13.83	217.18
9	" .....	7 7 <sup>1</sup>	3 7	1,087	38.2	138.45	12.60	209.33
10	" .....	7 9 <sup>1</sup>	3 6 <sup>1</sup>	1,220	30.7	241.72	33.72	340.44
11	Watertube (De Naeyer) .....	14 9	2 7 <sup>1</sup>	2,028	67.5	238.72	33.72	367.44
12	" .....	14 9	2 7 <sup>1</sup>	1,9 7	63.9			

<sup>1</sup> Dimensions of barrel.<sup>2</sup> Diameter of drum.



either personally or by employing competent engineers.

In a large public institution, where steam is required for warming buildings, for heating water for laundry, bath, cooking, and other domestic purposes, and for operating laundry and electric-light engines, pumps and other machinery, the expenditure on fuel is a very important item, and should be the subject of close scrutiny. It is, then, very desirable to ascertain whether the boilers are being worked economically, and, if not, to determine what measures ought to be taken for placing matters upon a proper footing.

It may become necessary to take observations of the flue temperatures and to analyse the gases under different conditions of stoking until a mean has been found giving the smallest possible loss of heat up the chimney.

As some boilers are worked so as to give an efficiency of more than 80 per cent., while others show less than 60 per cent., there is generally a possibility of reducing the waste up the chimney by nearly 20 per cent., thus effecting an economy which, on a coal bill of 300l., works out to 60l. a year.

The architect is frequently expected to advise his clients on the management of the plant installed under his directions, and for this reason it is desirable that the bearing of management on boiler efficiency should be clearly understood.

If the fire of a boiler be maintained under theoretically perfect conditions, every pound of carbon would require 11.59 lb. of air to ensure its complete combustion, and the weight of the products of combustion would be 12.59 lb. The combustion of 1 lb. of carbon generates 14,540 British thermal units, and, taking the specific heat of the furnace gases at 0.237, the temperature of the flame over that of the air admitted to the furnace will be:—

$$14,540 \div (0.237 \times 12.59) = 4,875 \text{ deg. Fahr.}$$

Assuming that, by being passed over the heating surfaces of the boiler, the temperature of the heated gases is reduced to 487.5 deg. Fahr. over that of the air admitted, the heat abstracted by the boiler is 90 per cent. of the total amount generated, only 10 per cent. being wasted up the chimney shaft.

In actual practice, perfect combustion cannot be secured with less than 14 lb. of air per pound of coal. This means that the weight of waste gases is increased to 15 lb., with a corresponding reduction of flame temperature to:—

$$14,540 \div (0.237 \times 15) = 4,091 \text{ deg. Fahr.}$$

Hence, if the gases be cooled down as before to 487.5 deg., the practical efficiency of the boiler becomes:—

$$(4,091 - 487.5) \div 4,091 = 88.08 \text{ per cent.}$$

Supposing the stoker admits so much air that the waste products weigh double the theoretical weight, the flame temperature will be:—

$$14,540 \div (0.237 \times 25.18) = 2,437.5 \text{ deg. Fahr.}$$

But, owing to the lower temperature of the furnace gases, a smaller proportion of the heat will be transmitted through the plates into the water, and it is probable that the final temperature of the gases will be about 600 deg. Fahr.

Consequently, the efficiency of the boiler will be reduced to:—

$$(2,437.5 - 600) \div 2,437.5 = 75.38 \text{ per cent.}$$

In very bad practice the products of combustion sometimes weigh as much as forty times the weight of the fuel consumed. Then the flame temperature will be further reduced, and the proportion of heat absorbed by the water further decreased, so that the boiler efficiency may drop to about 50 per cent. In such a case half the heat furnished by the coal is literally wasted up the chimney, and, even after making allowance for an inevitable loss of 12 per cent., we have the result that 25 per cent. of the coal burned is wasted by the ignorance of the fireman.

Incomplete combustion, which is usually accompanied by excessive production of smoke, is another cause of reduced efficiency, and is largely due to inadequate supplies of air, especially at times when fresh fuel has been added to the fire. If all the coal used in a boiler were burned so as to produce carbon monoxide (CO), instead of carbon dioxide (CO<sub>2</sub>), only 4,340 instead of 14,540

British thermal units would be generated per pound of carbon. Thus the value of the coal would be reduced by two-thirds or more. As a rule, however, the proportion of incompletely-consumed fuel is not large, except in cases of very bad stoking, to which the attention of the owner or manager of a public institution or other establishment should be attracted by the excessive amount of smoke coming from the chimney shaft.

The discussion of other matters affecting the efficiency of steam boilers must be deferred until next week.

#### OBITUARY.

MR. HAYWARD.—We announce with great regret the death, on July 6, in his seventy-fifth year, of Mr. Charles Forster Hayward, of No. 50, Great Hall, Lingfield, Surrey, and of No. 50, Russell-street, W.C., architect, and Great Russell-street, W.C., architect, and District Surveyor, London. Mr. Hayward was elected in 1855 an Associate, and in 1861 a Fellow, of the Royal Institute of British Architects, of which he served as member of the Council, and joint honorary secretary with Mr. J. P. Seddon. In 1881 he was elected member of the Architectural Association. Having studied in the Royal Academy schools he became an assistant of P. & P. C. Hardwick, and then began to practise at 5, Adam-street, Adelphi, in association with the late Professor T. Sir A. Blomfield, C. Eastlake, and G. J. Nicholl, in the Hardwick's offices. In 1871 Mr. Hayward succeeded the late Charles Fowler as District Surveyor for St. George, Bloomsbury, and St. Giles-in-the-Fields of the combined parishes; a rearrangement of the district areas having been effected ten years ago, he was appointed District Surveyor for St. Giles-in-the-Fields, St. George, Bloomsbury, St. Martin-in-the-Fields, St. Anna, Soho, and St. Paul, Covent Garden, parishes, with, for a limited period, certain adjoining portions of other parishes, and he filled that office until his death. Of Mr. Hayward's principal architectural works the following have been illustrated, together with plans, in our columns: The Duke of Cornwall Hotel, Plymouth, for the Plymouth Hotel Company (July 4, 1883); St. Andrew's Church, Malden-road, Haverstock Hill, N.W., under the Gothic style (September 14, 1867); "Oaklands," at Halesd, Essex (May 18, 1873); the Public Hall, Harrow, for a limited company (January 23, 1875, exterior and interior); for Harrow School: the Sanatorium, with laundry and residential quarters (January 23, 1875, Gymnasium and Workshops (January 23, 1875, and the Natural Science Schools and Laboratories (December 11, 1886); Christ Church, Zanibar, for Bishop Steers who superintended the erection of the church on the site of the old slave-market (May 28, 1881); the rebuilding of Nos. 7-8, Bloomsbury-square, W.C. (February 5, 1881); and the large block opposite the British Museum, consisting originally of Russell, the Duke's, and Montague mansions (since modified as Museum-mansions, the Thackeray Hotel, and Great Russell-mansions), together with Nos. 60-61, Great Russell-street, built in 1891-6 between Bury and Museum streets on the site of twenty-two houses in Great Russell-street and Gilbert-street at the rear (April 13, 1895). About forty-five years ago Mr. Hayward formulated a scheme for the reparation of the Church of St. Peter, Colchester; his designs for a reconstruction of the brick-cased tower were partially carried out, and he designed the stone case for the illuminated clock-dials sustained by a projecting ornamental support of Portland stone (March 21, 1896). In 1870 Mr. Hayward was employed as architect for the further alteration and improvement of Nash's Gothic Church of St. Mary in Brunswick-street, Haggerston, N.; and in 1878 (see C. Mackeson's "Guide") for the similar treatment of Coleman's late Gothic Church of St. Philip in New-street, Stepney, E. In the *Builder* of December 29, 1888, is published a drawing of his proposed Clock Tower which the late Mr. George Errington, of Lexden Park, had intended just before his death to erect on the site of St. Runwald's Church, Colchester, since pulled down. Mr. Hayward was architect of the Harrow Local Board Offices and Fire Station (February 17, 1894); of many houses and mansions in London and the provinces, amongst which we may instance a house, for Mr. Bezandale, in Brook-street, Mayfair, and a large half-timbered mansion, Coleronic, near St. Germans, Cornwall, for Mr. Trelawney; "The Firs," Worpleston, Surrey (1886); Copse Hill, for Mr. Brassey; many houses at Halesd; and (including one for himself) at Godalming and the vicinity; several private houses and masters' houses at Harrow; a large hotel at Albury with (with Mr. Davies); Nos. 192-4, 268-66, and 242-4, Oxford-street; and Nos. 141-4, Drury-lane, for Messrs. Lambert & Butler, being the last work he did in a private capacity; and he prepared some designs for the St. Giles-in-the-Fields (now Holborn) Public Library. In 1886-7 he carried

out the enlargement and improvement of Holy Trinity Church in Little Queen-street (now Kingsway), re-arranging the interior and changing the position of the altar from east to west. His most recent work includes the design, as a tribute of friendship, for the elaborated St. Paul's grove memorial chancel-screen in St. Paul's Church, Tottenham, which was fully described in our number of June 10, 1905, and he made the designs for the rest executed in alabaster and encaustic tiles, at Lawford Church, Essex, in memory of the late Honourable John Robertson, of Lawford Place. Mr. Hayward bestowed much care and labour upon the reinstatement (1897) for his own occupation of the half-timbered house, built in 1481, and known as the Guest Hall, at Lingfield. He restored the church, and wrote a history, an account of the Towers at Layer Marney, and made the illustrations for Mr. F. Harrison's book upon Sutton Place, Guildford. Many years ago he perfected a scheme for connecting the Thames between Westminster and Blackfriars, viaducts and lower roadways for the Strand and river levels. Soon after the opening of the Royal Courts of Justice Mr. Hayward took up the question of making new approaches from High Holborn to the Strand; in the *Builder* of November 18, 1890, will be found his description, and plan, of his projected approach to the Strand, and his suggestions for that object, showing a wide thoroughfare from the end of Southampton-row to a street, the west end of Portugal-street whence branch two streets to points opposite the churches of St. Mary-le-Strand and St. Clement Dane. Mr. Hayward was a keen antiquarian and archaeologist; he was a member of the Society of Antiquaries, a member of Council, London Geographical Society; and in July, 1900, was elected a member of Council, Architectural Museum and Westminster School of Art, being re-elected in the following year. His private papers will be carried on by his son, Mr. A. B. Hayward.

#### GENERAL BUILDING NEWS.

OWTHORPE CHURCH, NOTTINGHAMSHIRE.—The little Church of St. Margaret, in the village of Owthorpe, three miles from Plumtree Station, has of late years become much dilapidated, and it became necessary that the roof should be overhauled. The work has now been carried out under the superintendence of Messrs. A. W. Brewill, Diocesan Surveyor, and Mr. B. E. Baily, the contractors being Messrs. Bowman & Sons, Stamford. A flat plaster ceiling has been removed, and the timber roof opened out, most of the timbers as were decayed and rotten have been removed, the whole of the roof tiles removed, and the roof retiled, using up all the old tiles that were sound and perfect. The masonry of the windows was also in a defective state, and has been restored, inserting new stone where it was absolutely necessary. The lead glazing to the windows has been renewed, using as much of the old glass as possible.

SHINFIELD CHURCH TOWER, BERKS.—The tower of St. Mary's Church, Shinfield, was recently re-opened after restoration. In the tower are six bells—three cast in 1664, one in 1780, one in 1740, and one re-cast in 1803. In 1803 the church bells were taken down and rehung, after strengthening the tower by putting two more round the top. In 1863 two more hands were added to the tower from east to west, and inside arch built to support the west window of the tower. About Easter, 1904, it was intimated to the Vicar by an architect who volunteered to inspect the tower that in his opinion the effects of vibration, due to the action, and the peal caused by the six bells was likely to render the tower unsafe, and advised that the peal should not be rung till the defective timber frame construction had been remedied and the tower strengthened. The Vicar and the Church wardens elected at the Easter Vestry consulted Mr. S. Singsby Stallwood, F.S.A., the Diocesan Surveyor, who inspected the tower, and, while expressing his opinion that the ringing of the bells need not necessarily be attended with danger or risk of injury to the structure, advised the overhauling of the gear and the execution of such repair and renewals as might be necessary to secure smoothness of action and minimise the effects of vibration, and also the addition to the top of two ties of iron and belts from north to south, and cutting out some cracks, setting the new brickwork in cement well bonded to the old walling.—*Reading Mercury*.

CATHOLIC CHURCH, WILLINGHAM.—On the 5th inst. the new Catholic Church at Willingham, near Grimsby, was dedicated, and opened. The cost of the whole erection will be about £400. The church, which is in the shape of a cross, is about 90 ft. long, and the breadth is 65 ft. the dome is 35 ft. high, and the sanctuary is a transept on each side. Rock-faced steps from Dunhouse, Barnard Castle, has been set through Crook, and the roof is of pitch-pine and oak. The windows have been supplied by Messrs. Atkinson, of Newcastle. Adjacent to the church is the presbytery, a house of six rooms. The architects are Messrs. Kelly & Dick, of London. Mr. Hopper, of Wolsingham, was the general contractor.



**RESTORATION OF WYMONDHAM CHURCH.**—After having undergone restoration, Wymondham parish church was re-opened on Thursday last week. The work, which has been carried out by Messrs. Rattee & Kett, of Cambridge, under the direction of the architects, Messrs. Hicks & Charleswood, of Newcastle-on-Tyne, comprised the restoration of the carved roof of the nave and north aisles, and a new roof on the south. The roofs are all leaded. The stone work, both inside and out, has been cleared of colour wash, and most of the windows have been reglazed with cathedral glass. The monuments on the pillars have been removed to the walls of the north and south aisles. The sanctuary has been paved with marble, and choir stalls in oak, with carved poppy heads, have been provided for the surpliced choir. An altar-rail in open work has been given by Mr. Kett, and a stone screen has been erected for the organ at the west-end of the building, and the three-manual instrument has been restored by Messrs. Glasspool Brothers, of Wymondham.

**BAPTIST CHURCH, STOCKFELD, NEAR NEWCASTLE-ON-TYNE.**—A new church has been erected upon a site abutting the main highway between Mickleby and Stockfield. The building is of stone, and has been erected by Messrs. Smithson & Son, of Newcastle-on-Tyne. The design is by Messrs. W. Dixon & Son, architects, of Newcastle-on-Tyne. Accommodation is provided for some 200 worshippers.

**ST. ANNE'S CHURCH, BRISLINGTON.**—The Bishop of Bath and Wells recently dedicated the new Church of St. Anne's, Brislington. The building is Gothic, and is constructed of Pennant stone with Bath stone facings, the interior being of Bath stone alone. It consists of a nave, two aisles, and transepts, and provides accommodation for about 450, but the plans include a chancel, morning chapel, two vestries, and an organ chamber, and these will be added later. The cost so far has been £3,400. The floor is of oak blocks, and there is an open ceiling, carved corbels supporting the principals of the roof. There are flying buttresses between the aisles and transepts, and five bays in the arcading. Inside the west entrance a pitch-pine screen is erected, with light and the seating accommodation is by chairs. The building was designed by Mr. H. M. Bennett, and the work has been carried out by Messrs. E. Walters & Sons.

**S. OSMUND'S CHURCH, PARKSTONE.**—The chancel and north transept of this church were opened on the 3rd inst. The style adopted by the architect, Mr. G. A. Bligh Avelssey, is in its main features that of the earlier Christian churches of Southern Europe, of the "basilica" type, the details, however, being of more classical a character than was usual in those buildings. The plan of the church is cruciform, and the central crossing, of which the four piers are built, is to be surmounted by a dome. The chancel terminates in an apse, with semi-dome, and is surrounded by an ambulatory, divided from it by Ionic columns. The floor upon which the altar rests is of teak and abony, with a slab of red Devon marble, and it stands under a "baldachino" or canopy, modelled on a well-known ancient example. Round the ambulatory are places for clergy, with a seat for the bishop in the centre, behind the altar, in basilica fashion. There is some beautiful old wrought-iron work between the columns of the apse, formerly in the Church of S. Mary le Bow, Cheapside. This was given by the Rectory and Warden of S. Mary's, and has been remodelled and placed in position by Mr. Sellar. The chancel extends under the crossing, and there are two "ambones," one for the reading of the Epistle and of Lessons, and the other for the Gospel and to serve also as pulpit. The floor and steps of chancel sanctuary and ambulatory are in "terrazzo." No stone is employed in the building, except in the pavement already described. All the chief permanent work of the interior is of terra-cotta, supplied by Messrs. Carter & Co., of Poole. It is of two shades, most of the surface and some of the greater part of the mouldings, including the whole of the Ionic columns, of a rich red. The baldachino, including its four Corinthian columns, is in a terra-cotta material of a finer kind, with a slight glaze and of delicate blue-green hue. The considerable elevation of the chancel floor has given opportunities for a spacious crypt, which has accommodated for a spacious crypt, and for the appliances connected with the supply of water, gas, and electricity, as well as for a temporary vestry for clergy and choir. The church will be warmed by hot water on the low-pressure system, and the lighting is partly by gas and partly by electricity. The organ is the work of Mr. George Johnson, of Bristol. The remainder of the furniture consists of desks for clergy and choir, seats for the choir-boys, two credence-tables for the sanctuary, and chairs for the congregation. With the exception of the green, nearly all the furniture, fittings, and ornaments have been designed by the architect. The ancient font which has been in use in the chapel has been retained for the new church, and stands in the north-west corner of the nave. The

following firms have been employed in the structure and fittings:—Messrs. Miller & Sons and J. McWilliam & Son, and W. Hoare, builders; Messrs. Carter & Co., terra-cotta; Messrs. Homan & Rogers, steel construction; Messrs. Diespeker & Co., marble terrazzo; Mr. William Morris, glass; Messrs. Henry Hope & Sons, heating, etc.; Messrs. Barpe, electric lighting; Messrs. Sellar & Co., gas and old iron work; Mr. G. Johnson, organ; Messrs. Watts & Co., sanctuary ornaments; Messrs. Jones & Willis, sanctuary fittings; Messrs. West & Collier, T. Manuel, Mew & Tapper, and J. Burdett were also concerned in the work.

**MEMORIAL CHAPEL, CAMBRIDGE.**—The foundation-stone of the Moulton Memorial Chapel, which is being erected in connexion with the Leys School, Cambridge, was recently laid by the Duchess of Albany. When completed the edifice will be in harmony with the style of the existing school buildings. The body of the chapel will seat 320 boys, but in addition the space reserved for the choir will seat forty more, and the west gallery fifty-five more. There is to be a vestibule at the west end, two porches on the north and south sides, a vestry over which will be the organ loft, opening into the chancel by means of two arches, and a bell turret, rising, octagonal in shape, above the roof. The upper part will be composed of stone, and the lower part a canopy, carrying finally on its summit a copper vase. The walls externally will be faced with red brick, relieved by Monks Park Bath stone dressing, and inside they will be faced with Barlegh Down Bath stone ashlar enriched with decoration. Outside, the roof will be covered with red Broseley tiles. The system of ventilation consists of inlets in the back of the hot-water radiators with which the chapel will be heated. The floor will be of white and black marble slabs, with squares, enclosed within a border, and under the seats it will be of selected oak wood blocks. The lighting will be by electricity. The architect is Mr. Robert Curwen, and the builder, Mr. W. Saint, Cambridge. The cost will be about 9,000.

**MANNVILLE CHAPEL AND SCHOOL, BRADFORD.**—The trustees of the late Mannville Chapel have agreed to buy a piece of land, some 2,000 sq. yds. in extent, at the corner of Shearbridge-road and Woodhead-road, and to build a chapel facing Shearbridge-road, and to accommodate some 420 persons, and to build a school facing Woodhead-road. The scheme also includes the provision of a caretaker's house. Messrs. W. J. Morley & Sons, Messrs. Walker & Collinson, Mr. Abraham Sharp, and Mr. Edgar H. Parkinson, all Bradford architects, have consented to submit designs, and perforce of the trustees' requirements are now in their hands.

**BAPTIST SUNDAY SCHOOL, LECTURE HALL, ETC., SOUTHPORT.**—On Saturday, July 8th, eight memorial stones were laid in connexion with the new Sunday schools, etc., for the Baptist Tabernacle, Southport. The present school, only built about fifteen years ago, was too small for the scholars to be accommodated, and is altogether unsuitable for the requirements. The new buildings will occupy the site of the present school and a pair of cottages adjoining, which are being taken down for the purpose. The main schoolroom is 53 ft. by 32 ft., with entrances at each side of Scarisbrick New-road from A. A staircase leads up from one of these entrances to a balcony around three sides of the school. There is an infants' classroom, twelve other classrooms, kitchen, large minister's vestry, lecture hall, and library. There is a gentleman's cloak room with lavatory, and similar accommodation for ladies opening out of each entrance respectively. Two new staircases are to be provided to the Tabernacle, and various alterations to the organ and choir gallery are also to be carried out. Mr. Francis P. Halsall, of Southport, is the architect, and Messrs. Duxfield Bros. are the builders. The cost, exclusive of land, will be about 2,600. The elevations are being carried out in pressed brick and grey terra-cotta from Mr. Jaber Thompson's works at Northwich.

**FREE LIBRARY, NEWBURY.**—The foundation stone has just been laid of the new Free Library at Newbury. The library will be of red brick, with stone dressings, and a roof of Broseley tiles. There is a porch, inside which will be racks for newspapers for the daily morning readers. The porch will lead into a hall with a mosaic floor. The lending department will be on the right in entering, and the indicator system will be adopted. The room will be 24 ft. by 30 ft., with west-bow window, and accommodation will be afforded for 10,000 volumes. Overlooking the lending and reading rooms will be the librarian's office. The reading-room will be approached through the hall, and shut off by swinging doors. It will be 45 ft. by 30 ft., with sitting accommodation at tables for seventy persons, and standing at the wall racks for forty others. At the west end of the reading-room will be a gallery, which can be used as a book-store. On the first floor will be a reference-room and a students' room. An attic will afford the necessary storage accommodation, while the old gable basement will be used for the hot-water apparatus. A roadway will be left on the south side of the building. Mr. S. J. Lee Vincent is the honorary architect. The builders are Messrs. Hoskings Brothers, of West Mills, Newbury.

**SEAMEN'S HOSPITAL, CARDIFF.**—The new Seamen's Hospital, at Cardiff, the greater part of the site for which was given by the Marquess of Bute, who opened the building recently, is close to the old hospital ship, the *Hamadryad*, and is on land which was formerly covered by spring tides. The superstructure consists of the hospital wards, the administrative block, doctor's house, operating theatre, laundry, etc. The entrance to the hospital is in Ferry-road. From the entrance porch a corridor leads to the wards. On the right of this corridor on entering is a waiting-room for out-patients, and consulting-room, dispensary, etc., and a small accident ward for receiving and examining cases before sending them on to the wards. Also on the right of the corridor is the main stairs, with a bed-lift in the wall of the stairs. On the left of the corridor are the kitchen, staffroom, stores, etc., and at the end of the corridor the wards and their adjuncts. The wards are on three floors, a main ward, containing sixteen beds, and a small ward, with two beds, on each floor—fifty-four beds in all. At the entrance to the wards is the duty-room, with lifts, pantry, etc., and at the further end of the main ward a large day-room facing south, with bathrooms, sink-rooms, and emergency stairs. There is also a recreation-room on the first floor in front of the building. The wards and corridors are heated by low-pressure hot water, and are lighted by electricity. The ventilation is natural, with air inlets near the floor and outlets into flues near the ceiling. The incoming air is warmed in cold weather by radiators. The floors of the wards are of marble terrazzo, the walls are of red brick, and the ceiling is of cement worked to a smooth surface and painted. The operating theatre and Röntgen ray-room are connected to the administrative block by a covered way. There are also a small mortuary, viewing-room, and post-mortem room. The doctor's house is at the western side of the block, and is connected by a covered way with the administrative block. There is a small infectious ward, which has no communication with the rest of the building. The buildings are designed in red brick, with red-stone, Bath stone, and terra-cotta dressings. Mr. E. W. M. Corbett was appointed the architect. Tenders were invited for the foundations and the superstructure, and those of Messrs. W. Thomas & Co. were accepted, the aggregate amount being about £2,300. The total cost of the building and furnishing of the institution has been £30,000.

**DENTAL HOSPITAL, BIRMINGHAM.**—On the 6th inst. Sir Oliver Lodge opened the new Dental Hospital, erected in Great Charles-street, at a total cost of 10,000. The architects are Messrs. Bateman & Bateman, of Birmingham. The cost of the building is estimated at 8,500, and the equipment at a further 1,500. The new building has a frontage of red brick with stone dressing, and it consists of four stories. On the ground floor there is a general waiting-hall and accommodation for the staff, also classroom, students' room, and museum. On the first floor there are rooms for operations, with and without anaesthetics, also a lecture-hall. There are also separate recovery rooms for male and female patients. On the second floor there are filling and saving rooms, specially lighted. The top floor also possesses a mechanical department and work-room for making artificial teeth and crowns. The staircases are arranged so as to give the patients easy access to the various departments, and for their egress so as not to cross or pass along the corridors used for entrance. Measures are adopted for the teaching of University students.

**MARINE LAKE, MALDON.**—The new salt-water lake and bathing-place at Maldon, was opened a short time ago. The lake is 230 yards long, 70 yards wide, and it has an area of between 2 and 3 acres; its greatest depth is 7 ft., and it contains approximately 3,000,000 gallons of salt water, which is admitted by means of a 2-ft. pipe from the River Blackwater through a sluice. There are two bathing-sheds—one for ladies and the other for gentlemen—each containing six cubicles, the one for gentlemen being provided with diving-boards. The land was acquired by the Corporation at a cost of £25, the excavation, etc., cost about 450, and the buildings 200. The work was carried out under the superintendence of Mr. T. R. Swales, the Borough Surveyor.

**POST OFFICE, ROTHBURY, NORTHUMBERLAND.**—A new post office has been erected in Bridge-street, Rothbury. The work has been carried out under plans prepared by Mr. J. G. Burrell, architect, Durham. Mr. John Wake, of Rothbury, being the contractor; Mr. Wm. Shotton had the sub-contract for carpenter and joiner's work; Mr. J. Gregory for slating and plastering; the plumbing and smith's work was done by Messrs. Reavell Brothers, Alnwick; and the painting and decorating by Mr. F. Roper, Thropton.

**HOUSING SCHEME, HIGH WINCIBANK, SHEFFIELD.**—The competition promoted by the Health Committee and the City Council resulted in the submission of several designs, the first premium, as already mentioned in our columns, being awarded to Mr. H. L. Paterson, of Sheffield. The houses, twenty in number, will be erected in



SINGAPORE.—The building trade in Singapore is, at the present time, very quiet, and has been so for the past twelve months, due, probably, to a lull in the land and property market, and, perhaps also, to overbuilding of certain classes of buildings during the summer period. At present, however, there is an unusual amount of building trades hope for better times, in memorial to the late Queen Victoria, which takes the form of a large ceremonial hall, is now rapidly nearing completion, and was to be formally opened by the Governor, Sir John Anderson, on May 24. The site is a good one, with ample vacant space, and the new building can never be shut out by other buildings, for the land around will ever be built upon. The hall faces the sea, with a broad carriage road and open space in front; the back faces the Supreme Court, one side the Government buildings, with a garden in between, and the other side faces the esplanade. The building is attached to the existing law hall, but only by means of a connecting passage. It is intended that the memorial hall is completed, to convert the old town hall into a theatre, the elevations of which will be of the same design as the new hall, and thus make the two buildings into one large building with the tower, which has already been built, the central feature of a symmetrical elevation. The entrance is through a large carriage porch leading to the grand entrance hall. On the left is a hall 100 ft. long by 60 ft. wide and 26 ft. high, which will be used as a supper-room when the hall is used for a ball, and can also be used for public dining. There are verandahs 15 ft. wide on all sides of the hall. The internal decorations of the room have been purposely kept rather plain, and what ornament has been introduced has been, as far as possible, made in ironwork. The floor is of stone. There are also those of the verandah, refreshment-bar, service-room, entrance hall, cloakrooms, and lavatories.



ceiling is of teak, and the heavy Chenghei joists of the hall above are exposed. The doors and all other joiner's work is of Bakko teak. The upper floor is approached from the entrance hall by two polished marble staircases, one on each side of the hall, one stair having an extra flight leading direct into the verandah of the lower hall. The staircase is 12 ft. 6 in. wide, in easy flights, and is carried on concrete with expanded metal embedded in it, the whole being supported by steel framing. The entrance hall is divided up by granite columns and pilasters carrying heavy enriched entablatures. The staircases land on either side of the foyer, and are screened off with granite columns, from which spring arches. The foyer is very large, about 60 ft. wide by 50 ft. deep and 42 ft. high, and is over the entrance hall and carriage porch, one clear space without columns, and is richly decorated. The floor is of marble, carried on enforced concrete on steel girders. The ceremonial hall, which will be used for great ceremonies and all important public meetings, balls, banquets, and other uses to which such halls are put, is entered from the foyer by a long, low, 120 ft. 60 ft. wide and 45 ft. high, and has a segmental domed recess at the far end with a platform. The walls have composite pilasters, with detached columns of the same order in front of them. The whole of this hall is very richly decorated in ornamental plaster, except over the doors, where plain spaces have been left in which the portraits of past Governors and prominent public men will be hung. The floor is of teak in narrow batten widths, supported on joists clear of the walls to give it a spring. The ceiling is segmental in section, panelled and divided up with teak moulded ribs, the panels being formed of "Uralite" slabs. The whole of the ceiling is of teak, oiled. Verandahs 15 ft. wide run round the hall, and a refreshment bar and service-room are provided at the back. These are all paved with marble tiles on re-inforced concrete. The tower, which rises between the new and old building, is carried up for a very considerable height in plain rusticated masonry, above which are clock dials 10 ft. in diameter under a heavy and projecting cornice. Above this the tower becomes circular on plan, having an open colonnade of short columns, broken at the corners by projecting piers, with a cornice from which the diameter is reduced by masonry scrolls to a plain surface carrying a cornice, which supports a copper dome with the Imperial Crown on top. The tower is 132 ft. high, and, at a level of about 162 ft. there is a flat, from which charming views of the surrounding country for many miles round can be seen. The building will be lighted throughout by electricity, and special attention has been paid to the selection of fittings of suitable design. Electric fans will be provided in all parts of the building. Steel has been used very extensively throughout the building. The plaster cornices are formed on expanded metal, and all the re-inforced concrete is made with the same material. The marble has all been imported from Carrara, the granite partly from the Stevensons of Hong Kong, and the tiles from India. The architects of the building are Messrs. Swan & Maclaren, of Singapore, and the work has been carried out under the supervision of them and the Public Works Department. The contractors were a local Chinese firm.

#### MISCELLANEOUS.

**GERMAN CEMENT INDUSTRY.**—In his latest report to the British Foreign Office, Mr. Consul-General Schwabach remarks that although the cement trade was more active than in the last two or three years, and the ruling prices were above the very low rates of 1903, the works were far from fully employed. The turnover (including exports) in 1904 is estimated at 16,000,000 casks, against a producing capacity of 28,000,000 casks. Under these circumstances it seems impossible without the syndication of the industry to keep the prices at a level that insures even a very small margin of profit, and negotiations for the formation of local syndicates and conventions between the different local syndicates have been carried on throughout the year and were partly successful. The financial results of the Stevensons, writing for 1904 are better than in the preceding years, partly, no doubt, owing to the beneficent influence of the regional syndication of this industry. For twenty-three companies, with an aggregate share capital of 2,450,000, the average dividend for 1904 was 4.8 per cent., against 4.06 per cent. for 1903. —Mr. Vice-Consul-General, writing from Hanover, observes that the state of the Portland cement industry shows no improvement on that of the previous year. The year 1904 was the third year of open and unrestricted competition. It was not until November, 1904, that attempts to form a syndicate proved successful for arranging the prices in conjunction with the various cement firms whose works are situated in Westphalia and the Rhine district

on the west, and in Central Europe on the east, and at the same time to draw up agreements with these groups, from which, however, no advantage accrued for the last year. The open competition which prevailed during the years 1902-04, without any sort of restriction as regards prices and other arrangements, has shown, as far as the cement industry at Hanover and the two neighbouring districts is concerned, in periods of excessive over-production, that no improvement in the general conditions of the factories is attainable without some sort of agreement among themselves as to limiting the output and prices. One may, however, reasonably expect that the regulations drawn up by the syndicate as to the sale of cement may produce more healthy conditions and bring about such an improvement as the industry in Central Germany enjoys from similar measures. Notwithstanding the honest intentions of the majority of firms, the financial results of the year 1904 must show a loss, as in 1902 and 1903, owing to the avowed refusal of some firms to adopt measures approved by the majority. —Mr. Consul Ledeburg, reporting on the commercial affairs of the Grand Duchy of Baden, remarks that in cement trade was rather better than in the preceding year, and a few factories were even able to effect a small improvement in price. But that was quite exceptional. On the whole conditions of the production prevail, and most factories had to reduce their output to avoid further reduction of prices. The great period of the German cement industry belongs to the past, and with the development of cement-making in other countries, above all with the loss of the United States market, it is doomed to decline. The demand, which is large and increasing. Thus the Heidelberg Mannheim Portland Cement Company report that business in 1904 was tolerably good, the home demand very good, although at very low prices, while little cement could be exported, less even than in former years. Belgian works offered at 11. 3s. 6d. to 11. 8s. 6d. c.i.f. Marseilles in 4-ton lots. The quality, indeed, is described as inferior. A German company which established a branch factory in the United States finds that it does not pay. Owing to a variety of causes the British cement industry that was first in the field has lost its best opportunity; nevertheless, taking into account its natural advantages superior to most countries, it rests apparently only with the energy and enterprise of the British makers to regain lost ground.

**NORWEGIAN TIMBER AND STONE EXPORTS.**—In his annual report to the Foreign Office, just issued, Viscount Malvern, British Consul at Christiania, mentions that the timber business, which in 1903 was on the whole good, fell off very much in the course of 1904, with the result of a serious financial loss to the country. The Vice-Consul at both Drammen and Fredrikstad report that 1904 was most difficult for the timber trade. The prices for logs and sawn timber were unreasonably high in comparison with the low prices obtained for low goods, with the result that very few were able to close their books with a profit. Granite and other hard stone increases as an article of Norwegian exportation. Taking an average of the years 1901 and 1902, 136,621 tons were exported, compared with 185,000 tons in 1903, and the quantity has again increased in 1904. But some of this is Swedish stone quarried in Sweden by Norwegians and shipped from a Norwegian port. Most of the Norwegian granite comes from the large quarries in the southern part of Smålenene. The export to Germany has decreased considerably owing to Swedish competition, but the United Kingdom now takes far more than any other country. Although the export has increased, complaints are made that prices remain too low. The total value of the year's export of hewn stone is estimated at about 165,000. The trade in roofing slates has increased, the exports being now on a large scale. The United Kingdom offers a good market, and Denmark and Germany are spoken of as promising markets for the future. The railway now in course of construction in the Valdres district will greatly facilitate the transport from the Sildre quarries.

**HOUSING OF THE WORKING CLASSES, MIDDLESBROUGH.**—On the 4th inst. an amended scheme for the housing of the working classes in one of the slum districts of Middlesbrough gave rise to considerable discussion at a meeting of the Sanitary Committee of the Middlesbrough Corporation. For about a year and a half the subject of demolishing a number of houses in what is known as the Nile-street area, where the death-rate has been as high as 40 per cent., improving others, and building new dwellings, and also a municipal lodging-house, besides suitable cottages on the Ayresome Grange estate, has been repeatedly discussed. The ex-Mayor, Councillor Charles Dorman, formulated a few months ago a scheme which was sent to a sub-committee for reconsideration. The Borough-Engineer, Mr. Frank Baker, was directed to draw up an amended scheme, and prepare a fresh set of plans and estimates. Mr. Baker now recommended:—(1) That ten houses, facing Broughton-street and Stockton-street, also fourteen houses in

Olive-street, be left standing and improved. (2) That in place of the houses to be demolished, fourteen houses of the Gas Works type, and twenty-nine two-roomed cottages be erected; that Vine and Nile streets be widened to 36 ft., and that Princess-street be diverted and made 36 ft. wide. (3) That a lodging-house to hold from 100 to 120 cubicles be erected on the site facing Bridge-street, the new Princess and Nile streets, with the rear thereof facing Olive-street. His estimate for what was required to be done in the Nile-street area was 12,644l. 12s., and his estimate for the laying out of the Ayresome Grange Estate and building thirty-two cottages was 6,706l. 4s. 2d. In the Nile-street area the following accommodation would be provided: fourteen Gas Works type of cottages, seventy persons; twenty-seven two-roomed cottages, eighty-one persons; four-roomed cottage, five persons; houses altered and improved, 120 persons; municipal lodging-house, 100 persons. On the Ayresome Grange Estate accommodation would be provided by the proposed thirty-two cottages for 160 persons. The total number of persons thus provided for under the scheme would be 536. The estimated annual revenue of 1,899l. 17s. 6d. was based upon the rents as follows: twenty-four houses altered and improved, 5s. per week, 312l.; fourteen cottages, Gas Works type, 5s. per week, 182l.; twenty-seven two-roomed cottages, 3s. per week, 210l. 12s.; one four-roomed cottage, 4s. 6d. per week, 11l. 14s.; and revenue from the lodging-house, ninety beds at 5d. each per night, 684l. 7s. 6d. The scheme was ultimately carried.—*Yorkshire Herald.*

**A NEW WINDOW SASH.**—Messrs. R. P. B. & R. Wright (Leeds) send us a working model of their new patent sash, which has much to recommend it to attention. It is a kind of combination of sash window and casement window; the vertical (sash) action being intended for the ordinary opening of the window for air, the casement action for cleaning. The cords, pulleys, and weights are at one side of the window only (this may be a practical difficulty in large and heavy windows), and on the same side is a vertical rod to which the sash is attached by metal grips, arranged to slide up and down on the rod. When the lower sash is pushed up some little distance it meets a bead coming part way down the frame, which keeps it in position; but if only raised slightly, it can be swung in like a casement, on the vertical rod as a hinge. Similarly, the upper sash can be pulled down its whole depth as a sash, but when it is pulled down lower than that (the lower sash having been opened inwards first), it gets clear of the parting slip, which is set off at the level of the meeting rail, and can then also be swung inward as a casement, turning on its own vertical rod. The patentees say their window has "every advantage of the French casement, without its defects." We hardly see any defect in the French casement as made and fitted in good French houses, but in smoky towns it has the drawback, when opening inwards, of bringing the dirt and dust clinging to it into the room; and when opening outwards there is the difficulty as to cleaning. Messrs. Wright's window can be ordinarily used, and is apparently intended to be used, as a vertical opening sash window; but it can be swung inside for cleaning as easily as the French casement, and there is no taking to pieces of any kind required; the action is quite simple and always available. Some persons might object to the appearance of the metal bar from top to bottom of the window; but that can hardly be called a very serious objection. As a whole it is one of the best and simplest patent sashes for cleaning that we have seen.

**CATTLE MARKET, ISLINGTON.**—The Corporation of the City of London have under consideration a scheme for obtaining Parliamentary powers to enable them to dispose upon building leases of a portion—consisting of the sheep lairs and some lands along the north and west frontages of the market area—and to empower the erection at an estimated cost of 30,000l. of public abattoirs instead of the private slaughter-houses. The slaughter-houses stand upon ground which was added eleven years ago to the original market area defined by the Acts of 1857-1861. The Islington market was laid out after J. B. Bunning's plans and designs, at a cost of about 300,000l. upon a space of 15 acres in Copenhagen-fields, in lieu of the cattle market in West Smithfield which was abolished in pursuance of a report made by a Commission of Inquiry, 1849, into the Meat Supply of the Metropolis. The new building, illustrated in the *Builder* of December 2, 1864, were opened by Albert, Prince Consort, on June 13, 1855. In December, 1886, the Corporation sold for 16,000l. to the Islington Vestry two parcels of the surplus lands on the south side for purposes of an open space and recreation ground, covering some 5½ acres; the London County Council contributed to the purchase-money. The central clock-tower stands on the site of Copenhagen House, a favourite resort of holiday-makers, which remained until April, 1853, and is depicted in Vol. I. of Hone's "Every Day Book." Copenhagen-fields lay between the ancient bridle-way Hagbush-lane, now Caledonian road, and Maiden-lane, since York-road. —*L.*



**THE ROYAL MINT, 1904.**—The thirty-fifth annual report which is just issued contains a large number of illustrations of the new seals and counter seals of the United Kingdom, Scotland, and Ireland, as authorised on the King's accession. These, the counter seal of Scotland excepted, were designed by the late engraver to the Mint, Mr. de Saulles, the wax models being executed by Mr. Frank Bowcher.

**HAMPTON-COURT GALLERIES.**—The Cartoon Gallery of Hampton Court Palace will be closed during the next three or four weeks for the purpose of the arrangement and erection of a series of valuable tapestries, worked after the Raffaele cartoons, for exhibition in the Cartoon Gallery. The tapestries are a gift to the nation of Baron d'Erlanger.

**ARTIFICIAL SANDSTONE BRICKS.**—Mr. Gillies, British Vice-Consul at Barranquilla, Colombia, in his report on the trade and commerce of that port for 1904, mentions that recently a large factory has been established there for the manufacture of artificial sandstone bricks for building purposes. The manufacture of artificial sandstone is a recent German invention in which sand and quicklime are mixed together in certain proportions, the latter hydrated in a mould in which a vacuum is produced, and, as there is no space for expansion of the lime on hydration, the compression of the material follows. The brick is further compressed in stamps of high pressure, and then passed into steam boilers in which a current of steam is kept up for eight or ten hours, causing a chemical combination of the sand and lime and producing hydro-silicate of lime. The lime acts as a binding material or cement, uniting the particles of sand together and producing a brick of great hardness and practically impervious to moisture. The industry promises to be one of the most important of the country, as the supply of raw material is inexhaustible, the geological formation for miles round Barranquilla being coral limestone covered with a stratum of sand varying from 4 ft. to 10 ft. in depth. The factory has a productive capacity of 1,000,000 bricks per month. In addition to the standard size brick, fancy face bricks, coloured fancy tiles for flooring, tiles for roofing, and building material of every description can be supplied. Natural cement of a very good quality is, in many cases, found in the vicinity of the coral limestone.

**CHICHESTER CATHEDRAL.**—A meeting of the Chichester Cathedral Repair and Restoration General Committee was held at the Royal Pavilion, Brighton, on the 10th inst. In the absence of the Duke of Richmond, the chair was taken by the Bishop, who detailed the steps which had been taken by the sub-committee appointed to approach the Ecclesiastical Commissioners upon the subject of the further necessary repairs to the canopy and the roof of the cathedral, and referred to the efforts which had been made by the Dean and Chapter during the last sixty years for the repair and restoration of the cathedral, involving an expenditure of no less than 117,000*l.* His lordship read a letter from the Ecclesiastical Commissioners offering to subscribe 500*l.* for the purpose required. The meeting was then addressed by the Dean of Chichester. He stated that in his opinion it would be better to proceed with the restoration of the bell tower in the first instance before attempting to touch the roof of the cathedral, which he thought might remain in its present condition for some time. Mr. Somers Clarke, the consulting architect, then addressed the meeting, and said he believed that 5,000*l.*, the amount now asked for, would be sufficient to do what was required. But as everyone was aware, when an ancient building had to be dealt with, it was impossible to say what might be revealed. The experiments with baryta water on the Campanile had proved very successful indeed, and the Committee were now going on applying it to the octagon at the top of the tower. As soon as the north and western turret had been finished and the dry summer which was anticipated permitted the baryta water to be applied, the octagon would be completed. Then there were the new N.E. and the S.E. turrets to be built. The other important work was the repair of the roof, which he thought ought not to be put off for a single day. As soon as the damp got through the lead roof into the gutters it falls into the pockets of the vaulting, collected in a puddle, and went through making stains and marks. Therefore, as the money was collected, it should be set aside in two separate sums, taking, say, two-fifths for the work to the bell tower now in progress, and three-fifths for the roof until there was enough money collected for the roof to pay for doing one whole piece. The Committee could not begin the roof and then wait for money to come in as they did with the bell tower; the structure could not be left open. It would be necessary that the Committee should be able at a certain date, finding there were several hundreds of pounds in hand, to do so much, and then again to do so much more, and so on by pieces, and never to leave any large area of the structure exposed.—After a discussion, it was resolved that the existing Appeal Committee should draw up the necessary appeal to the county for circulation at an early date.

**ROYAL SANITARY INSTITUTE.**—At an examination in sanitary science as applied to buildings and public works, held in Norwich on July 7 and 8, 1906, one candidate presented himself, Mr. H. S. Danckwerts (Norwich), to whom a certificate was granted.

**HYDE ABBEY.**—A representative committee has been formed under the chairmanship of the Mayor of Winchester, with the object of excavating, preserving, and enclosing the remains of the ancient Abbey of Hyde, and the burial place of King Alfred, his wife Queen Elswita, and his son King Edward the Elder. The remains of the abbey are within a short distance of the spot where the fine statue of King Alfred, by Mr. Hamo Thornycroft, R.A., was erected in 1901 to commemorate the 1,000th anniversary of his death; but up to the present time no proper care has been taken for their preservation. King Alfred died in 901, and his body was placed in the Old Minster, but was subsequently removed to the New Minster, which was built shortly after his death. The bodies of the king, his wife, and son were eventually transferred to Hyde Abbey, outside the wall of the city, on its completion in 1110, and finally buried there. In 1538, at the dissolution of the monasteries, Hyde Abbey was given by Henry VIII. to Wriothesley, Earl of Southampton, who lost no time in pulling it down and selling the material. In 1788 the county authorities erected a bridge over the western portion of the nave. In digging the foundations for this building many objects of interest were found, which were either dispersed or ruthlessly broken up. The bridge was taken down in 1850, but a row of cottages there since been built in such a position. —At present condition of the site is as follows:—(1) The ground is to a great extent undisturbed, and large portions of the foundations remain. On the south side of the nave stand several cottages. To the west, outside the area of the church, there remain a perpendicular gateway and some portions of the walls of the church. The object of the committee is: (1) To remove the surface soil, the accumulation of centuries, and carefully uncover the foundations; (2) to provide for the safe custody of any relics which may be found; (3) to secure the preservation of such of the remains of the abbey as still exist; (4) to purchase that portion of the site which is not already owned by the corporation; (5) to fence round the entire area of "Hyde Mede." Subscriptions may be sent to the Hon. Treasurer, Mr. Alfred Bowker, Lankhills, Winchester.

**THE CHEAP COTTAGES EXHIBITION.**—The Duke of Devonshire will open the Cheap Cottages Exhibition at 4 p.m. on Tuesday, July 25th. Those who wish to avail themselves of the special train leaving King's Cross for Letchworth at 2.25 are requested to inform the secretary, Mr. Wilbraham V. Cooper, of their intentions, at 347, Birkbeck Bank-chambers, W.C.

## Legal.

### DMAGE TO PROPERTY BY FLOODING.

The hearing of the case of the Mayor and Corporation of East Ham v. the Ilford Gas Co. was concluded before the Lord Chief Justice and a special jury in the King's Bench Division on the 12th inst. An action by the plaintiff to recover damages from the defendants for having, as it was alleged, negligently caused a large quantity of flood water to overflow the plaintiffs' property in June, 1903, from the River Roding and a stream called the Aldersbrook.

The facts were these:—At the time of the commencement of the action the East Ham Urban District Council was the Urban Sanitary Authority for the district, which comprised the parishes of East Ham and Little Ilford, and by a Charter granted in 1904 the district was incorporated as the borough of East Ham, and the property of the district council devolved upon the plaintiffs. The defendants owned and occupied certain lands in the urban sanitary districts of Ilford and East Ham abutting on the river Roding, the Aldersbrook passing through the defendants' lands on which they had erected gas works. Both the Roding and the Aldersbrook were covered by the Romford-road, which ran east and west on a high bank to the north of the gas works, and was carried over both channels by the bridges. There was also a channel between the Roding and the Aldersbrook parallel to Romford-road and immediately to the north of it. By their special Act the defendants were empowered to fill in part of the channel of the Aldersbrook inside their grounds, provided that if they closed any part of it southward from the Romford-road bridge within three years from the passing of the Act (1899) they should maintain, until the Barking-road bridge was reconstructed, a culvert having a diameter of 4 ft. 6 in. from the Aldersbrook to the river Roding through their own lands. The defendants made some changes in the channel of the Aldersbrook within their own grounds, leaving the culvert which was required

by the Act; but in August, 1902, they closed the culvert, but did not close the arches of the bridge carrying the Romford-road over the Aldersbrook. Defendants, also for the purpose of laying gas mains, cut and reinstated with an additional depth of 1 ft. the river bank inside their grounds. Defendants also raised the height of the island between the Roding and the Aldersbrook, thus forming a sort of pit where any water would collect that might come under the Romford-road bridge along the Aldersbrook. In June, 1903, in consequence of a heavy rainfall, the water in the Aldersbrook and the defendants' collected on the defendants' ground by the bank of the Roding, the result being that the burst, which caused the damage complained of. The plaintiffs' case was that defendants were liable to maintain in repair the river bank inside their grounds as a protection against flooding, and that it had been weakened by the defendants carrying the gas mains through it and not properly reinstated, and therefore that they were liable to the damage caused by flooding. Defendants denied that they were liable to maintain in repair the river bank and that they had failed to keep their portion of the bank in repair. They also said that if any damage was caused to the plaintiffs it was through the overflow of the Aldersbrook, due to an act of God.

After hearing a great mass of evidence the jury found that the defendants were guilty of negligence or want of reasonable care in closing the Aldersbrook and in not keeping the bank, and that the damage was caused by both. They also found that the flooding could have been prevented by reasonable care.

On these findings his lordship gave judgment for the plaintiffs, the amount of damages to be assessed by an official referee.

A stay of execution was refused. Counsel for the plaintiffs: Lush, K.C., Mr. Montague Shearman, K.C., and Mr. L. M. Richards. Counsel for the defendants: and Mr. Duke, K.C., Mr. Danckwerts, K.C., and Mr. Sylvain Mayer for the defendants.

## PATENTS OF THE WEEK.

### APPLICATIONS PUBLISHED.\*

15,795 of 1904.—E. H. RIETTER-BODMER: Manufacture of Artificial Stone Pipes, Tiles, etc., and Apparatus Therefor.

A process for the manufacture of articles such as artificial stone pipes, relief pipes, vessels, and tiles, according to which a mixture of asbestos (chrysotile), or some artificial fibrous material reduced to a state of fine division, is incorporated with cement such as Portland cement or other hydraulic binding medium and water in a boiler, the vessel provided with a stirring device, and for the purpose of freeing it from the water is in order that the fibres may be caused to lie in all directions throughout the mass, the said mixture is subjected to high pressure in a mould made strong enough to resist the pressure, whose walls are provided with holes and which is internally lined wholly or partly with an outer elastic thin metallic plate covered with an outer wire sieve of a fineness of from 150 to 180 meshes per square centimetre.

18,674 of 1904.—H. C. PRUCE: Telescopic Casements and Similar Stays.

A telescopic stay for casements and the like, consisting of an outer tubular and slotted member, telescoped by an inner and separable member provided with a detachable screw or the like traversing the said slot and serving as a means for preventing the separation of the members when in use, the said inner member being of such a section that it fills up the bore of the tubular member or outer sleeve, means being also provided for clamping or securing the said member in the adjusted position, the said outer member being made from open jointed tubing and its ends are secured into pummels or fittings whose edges constitute stops for the opposite ends of the slot which is formed by the said open joint, and is traversed by the detachable pin or stud of the inner member.

24,912 of 1904.—C. ROSENHEIM: Means for Operating and Securing Windows.

Apparatus for operating windows comprising a screw supported horizontally at a convenient height and a nut mounted on the said screw and adapted to engage one arm of a pivoted bell crank lever, the other portion of which imparts to the operating rod a vertical movement parallel to the window, means for automatically bolting the window comprising a lever pivoted above the operating rod and provided with a slot with an inclined portion in which travels a pin fixed to the operating rod so that the pressure of said pin against the inclined portion of the slot will cause said lever to turn about its pivot and operate a bolt to which it is secured at the end of a recessed guide provided with a spring and regulating the movement of the bolt when opening and closing the window.

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



### 694 of 1905.—R. S. GONSON: Means for Plugging the Outlet Pipes of Cisterns.

This invention relates to means removable at will for plugging the outlet pipes of cisterns and has for its object to obviate the present necessity of emptying a cistern and thus wasting water, or of resorting to the present method of a plumber having to thrust his arm into the water to cork or plug up the outlet pipe when anything is to be done to the taps or pipes supplied by the cistern. The invention consists in a portable tool or plug which may be carried by the plumber for use when required.

### 1,487 of 1905.—T. J. ARMSTRONG: Process in the Manufacture of Keen's or Other Cements Having a Gypsum Base.

This invention relates to the manufacture of cement of that class which have a gypsum base together with a small quantity of some supplementary salt. In carrying the invention into effect raw gypsum is taken in a fairly dry state and reduced to powder. This powder is then sufficiently incinerated with a solution of the supplementary salt to be used, each particle thus becoming covered. The damp mass thus obtained is then formed into cakes or briquettes in a press. These cakes are then calcined in the same manner as raw lump gypsum and subsequently again reduced to a powder which constitutes the cement.

### 2,427 of 1905.—A. H. TILTMAN: Construction of Walls.

An L-shaped facing brick having the upper and lower faces of the main portion of the brick and of the extending portion parallel to each other and the front and rear faces of the brick and extending portion parallel to each other with grooves arranged within said faces and around the top, bottom, and side of the main portion and extending portions of the brick.

### 7,385 of 1905.—J. ARMOUR: Dampers for Chimneys, Flues, and Like Purposes.

This invention relates to dampers for chimneys, flues, and like purposes and has for its object to construct such in a more effective manner than those now in use. In constructing a damper according to the invention upon the damper plate are cast or secured runners of V or half-round section which work in corresponding grooves in the damper case secured in the flue. By this means the passage of steam and smoke is prevented up the chimney when the damper is closed. In the event of dampers so made becoming warped owing to the action of the heat the runners remain in contact with their grooves at either the side or the bottom of such, thus effectively sealing the flue.

### 7,886 of 1904.—A. BRANCART and E. MICHOITE: Machines for Making Tiles for Lining Purposes, with Holding Hooks.

A press for moulding tiles, made of vitrified material, with catches on one side and a lustrous face on the other, composed of a table to carry any desired number of moulds, these moulds being closed on top by a lifting-plate which makes the smooth face, while on the bottom there is a hollow plate for water circulation, lifting vertically, and forming the impressed face of the tile, and the removal of the tile from the mould horizontally, after it has been sufficiently cooled.

### 19,737 of 1904.—A. J. BOULAN (HULSBERRY & Co.): Impregnation of Wood and Other Porous Materials.

The materials or substances to be impregnated are brought under atmospheric pressure into a room and are then exposed to the influence of the liquid having a pressure of one or more atmospheres. The surplus of the impregnating liquid is thereupon allowed to run off, and the impregnating apparatus, is put under vacuum, the result being that a large part of the impregnating liquid that penetrates into the cells, or pores during the process of impregnation, is expelled by the expansion of the air contained in the cells and compressed during the process of the impregnation.

### 1,812 of 1905.—J. C. BAYLES: Pavings or the Like, Composed of Plastic Material.

This invention relates to road surfaces, and other surfaces made from material which is plastic at the time of construction and has for its object to correct defects which exist in pavings and other surfaces of material and in a plastic condition. In carrying out the invention as applied to roadways, street surfaces, etc., laid with asphalt or other bituminous material, the grilles are prepared by binding flexible strips or ribbons of iron or steel into the form best adapted to accomplish the objects immediately in view, the strips thickness and width as the nature and other conditions may require. For asphalt street surfaces subject to normal ordinary traffic the strips are of strips or ribbons, of iron or steel, each one enough to form from one piece by binding, edge up, a grille covering a superficial area of about 12 in. square.

### 5,469 of 1904.—J. VINDEN: Apparatus for Melting Asphalt.

This invention relates to apparatus for melting asphalt to prepare it for laying, and has for its object to provide an apparatus of this class in which the heat shall be utilised to better advantage than those hitherto, with a resulting economy of fuel, and more rapid melting of the asphalt. According to the invention the apparatus comprises a furnace, a shell, and a cauldron supported in the shell above the furnace and so constructed that the hot gases or products of combustion are caused to sweep over the top as well as the sides and bottom of the cauldron before reaching the outlet or chimney. The apparatus also comprises a support for the fire bars adapted to admit air to the fuel to promote combustion.

### SOME RECENT SALES OF PROPERTY:

#### ESTATE EXCHANGE REPORT.

June 22.—By R. & J. R. MITCHELL (at Whitehaven).

Beckermest, Cumberland.—"Petersburgh Estate," 182 a. 2 r. 22 p., f. . . . . 28,000  
Halle, Cumberland.—A common allotment . . . 100  
Irtou, Cumberland.—"Moorgate Farm," 145 a. 1 r. 18 p., f. . . . . 2,000

June 22 and 23.—By WALTON & LEE (at Frome).

Marston Biggott, etc., Somerset.—"The Marston Estate," 3,564 a., f. (in numerous lots) . . . . . 120,000

June 23.—By FAREBROTHER, ELLIS, & Co. (at Ramsgate).

Ramsgate, Kent.—Bilton Pk.-rd., etc., twelve freehold building plots . . . . . 920

June 24.—By HAMPTON & SONS (at Oxford).

Oxford, Surrey.—A freehold building site, 17 a. 2 r. 10 p., f. . . . . 3,800

June 26.—By FAREBROTHER, ELLIS, & Co. (at Kingston).

Kingston, Surrey.—King's-rd., etc., twenty freehold building plots . . . . . 1,780

By CHOL. HODDAY (at Putney).

Putney.—100, Clarendon-rd., u.t. 88 yrs., g.r. 61. 10s., e.r. 502 . . . . . 630

June 28.—By ALFRED RICHARDS (at Tottenham).

Tottenham.—61, Baronet-rd., l.e.r. 281 . . . . . 340

June 28.—By J. M. LINDSEY & SONS (at Llanelli).

Pontyberem, Carmarthen.—"The Star Inn," y.r. 251; also three cottages and old post-office adjoining, f. . . . . 1,200

July 1.—By WRIGHT & SORBY (at Cambridge).

Burwell, Cambs.—Various enclosures of pasture and fens land, 134 a. 0 r. 31 p., f. and c. (in lots) . . . . . 778

By HENRY DIXON & SON (at Dorchester).

Corcombe, etc., Dorset.—"Pleasford Farm," 272 a. 3 r. 12 p., f., y.r. 2381 . . . . . 4,200

July 3.—By W. BRADBURY & SON.

Canorbury, S. Balfour-rd., u.t. 44 yrs., g.r. 61. 6s., e.r. 481 . . . . . 435

74, Marguery-st., u.t. 401 yrs., g.r. 61. e.r. 481 . . . . . 595

By DOWSETT, KNIGHT, & Co.

Islington.—47, 49, 51, and 53, Ockendon-rd., u.t. 98 yrs., g.r. 231, y.r. 1581 . . . . . 1,210

By EDWIN EVANS.

Cheshunt, Herts.—Crossbrook-st., "The Grange," 12 a., y.r. 1411. 6s.; also "Springfield" (adjoining) 3 a. of acres, y.r. 461 . . . . . 5,500

By CHOL. HODDAY.

Streatham.—41, 43, 45, 47, 50, 52, and 54, Pabfield-rd., u.t. 901 yrs., g.r. 441. 2s., y.r. 2401 . . . . . 2,060

By TUCKETT & SON.

Southend-on-Sea, Essex.—"The Castle Hotel," Danbury Hill, Essex.—"The Griffin Hotel," and 2 a. 2 r. 30 p., f. . . . . 7,000

Bayleigh, Essex.—"The Golden Lion Hotel," 71, 10s., e.r. 481 . . . . . 2,325

By CHOL. HODDAY.

Great Wakering, Essex.—"The Bell Inn," f. Canvey Island, Essex.—"The Lobster Smack," p.h. l.e. . . . . 3,050

By TUCKETT & SON.

East Hanningfield, Essex.—"The Windmill Inn" and 0 a. 3 r. 10 p., c. . . . . 2,300

High-rd., three copyhold enclosures, 11 a. 1 r. 20 p., f. . . . . 1,400

Bradwell-on-Sea, Essex.—"The Green Man," p.h. and 1 a. 1 r. 10 p., f. . . . . 2,075

Tillingham-rd., a plot of building land, f. Southminster, Essex.—High-st., "Rose and Crown Hotel," and 0 a. 2 r. 30 p., f. . . . . 150

King's-rd., copyhold building land, 1 a. 1 r. 0 p., f. . . . . 1,800

By J. D. WOOD & Co.

Attleborough, Norfolk.—"Little Ellingham Hall Estate," 523 a. 0 r. 16 p., f. . . . . 8,350

By SIMMONS & SONS (at Newbury).

Shefford, Berks.—"South Hadden" and "Shefford-pk." and "Temple Farm," 384 a. 3 r. 3 p., f. . . . . 2,500

Freehold residential site, 30 a. 0 r. 9 p., f. Enclosure of land, 120 a. 1 r. 9 p., f. . . . . 1,000

Shop and premises, area 1 1/2 a. y.r. 121. "Northfield Farm," 331 a. 1 r. 2 p., f. . . . . 2,225

Blacksmith's shop, cottage, etc., f., y.r. 71. 10s. . . . . 220

Two freehold holdings, 2 a. 1 r. 22 p., y.r. 311. (one with fishing rights) . . . . . 605

Residence, farmery, two cottages, and 2 a. 2 r. 15 p., f. . . . . 380

Freehold shop, residence, and 0 a. 3 r. 9 p., y.r. 101 . . . . . 220

Shefford Mill and 5 a. 0 r. 27 p., f. . . . . 900

Freehold enclosures, 1 r. 9 p., f. . . . . 180

Two cottages, shop, etc., 0 a. 3 r. 10 p., f. . . . . 180

Sixteen freehold cottages . . . . . 1,220

By MORGAN, BAINES, & CLARK.

Carshalton, Surrey.—Park Hill, "Elvetham," l., y.r. 651 . . . . . 2,750

By ALFRED RICHARDS.

Tottenham.—880 and 882, High-rd. (a.), f. . . . . 1,890

145 and 147, Northumberland-pk., f., y.r. 682 . . . . . 1,035

Waltham Abbey, Essex.—Eleanor Cross-rd., freehold building land, 5 a. 3 r. 8 p., p. . . . . 1,400

By ROBINS & HINE.

Hornsey.—40 and 42, Sydney-rd., f., y.r. 622 . . . . . 895

2, Windermere-villas, u.t. 851 yrs., g.r. 41. 10s., e.r. 481 . . . . . 455

Bow.—3, Gainsborough-rd., u.t. 841 yrs., g.r. 31. 6s., y.r. 301 . . . . . 280

Hounslow, Middlesex.—Rugby-rd., "The Harworth-road Nursery," area 2 a. 0 r. 37 p., c., y.r. 321 . . . . . 700

July 4.—By W. BRACKETT & SONS.

Beckenham, Kent.—37, Barnmead-rd., u.t. 70 yrs., g.r. 61. 10s., y.r. 401 . . . . . 800

By DAVID BURNETT & Co.

Stamford Hill.—Ferndale-rd., etc., two plots of freehold building land . . . . . 2,642

Tottenham.—Glasgow-rd., l.g. rents 1801, reversion in 73 yrs. . . . . 4,335

Lealand-rd., f.g. rents 961, reversion in 73 yrs. . . . . 2,415

High-rd., l.g. rents 371. 18s., reversion in 73 yrs. . . . . 1,010

Belton-rd., "The Belton Stores," u.t. 96 yrs., g.r. 161, y.r. 401 . . . . . 345

18, Beaconsfield-rd., u.t. 71 yrs., g.r. 61, e.r. 301 . . . . . 225

By J. W. COADE.

Holloway.—61, Cromwell-rd., u.t. 60 yrs., g.r. 11, w.r. 281. 12s. . . . . 160

By DEENHAM, TETSON, & Co.

Kennington.—139, Upper Kennington-ls., c., p. . . . . 400

By HAMPTON & SONS.

Northwood, Herts.—"Tower Dene" and 2 1/2 a., f. . . . . 3,450

By WALTON & LEE.

Kennington.—20, Kennington Gdn.-ter., u.t. 28 yrs., g.r. 121. 10s., y.r. 1901 . . . . . 1,830

By WESTON & SONS.

Brixton.—9, 11, and 13, Crasshaw-rd., u.t. 58 yrs., g.r. 161. 18s., y.r. 961 . . . . . 970

By WYER, ADAMS, & GLOVER.

Tottenham.—758, Seven Sisters-rd., f., p. . . . . 700

By STEPHENSON & ALEXANDER (at Chepstow).

Wolverton, etc., Monmouth.—"The Wolverton Estate," 1,672 a. 2 r. 25 p., f. (in lots) . . . . . 15,000

Llangwila Ucha, etc., Monmouth.—"Cafn Iola Farm," 42 a. 3 r. 33 p., f. . . . . 775

Wolverton, Monmouth.—"Mynydd Bach Farm," 18 a. 3 r. 12 p., f. . . . . 875

By H. & B. L. COBB (at Rochester).

Higham, Kent.—London-rd., eight enclosures, 43 a. 3 r. 23 p., f. . . . . 2,750

"Higham Hill Farm," 43 a. 3 r. 35 p., f., y.r. 461 . . . . . 3,150

Chiffe, Kent.—Two enclosures of pasture, 11 a. 3 r. 15 p., f. . . . . 280

Queenborough, Kent.—"Sittingbourne-rd., a block of freehold land, 15 a. 1 r. 25 p. . . . . 900

Sittingbourne-rd., three enclosures of pasture, 21 a. 0 r. 15 p., f. . . . . 1,125

By B. DONKIN & SON (at Newcast).

Warkworth, Northumberland.—"Amble Hope House" and farm, 362 1/2 acres, f., y.r. 3001 . . . . . 5,500

"The North Links," 57 acres, f. . . . . 350

"The East and West Garth," 1 a. 0 r. 17 p., f. . . . . 620

July 6.—By D. SMITH, SON, & OAKLEY.

West Levington, Wilts.—"West Levington House Estate," 2,566 a. 2 r. 24 p., f. . . . . 32,500

"The Lodge," 18 a. 3 r. 12 p., f., e.r. 1281 . . . . . 2,750

Ten freehold cottages and 3 a. 3 r. 14 p. . . . . 500

House, five cottages, and 0 a. 0 r. 58 p., f. . . . . 800

By BAXTER, PAYNE, & LEPPER.

Beckenham.—Wickham-rd., "Chilchester Lodge" and nearly 1 acre, f., y.r. 701 . . . . . 1,310

Wickham-rd., "Burrell Lodge," two cottages and nursery ground, f., y.r. 1001. 8s. . . . . 1,410

West Wickham, Kent.—Wickham Green, a parcel of building land with two cottages . . . . . 500

Beckenham.—Chancery-ls., l.g. 321, reversion in 401 yrs. . . . . 895

By ALLAN BOOTH.

Holloway.—110, Sussex-rd., u.t. 47 yrs., g.r. 61. 6s., e.r. 401 . . . . . 345

By PERCIVAL HODSON.

Hampstead-road.—10, Barnby-st., u.t. 37 yrs., g.r. 81, y.r. 661 . . . . . 490

By J. KEEF.

Finchley.—20 to 42 (even), Brackenbury-rd., u.t. 97 yrs., g.r. 601. 8s., y.r. 3271. 12s. . . . . 2,230

Leytonstone.—49, Pretoria-rd., f., y.r. 301 . . . . . 235

Walthamstow.—23, Melville-rd., u.t. 891 yrs., g.r. 61, y.r. 311. 4s. . . . . 200

By NASH, SON, & Co. (at Royston).

Therfield, Herts.—"Roborn Farm," 107 a. 3 r. 22 p., f., y.r. 601 . . . . . 1,070

By W. H. TAMPDEN (at Bridgwater).

North Peabottom, Somerset.—"Willstock Farm," 135 a. 1 r. 19 p., f. . . . . 6,500

July 6.—By H. J. BLISS & SONS.

Victoria-park.—53 and 54, Gore-rd., u.t. 49 yrs., g.r. 161, y.r. 581 . . . . . 885

Clapton.—143 and 145, Riderfield-rd., u.t. 73 yrs., g.r. 101, w.r. 681. 18s. . . . . 450

Tottenham.—Arnold-rd., builder's yard and workshop, f., e.r. 201 . . . . . 100

By GRAVES & SON.

Baywater.—20, Durham-ter., u.t. 431 yrs., g.r. 121, e.r. 891 . . . . . 610

By C. MANDELL.

Barnsbury.—5, 6, and 7, Cromley-st., u.t. 76 yrs., g.r. 211, y.r. 1201 . . . . . 1,200

2 and 4, Warner-st., u.t. 54 yrs., g.r. 161, y.r. 841 . . . . . 800

Limehouse.—Garriok Buildings, l.g. 201, reversion in 89 yrs. . . . . 400



FRIDAY, JULY 14.  
*Incorporated Association of Municipal and County Engineers.*—South Wales District Meeting, to be held at Swansea.

SATURDAY, JULY 15.  
*Incorporated Association of Municipal and County Engineers.*—Swansea Meeting (concluded).

WEDNESDAY, JULY 16. TUESDAY, JULY 25.  
*Royal Institute of Public Health*—London Congress (King's College and Regent-street Polytechnic).

WEDNESDAY, JULY 19.  
*Builders' Foremen and Clerks of Works' Institution.*—Half-yearly Meeting of the Members. 8 p.m.

*Institute of Sanitary Engineers, Ltd.*—Examination and Litera Committee. 3.30 p.m. Finance Committee. 5 p.m.

SATURDAY, JULY 22.  
*Northern Architectural Association*—Annual Excursion.—Barnard Castle and Raby Castle.

SATURDAY TO MONDAY, JULY 29-31.  
*Institute of Sanitary Engineers, Ltd.*—Summer Outing, to Southampton.

YORK STONE—Robin Hood Quality.		
Scrapped random blocks 2 10		
6 in. sawn two sides		
landings to sizes		
(under 40 ft. super.)	2 3 per ft. super.	
6 in. rubbed two sides		
ditto, ditto	2 6	
3 in. sawn two sides		
slabs (random sizes)	0 11½	

28	28	8 in. by 9 in.	12	10	0	13	10	0
29	29	battens .....	10	0	0	11	0	0







## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
*PUBLIC LIBRARY.....	Cheshunt U.D.C. ....	Not stated .....	Sept. 23

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
Repairs, Painting, etc., to Schools .....	Brighton Education Committee .....	T. Simpson & Sons, Surveyors, 17, Ship-street, Brighton .....	July 17
Two Traction Engines, 2 Stonebreaking Machines, etc. ....	London County Council .....	County Surveyor, County Court House, London .....	July 18
Stores .....	Bombay, Baroda, & Gen. In. Ry. Co. ....	T. W. Wood, Sec., Gloucester Hse., Bishopsgate-st. Without, E.C. ....	do.
Making-up and Paving Finland-road, etc. ....	Deftford Borough Council .....	Municipal Offices, 20, Fanners Hill, Deftford .....	do.
Thirty-one Cottages at Glyncorrwg .....	Glyncorrwg Building Club .....	Cook & Edwards, Architects, Masonic-buildings, Bridgend .....	do.
Painting and Cleaning Schools .....	Lea Education Committee .....	W. Pickett, Secretary, Education Offices, Leeds .....	do.
Trench Work .....	Glasgow Gas Department .....	A. Wilson, Engineer, 45, John-street, Glasgow .....	do.
Repairs & Improve, Boys' Sch., Georgetown, Trinidad .....	Monmouthshire Education Com. ..	D. Morgan, Architect, Charles-street-chambers, Cardiff .....	do.
Repairs & Improvements, School, Traedrhigwair .....	do. ....	do. ....	do.
Repairs and Improve, Infants' Sch., New Tredegar .....	Corporation of London .....	Engineer's Office, Guildhall, E.C. ....	do.
*DIRECTION, WHARF, HORNBURCH MARSHES .....	East Indian Railway Co. ....	C. W. Young, Secretary .....	July 19
Mild Steel Plates, Bars, etc. ....	North Dublin Guardians .....	F. Hall, Council Offices, Dublin .....	do.
Painting Work at City Dispensaries .....	Edinburgh Roads Department .....	City Road Surveyor, City-chambers, Edinburgh .....	do.
Concrete Paving, etc., of Carriage-ways of Streets .....	Mr. D. Evans .....	A. J. Margatroyd, Architect, 23, Strutt-street, Manchester .....	do.
Houses for Master at Crumpsall Workhouse .....	do. ....	B. L. Pritchard, 22, Castle-street, Brecon .....	do.
Alterations, etc., Servants' Quar., Ffrwdgrech, Brecon .....	do. ....	do. ....	do.
Buildings in the Stable-yard, Ffrwdgrech .....	do. ....	do. ....	do.
Alterations, etc., to Stables, etc. ....	Monmouthshire Education Com. ..	R. L. Roberts, Architect, Abercarn .....	do.
Classroom, Nantyglo Council School .....	Ipswich Corporation .....	E. Buckham, Borough Surveyor, County Hall, Ipswich .....	do.
1,000 tons of Grit Sand .....	Ilkley U.D.C. ....	J. R. Sutherland, City Chambers, 45, John-street, Glasgow .....	do.
Limestone, Granite, and Tar Macadam .....	Glasgow Corporation .....	E. C. Case, Architect, 37, Frederick-street, Edinburgh .....	do.
Brick Abutments, Piers, Olders, for Temporary Edges .....	Edinburgh & District Water Trustees .....	do. ....	do.
Additions to Superintendent's House, Alnwick Hill .....	Edinburgh City Council .....	Burgh Surveyor, Police-chambers, Edinburgh .....	do.
Stable, etc. ....	Edinburgh Education Committee .....	W. E. Putnam, Borough Engineer, Town Hall, Morley .....	July 20
Reconstruction of Drainage System of Waverley Mkt. ....	Consett Iron Co., Ltd. ....	C. E. Oliver, Architect, General Offices, Consett .....	do.
Tar Macadam, Bridge-street and Charwell School .....	do. ....	do. ....	do.
Two Semi-Detached Houses at Langley Park .....	Rhondda U.D.C. ....	O. Thomas, Engineer, Gas and Water Offices, Penfre .....	do.
Twelve Cottages at Leadgate .....	do. ....	J. Wiltet, Architect, Bideford .....	do.
One Cottage at Consett .....	Borough of Hampstead .....	Borough Engineer, Town Hall, Haverstock Hill, S.W. ....	do.
Gas Cooking Stoves .....	C.B. of Brighton .....	Borough Engineer, Town Hall, Brighton .....	July 21
Improvements, Morayshire Union Foorhouse .....	West Riding C.C. ....	F. G. Carpenter, Borough Surveyor, Town Hall, Leicester .....	do.
Four Shops and Houses, Towngate, Wyke .....	Leicester Corporation .....	J. H. Brierley, Borough Surveyor, Town Hall, Richmond .....	do.
*INTERVAL REDECORATION OF TOWN HALL .....	Richmond Corporation (Survey) .....	O. Thomas, Engineer, Gas and Water Offices, Penfre .....	do.
*GLAZED DRAIN PIPES .....	Rhondda U.D.C. ....	G. Ross, Burgh Surveyor, City-chambers, Edinburgh .....	do.
Reconstruct, Watchhouse, Hill Culvert, Thurleston .....	Clydebank Town Council .....	R. Morham, City Arch., Public Works Office, City-chambers, Edinburgh .....	do.
1,271 yds. Brick & Pipe Sewers (Belgrave Sewerage) .....	Bradford Education Committee .....	do. ....	do.
Painting, etc., Workmen's Dwellings, Manor-grove .....	Edinburgh City Council .....	W. A. Nicholson, Surveyor, Halstead, Essex .....	July 22
Gasholder and Steel Tank .....	do. ....	C. F. Wike, City Surveyor, Town Hall, Sheffield .....	do.
2,000 yds. of Sewers .....	Halstead U.D.C. ....	J. Vickers-Edwards, County Architect, County Hall, Walsfield .....	do.
Machine Tools, etc., Grange-road Centres .....	Sheffield Improvement Committee .....	A. A. Hunt, County Architect, Scarborough and Stry St. Edmunds .....	do.
Furnishings, Branch Library, Mornington .....	West Riding Education Committee .....	T. Kershaw, Architect, Lancs & York. Bank-chambers, Halifax .....	do.
Painting Branch Library, Mornington .....	West Sufolk Standing Joint Com. ....	do. ....	do.
Crossings of 13-brake Horse-power Gas Engine .....	Bingley Grammar School Trust .....	W. Rhodes Nunn, Architect, 13, Market-street, Bingley .....	do.
Cottages, Edmund-road and Clough-road .....	Conway Corporation .....	Borough Surveyor, Town Hall, Richmond .....	July 24
Two Schools at Bingley .....	Richmond Corporation .....	do. ....	do.
Alterations, etc., Newmarket Police Station .....	do. ....	J. Parker, City Surveyor, Town Hall, Hereford .....	do.
Two Houses .....	Hereford Education Authority .....	R. M. Kilop, Burgh Surveyor, 12, Tay-street, Perth .....	do.
Barkland Upper Hall, etc. ....	Perth Town Council .....	City Architect, Municipal-buildings, Cork-hill, Dublin .....	do.
Boys' School, Bradford-road, Bingley .....	Dublin Improvement Committee .....	J. E. Parker, C.E., Post-office-chambers, Newcastle-on-Tyne .....	do.
Annual Contracts .....	Hexham R.D.C. ....	District Engineer, Princes-street-station, Edinburgh .....	do.
Convenience, King Edward VII. Bridge, Kew .....	Caledonian Railway Co. ....	C. H. Baxter, 16, Robertson-street, Glasgow .....	do.
Conversion, St. Peter's Sch., into Council Sch. for 280 .....	Clyde Navigation Trustees .....	R. S. Griffiths, Architect, Tonypandy .....	do.
Conveyancing, etc., King Edward-street .....	Worley U.D.C. ....	A. S. Corson, Surveyor, Council Offices, Walsden .....	do.
Workmen's Dwellings at Kilmatham .....	Proprietor of Estate of Blairadam .....	Buchanan & Bennett, C.E., 12, Hill-street, Edinburgh .....	do.
Frithies and West Wylam Sewage Disposal .....	Surry Education Committee .....	J. Jarvis & Richards, 39, Victoria-street, Westminster, S.W. ....	do.
Steelwork, Oak Viaduct Renewal .....	Bockenham U.D.C. ....	Council's Surveyor, Beckenham .....	do.
Two Twin-Screw Steam Hopper Barges .....	Central London Slek Ass. Dist. Mgrs. ....	W. Lockwood, Architect, 3, Great Marlborough-st., Argyll-pl., W. ....	do.
Additions, etc., to Miners' Offices, Forth .....	Royal Borough of Kensington .....	Borough Engineer's Office, Town Hall, High-st., Kensington .....	do.
250 tons of Granite Setts .....	St. Marylebone Guardians .....	A. S. Snel, Archt., 22, Southampton-buildings, Chancery-la., W.C. ....	do.
*NEW SCHOOL AT BROOKWOOD .....	Hutton Down Amic. & Indus. Soc. ....	Manager of the Society .....	July 25
*EXTENSION OF ELECTRIC LIGHT WORKS .....	West Ham Corporation .....	J. G. Morley, Borough Engineer, Town Hall, West Ham, E. ....	do.
*FOR WORK, CLEVELAND-ST. W. ETC., ASYS. ....	West Ham Borough Council .....	A. B. McDonald, City Engineer, 64, Cochrane-street, Glasgow .....	do.
*PAVING & DRAINAGE IN DRAYTON-MEWS .....	Glasgow Corporation .....	E. C. Brooke, Architect & Surveyor, 6, Huddersfield-rd., Brighouse .....	do.
*PAINT, ETC., HOUSE, POOR WDS., EAST-ST., W. ....	Exmouth U.D.C. ....	S. Hutton, Surveyor, Public Hall-chambers, Exmouth .....	do.
*STABLES AND WAGON LARIES AT HUTTON, DOWNS .....	Stanley U.D.C. ....	J. Routledge, Surveyor, Stanley, R.S.O. ....	do.
*MAKING-UP BRADFELD-ROAD .....	Dorchester National Schs. Managers .....	H. O. Lock, 24, High West-street, Dorchester .....	July 29
*TRAMWAY OFFICES & GAS DEPOT, PLAISTOW .....	Malvern U.D.C. ....	Chapel House .....	do.
Baths and Washhouses at Springbank .....	Nelson Education Committee .....	W. O. Thorp, Surveyor and Waterworks Engineer, Malvern .....	do.
Old Premises, Brigatage, Brighouse .....	Metropolitan Asylums Board .....	T. Bell, Architect, Grimsbow-street, Burnley .....	do.
Cast Iron Pipes .....	do. ....	Office of the Board, Embankment, E.C. ....	do.
Steel Works and Improvements, South Moor-lane .....	Belfast Gas Committee .....	J. Stelfox, Engineer, Gasworks, Belfast .....	July 27
Street Crossings at Slacks, Oxhill and South Mo. ....	Prestwich Guardians .....	T. Worthington & Sons, Architects, 43, Brown-street, Manchester .....	do.
Painting, Whitewashing, and Repairs, etc., of Schools .....	Pansey U.D.C. ....	D. J. Longley, Engineer, Bank-chambers, Pontypool .....	July 23
Alterations, etc., to Brynhyfryd C.M. Chapel, Rhymney .....	Walsall Education Committee .....	Bailey & McCann, Architects, Bridge-street, Walsall .....	do.
Water Plant, Bromsborough .....	Birmingham Tramway Department .....	Harris & Harris, Surveyors, 1, Bennett's-hill, Birmingham .....	do.
Rating Main, Bromsborough to South Camp Reservoir .....	Hull Corporation .....	City Architect, Town Hall, Hull .....	do.
*PAINT, ETC., HIGHWOOD SCHL., BRENTWOOD .....	Gloucestershire Education Com. ....	M. R. Medland, County Architect, 16, Clarence-street, Gloucester .....	July 29
*PAINTING AT FORT GREEN S.P. HOSPITAL .....	South Yorkshire Joint Line Com. ....	E. Parry, Engineer, 13, Victoria-street, Westminster, S.W. ....	do.
*PAINTING AT DAREBETH ASYLUM, KENT .....	Ellensmere Port and Whitby U.D.C. ....	J. M. Hudson, Surveyor, Bank-buildings, Ellensmere Port .....	do.
Iron Castings .....	The Governors .....	Leonard Stokes, Architect, 2, Great Smith-street, S.W. ....	do.
Boundary Wall, Charlston-road, Blackley .....	Northumberland Education Com. ....	A. J. Bean, County Surveyor, The Moot Hall, Newcastle-on-Tyne .....	July 31
Cemetery Chapel, Caretaker's House, Roads, etc. ....	Prestwich U.D.C. ....	Surveyor, Chester Bank, Prestwich .....	do.
School, Wolverhampton-road .....	Axbridge U.D.C. ....	A. Powell, Engineer, 10, Orchard-street, College Green, Bristol .....	do.
Tramway Depot, Coventry-road .....	do. ....	do. ....	do.
*STEELWORK, ETC., NEW PUBLIC HALL, HULL .....	do. ....	do. ....	do.
Elementary School, Lydbrook .....	do. ....	do. ....	do.
Main Line & Branches between Laughton & Kirk Sandall .....	do. ....	do. ....	do.
Street-making (Bridge-street, etc.) .....	do. ....	do. ....	do.
*NEW GRAMMAR SCHOOL, LINCOLN .....	do. ....	do. ....	do.
Chappington Guide Post New School .....	do. ....	do. ....	do.
Private Street Improvements, Chester-street, etc. ....	do. ....	do. ....	do.
Two miles of Sewers (Wington Sewerage Works) .....	do. ....	do. ....	do.

## CONTRACTS.—Continued.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
465 yds. of New Street (Richmond-street) .....	Brackley R.D.C. ....	W. J. Treadwell, Council's Surveyor, Middleton Cheney, Banbury	July 31
Alterations, etc., to Workhouse .....	Derby Guardians .....	F. C. Couthurst, Architect, 4, Albert-street, Derby .....	do.
Iron Fencing and Wall at New Cemetery .....	Sevenoaks U.D.C. ....	S. Towson, Surveyor, Council Offices, Argyle-road, Sevenoaks ..	do.
Granite .....	East Dereham U.D.C. ....	H. G. Hinson, Surveyor, Theatre-street, East Dereham .....	do.
Repairing & Paint Outside Workhouse, Tatlingstone Station at Waterford .....	Sanford Guardians .....	A. J. Howard, Clerk, 34, Princes-street, Ipswich .....	do.
Premises, Ballymoney Technical School .....	Gt. Southern & Western Ry., Ireland	J. A. Hanna, Architect, Ocean-buildings, Belfast .....	Aug. 1
*MAK-UP FERDALE, GLADSMORE, ETC., R.D.S.	Tottenham U.D.C. ....	Council's Engr., Coombes Croft House, 712, High-rd., Tottenham	do.
*SUPPLY, ETC., 4-in. CON. TUBES, MARSH-LA.	Glasgow Corporation .....	do.	do.
Painters' Work at Police Offices, etc. ....	Ebbw Vale U.D.C. ....	Office of Public Works, City Chambers, 64, Cochrane-st., Glasgow	Auk. 2
Cables, Overhead Lines, Street Lamps & Fittings, etc.	Belfast Gas Committee .....	R. P. Wilson, Engineer, 68, Victoria-street, Westminster .....	Aug. 5
Gas Cookers, Heating Stoves, etc. ....	Septon U.D.C. ....	J. Stelfox, Engineer and Manager .....	Aug. 9
Embury Moor Reservoir on Blackey Moor .....	Blackburn Corporation .....	G. H. Hill & Sons, Engineers, 3, Victoria-st., Westminster, S.W.	Aug. 21
Fire Station and Dwellings on Blackey Moor .....	Wolverhampton Corporation .....	Briggs & Wolstenholme & Stones & Stones, Richmond-ter., Blackbn.	Aug. 26
Tatlingstone Pumping Sta. Extensions (Contract No. 2)	Merthyr Tydfil U.D.C. ....	E. A. B. Woodward, Waterworks, Engr., Town Hall, Wolverhampton	Sept. 1
Recess Destructor, Plant, and Buildings .....	Corporation of Calicut (Peru) .....	T. F. Harvey, Engr. and Surveyor to the Council, Merthyr Tydfil	do.
\$8,000 lineal metres of Earthenware Tubing .....	West Riding Education Committee	Graham, Howe, & Co., Mersey Chambers, Liverpool .....	Oct. 5
C.I. Piping for Ventilation .....	Inveresk (Land) School Board .....	S. Abson, Divisional Clerk, Education Offices, Woodhouse .....	No date
Cleaning and Painting of Intake, etc., Schools .....	Cardiff Education Committee .....	G. Rayhurst and J. Whittaker, Joint Secs., 2, Oak-st., Acrlington	do.
Hill, Hlshaw, Abercrombie .....	do.	A. Murray Hardie, Architect, 20, George-street, Edinburgh .....	do.
School at New Craig .....	do.	J. H. Dunn & Co., Estate Agents, Waterloo-road, Hunslet .....	do.
Laundry and Alterations, Brampton Workhouse .....	do.	do.	do.
Ten Through Houses, Longwood-grove, Hunslet .....	do.	Danby & Simpson, Architects, 73, Albion-street, Leeds .....	do.
Two Through Houses, Longwood-grove, Hunslet .....	do.	J. J. Jackson, Education Offices, Howard-gardens, Cardiff .....	do.
Wesleyan Chapel and Schools, Bramham, Leeds .....	do.	Brodwick, Lowther, & Walker, Architects, York-chbrs., 77, Lowgate, Hull	do.
Painting, Colouring, etc., Severn-rd. Council School	do.	do.	do.
Catholic Church, Tyne Dock, South Shields .....	do.	do.	do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*JUNIOR BUILDING SURVEYOR .....	London C.C. ....	150l. per annum .....	July 20
*CHIEF ASSISTANT IN BUILD. TRADES DEPOT .....	Northern Polytechnic Institute .....	150l. per annum .....	July 24
*JUNIOR ASSISTANT .....	William D.D. ....	175l. per annum .....	do.
*CLERK OF WORKS .....	Ilkley U.D.C. ....	19. Roberts .....	July 28
*TEACHER OF BUILDERS' QUANTITIES .....	East Ham Technical College .....	Not stated .....	No date
*TEACHER OF BRICKWORK .....	do.	do.	do.
*TEACHER OF PLUMBER'S WORK .....	do.	do.	do.

Those marked with an asterisk (\*) are advertised in this number.

Competitions, lv.

Contracts, lv. vi. viii. x.

Public Appointments, xvi. xvii.

## TENDERS.—Continued from page 79.

LLANWYDDYD WELLS.—For building a bungalow at Llanwryd, for Mr. Rhyu D. Jones, B.A. Mr. D. Jenkins, architect, Llanidlo.—  
N. Evans, Llanwryd— £685

LONDON.—For the erection of new public baths in Manor-street, King's-road, Chelsea, for the Chelsea Borough Council. Messrs. Wills & Anderson, architects, 4, Adam-street, Adelphi, W.C. Quantities by Mr. F. H. A. Hardcastle, 5, Old Queen-street, S.W. —

	Reinforced Concrete	Expanded Metal Co.	Total.
Sims & Woods .....	£4,398	100	34,496
Fryer & Co. ....	35,388	100	35,000
W. Taylor & Co. ....	32,500	50	32,815
Kilby & Gayford .....	32,125	600	32,000
Spencer, Sanjo, & Co., Ltd.	32,000	675	32,560
Gordon & Sons .....	31,000	650	32,550
Appleby & Sons .....	31,662	850	32,512
Foster & Dickson .....	31,600	700	32,300
Johnson & Son .....	31,454	580	32,004
Lole & Co. ....	31,817	175	31,993
O. Wall, Ltd. ....	31,250	700	31,950
Strange & Sons .....	31,322	101	31,713
Stimpson & Co. ....	31,111	1,000	31,700
Bulled & Co. ....	31,111	530	31,641
Deering & Co. ....	30,975	624	31,599
Leale & Co., Ltd. ....	31,167	350	31,463
Martin & Wells, Ltd. ....	30,900	500	31,400
Kirk & Randall .....	30,546	800	31,046
Patman & Fotheringham	31,000	—	31,000
Ltd. ....	30,500	500	31,000
Holliday & Greenwood .....	30,577	400	30,977
W. Johnson & Co., Ltd. ....	29,806	1,050	30,850
H. L. Holliday .....	29,874	—	29,874
W. Lawrence & Co. ....	29,704	—	29,704
Wollock & Co. ....	29,872	850	30,722
Lordon & Son .....	29,997	800	30,797
Cropley Bros., Ltd. ....	29,715	652	30,549
Prestige & Co. ....	29,705	600	30,545
D. W. Barker .....	29,808	449	30,422
Kirk & Randall .....	29,873	449	30,422
W. J. Roushey .....	29,440	950	30,390
Walls & Sons, Ltd. ....	29,113	1,200	30,313
W. Wallis .....	29,831	1,280	30,211
C. G. Hill .....	29,097	1,000	30,057
A. Hudson & Co. ....	29,220	750	29,970
B. T. Nighlingale .....	29,200	800	29,700
W. G. Minter .....	29,400	—	29,400
Galbraith Bros. ....	29,429	818	29,247
A. Faulkes .....	29,192	818	29,136
A. N. Coles .....	28,616	534	29,049
Cheesman & Sons .....	28,499	—	28,499
J. M. Patrick .....	27,592	651	28,253
Garrett & Son .....	27,592	—	27,592

## LONDON BOARD OF EDUCATION TENDERS.

## PAINTING OF SCHOOLS DURING THE SUMMER

## HOLIDAYS, 1905.

## Camberwell, N., Crawford-street (Painting Interior and

## Exterior).

## H. L. Holloway 5374 0 0 W. Sayer &amp; Son 5511 0 0

J. R. Sims .....

W. V. Goad .....

J. Appleby & Sons .....

Maxwell Bros. ....

Lid. ....

Chelsea, "Ashburham" (Painting Interior and Exterior).

C. Johnson .....

Lole & Co. ....

Crabb & Sons .....

W. Johnson & Co., Ltd. ....

W. King & Son .....

Lathey Bros. ....

Son .....

Clapham, Honeywell-road (Painting Interior of Old

Portion and Interior and Exterior of Enlargement).

W. King & Son 2585 0 0 R. A. Jewell .....

J. Sheldbourne & Co. ....

Martin, Wells, & Co., Ltd. ....

E. Flood .....

W. Johnson & Co., Ltd. ....

Holloway Bros. ....

(London).

Lid. ....

Fulham, the "Peterborough" (Painting Interior and

Exterior).

Lole & Co. ....

Hudson Bros. ....

A. Leather .....

W. Johnson & Co., Ltd. ....

Crabb & Son .....

Hamstead, Fleet-road (Painting Interior and Exterior).

Holloway Bros. ....

(London), Lid. £1,110 0 0 F. Chidley & Co., Ltd. ....

P. A. M. & Co. ....

Fotheringham, Ltd. ....

T. Crutts .....

G. Neale .....

LONDON.—For the erection of five shops at Askew-

Road, Hammersmith, for Mr. A. Gard. Mr. Jasper J.

Kell, architect, 213, Hoe-street, Walthamstow, and

Leytonstone.—

Cropley Bros. ....

S. W. Robinson .....

J. Reppen .....

LONDON.—For alterations and additions to casual

wards, Lowndes-road, Rotherhithe, S.E., for the Bermond-

sey Guardians. Messrs. Newman & Newman, architects,

31, Tonley-street, London Bridge, S.E. —

W. Reason, 47, Rotherby-avenue, E.C. — £420

LONDON.—For alterations to No. 514, High-road,

Tottenham, for Mr. A. J. H. Ladd. Mr. Augustine C.

Green, architect and surveyor, 40, Bruce Castle-road,

Tottenham, N. —

Pollard & Brand .....

A. Monk .....

J. Groves & Sons .....

A. Porter .....

Luton.—For the erection of a bandstand at War-

down Park for the Luton Corporation. Mr. S. F. L.

Fox, A.M.Inst.C.E. —

W. MacFarlane & Co., Glasgow .....

Luton.—For unclimbable iron fence, for the Town

Council of Luton. Mr. S. F. L. Fox, A.M.Inst.C.E. —

Per yd. a. d.

Baylis, Jones, & Baylis, Wolver-

hampton .....

Norbiton.—For alterations to 200, London-road,

Norbiton, for Mr. A. Moss. Mr. Jasper J. Kell, archi-

tect, 213, Hoe-street, Walthamstow, and Leytonstone:—

Warwick & Son .....

Norwich.—For colouring, painting, whitewashing,

etc., various schools, for the Education Committee.

Mr. C. J. Brown, architect and surveyor, Cathedral

Offices, The Close, Norwich:—

A. Taylor, 98, Only-street, Norwich .....

Lawn & Blyth, Ber-street, Norwich .....

A. Browne, Only-street, Norwich .....

E. E. Huggins, Queens-road, Norwich .....

Ludlow & Son, St. Giles-street, Norwich .....

Abbs, 106, Aylsham-road, Norwich .....

I. W. King, Southwell-road, Norwich .....

Pontypool.—For erecting new school, and

alteration and additions to Pengam Chapel. Mr. W.

Beddoe Rees, architect, 3, Dumfries-place, Cardiff:—

Jenkins & Co. ....

Bailey Bros. ....

T. Broad & Co. ....

Mears & Co. ....

J. Charles .....

To be completed in ten months.

PORTADAW.—For water mains, etc., for the

Rural District Council. Mr. J. Morgan, Surveyor.

Quantities by Surveyor:—

At Cwmantilly, Cylpebbyl, and Gwyn-street, Allthron.

D. Evans, Llanelly .....

At Yr-hall, and Warrington, Gwyn-street, Gwyn.

J. Rees, Yr-hall, Gwyn .....

For 100 yds. of 4-in. Kerbstones at Varde-road, Clydach.

E. Reynolds, Clydach-on-Tawe .....

Queensbury.—For erecting six through houses at

Ford Hill. Messrs. J. Drake & Son, architects, Queens-

bury:—

Mason: G. Drake, Queensbury .....

Joiner and Carpenter: H. Abbott, Queens-

bury .....

Slater: A. Blagborough, Bradshaw .....

Plasterer: W. H. Sutcliffe, Queensbury .....

Plumber: W. Hodgson, Queensbury .....



**RHYDYMYN (Flintshire).**—For erecting a new bridge and approaches over the River Alyn, for Holywell Rural District Council. Mr. S. Evans, County Surveyor, County-buildings, Mold:—

**Contract A.**—Excavation for, and Building of, Abutment and Wing Walls, Filling, Road-Making, Draining, etc.  
Sibson Bros. £443 10 0 G. Wright & Sons ..... £256 0 0  
R. Williams ..... 408 5 10 H. Hughes ..... 348 8 0  
T. Foulkes ..... 393 17 8 E. M. Patrick ..... 341 18 0  
R. Peters ..... 370 0 0 M. S. Rogers, .....  
T. Roberts ..... 480 0 0 Flint\* ..... 318 14 0  
P. Edwards ..... 375 0 0

**Contract B.**—For Supplying and Erecting Steel Work Complete.  
Pondleton Iron Works ..... £220 17 3 J. O. Brettell ..... £254 10 6  
W. C. & J. Kay ..... 327 0 0 Gilbert Thomp-son & Co. .... 220 0 0  
Rubbey & Co. .... 300 0 0 Dorman, Bagnall & Co., Middle-  
Dee Shipbuilding Co. .... 270 0 0 borough\* ..... 168 0 0

**SALISBURY.**—For erecting post office, Inland Revenue offices, and county court, for H.M. Commissioners of Works and Public Buildings:—  
A. W. Long ..... £11,691 0 Bird & Pippard ..... £2,700 0  
Hayward & Webb & Co. .... 9,487 0  
Wrooker ..... 10,493 0 W. Webb ..... 9,339 0  
F. Merrick & Son ..... 10,417 0 A. J. Colborne ..... 8,869 0  
H. & C. Spackman ..... 9,087 0 Harris Bros. .... 8,475 0  
E. Walters & Son ..... 8,444 0 J. Long & Sons ..... 8,414 0  
S. Son ..... 9,350 0 S. Salter ..... 8,361 0  
E. Hall ..... 9,890 0 G. Moore\* ..... 7,436 13  
Stephens, Bastow & Co. .... 9,734 0

**SOUTHAMPTON.**—For constructing a pipe sewer at Hoare's Hill, for the Corporation. Mr. J. A. Crowther, Borough Engineer:—  
Lawrence ..... £232 0 0 Douglas & Richards ..... £190 0 0  
G. R. Long ..... 227 13 3 J. Butts\* ..... 187 0 0  
F. Osma ..... 211 0 0 J. Butts\* ..... 187 0 0  
[All of Southampton.]

**SOUTHAMPTON.**—For constructing a pipe sewer and storm water drains in Belleme-road and Hill-lane for the Corporation. Mr. J. A. Crowther, Borough Engineer:—  
G. R. Long ..... £1,771 16 7 F. Osma ..... £1,447 0 0  
H. J. Hood ..... 1,662 0 0 Douglas & Richards ..... 1,827 0 0  
H. Lawrence ..... 1,629 0 0 J. Butts\* ..... 1,498 0 0  
J. Butts\* ..... 1,498 0 0  
[All of Southampton.]

**SWANSEA.**—For Libanus new Baptist Chapel, Cwmberla. Mr. H. A. Ellis, architect, 10, Fish-street, Swansea:—  
T. Richards & Son £4,816 0 Lloyd Bros. .... £4,400  
Walters & Johns ..... 4,800 J. & D. Jones ..... 4,400  
Bennet Bros. .... 4,750 J. & F. Weaver, .....  
D. Jenkins ..... 4,699 Swansea\* ..... 4,100  
[Architect's estimate, £4,376.]

**SWANSEA.**—For erecting ten pairs of semi-detached villa residences on the Codsiacon Estate, Society, for the Committee of the Grosvenor Building Club. Mr. Harold Kennard, architect, 13, Railway-approach, London Bridge, and at Swansea. Quantities by Mr. John Moir Kennard, 13, Railway-approach, London Bridge:—  
Waring, Cole, & J. & T. Weaver £9,900 0  
Waring ..... £11,366 18 Lloyd Bros. .... 9,615 0  
E. Thomas & T. Richards ..... 9,614 0  
Sons ..... 10,684 0 Pye, Parkinson, & Co., Sketty\* ..... 8,638 0  
D. Jenkins ..... 10,600 0 J. Richards ..... 7,500 0  
G. Mercer ..... 9,095 0  
Price Bros. .... 9,951 0

**SWINDON.**—For erection of a detached house at Shaw, for Mr. H. Carter. Messrs. Drew & Sons, architects, Regent-circus, Swindon. Quantities by the architects:—  
H. & C. Spackman, Swindon\* ..... £630 2 7

**SWINDON.**—For erection of six cottages and house and shop at Redborne, for Mr. J. Talbot. Messrs. Drew & Sons, architects, Regent-circus, Swindon:—  
J. G. Norman, Swindon\* ..... £912 10

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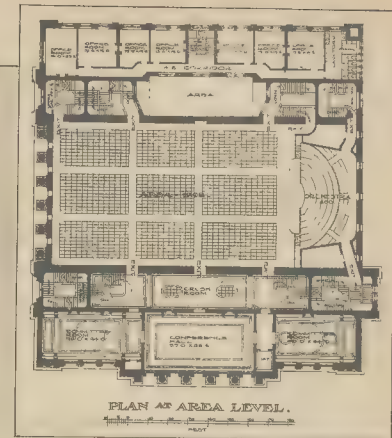


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THE BUILDER, JULY 15, 1905



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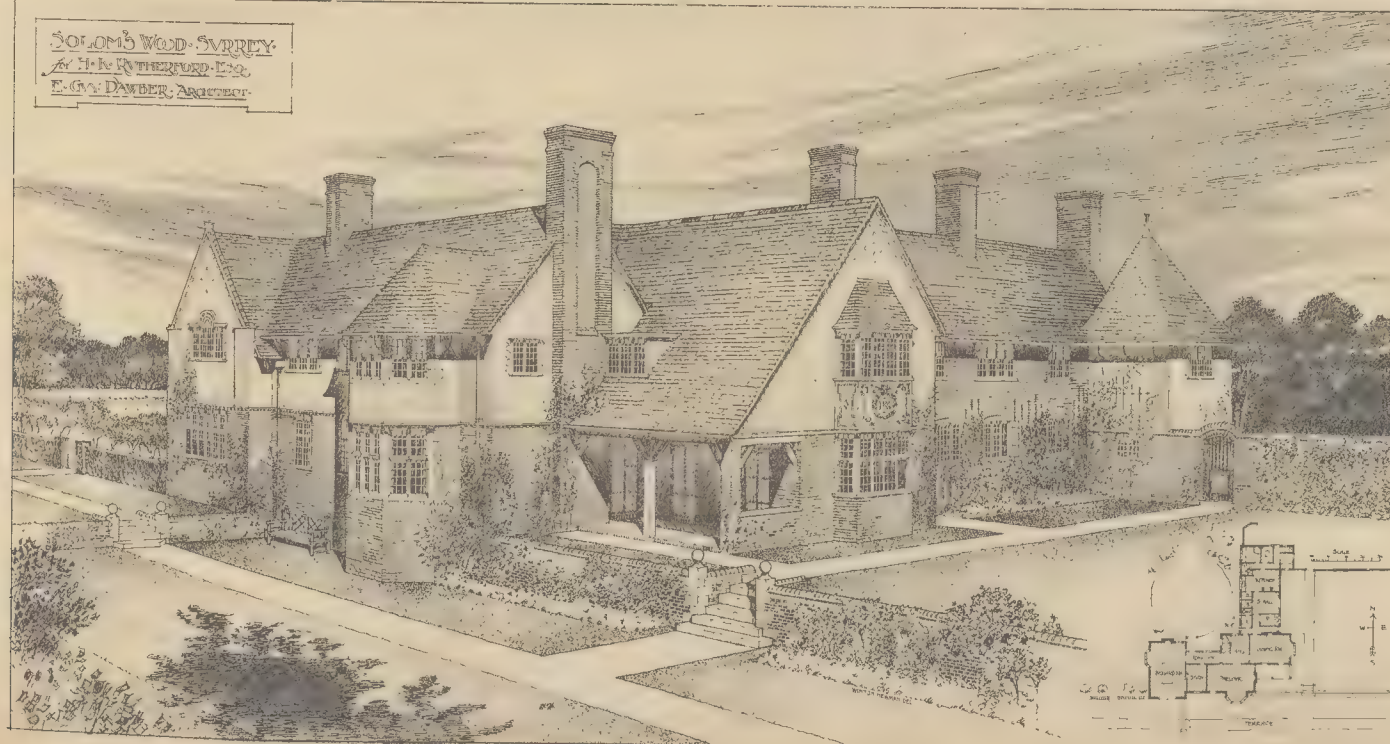




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# The Builder.

VOL. LXXXIX.—No. 3259.

JULY 22, 1905.

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New Premises, St. James's-street.....	Mr. Leslie W. Green, A.R.I.B.A., Architect.
Design for Proposed Grammar School.....	By Mr. C. F. A. Voysey.
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### Report of the London Traffic Commission.



THE Report of the "Royal Commission on London Traffic" is a document that almost takes away one's breath—so immense are the interests involved in

it, and so heroic are some of the measures suggested in it for the amelioration of the means of locomotion and transport in London. The subject, in fact, cannot be restricted to mere questions of accelerating traffic; it is inextricably interwoven with questions of street improvement, distribution of habitations, and hygiene; the last-named consideration, indeed, forcing itself upon us in one or two aspects which do not seem to have been quite obvious to the Commissioners.

The present first volume of the Report gives us only the outline or framework of the inquiry; long as it is, it is the Commissioners' Report only, their *résumé* of what was brought before them; for the evidence and much other valuable matter we have to wait for the appearance of the remaining volumes. But we may take it that the Report gives a perfectly fair summary of the case as it was brought before the Commission.

In their Preliminary observations the Commission wisely remark that "there can be no finality in the question of the best means of locomotion and transport for great cities"; and that in the case of London more especially the problem

should be considered in the first instance on broad and general lines, particular branches of the problem being the subject of separate and distinct inquiries. This is a rational view to take: settle a broad principle first, then consider details in relation to it. And in London especially the question of locomotion assumes an unusually large aspect in view of the immense numbers of people who live on the outer radius of greater London, and have to get into and out from the centre of London every morning and evening; so that it is not only the question of the congestion of traffic in London, but of the rapid and healthy means of transit (we insert the second adjective advisedly) from the centre to the suburbs. And with this is connected, in the opinion of the Commission, the problem of the housing of the working classes, and of overcrowding, only to be met, says the Report, by enabling workmen to get in and out of London quickly and cheaply, and providing housing for them in outer zones.

We will return to that afterwards. The traffic of central London is, after all, the central portion of the subject. The gist of the problem is stated in Section 21 of the Report:—

"21. The chief difficulty that stands in the way of improving the means of locomotion in London is the narrowness of the streets and the fact that they were not originally laid out on any general plan. If the streets were of sufficient width, and had been laid out on a regular plan, the congestion of vehicular traffic would practically disappear; the long-distance traffic could be provided for by shallow underground railways at a cost which would not be prohibitive; and a complete system of surface tramways could be laid down which would carry the short-distance and miscellaneous passenger traffic of London cheaply and quickly."

This is only another of many testimonies to the serious mistake that has been continuously made in London, in carrying out street improvements without any reference to a comprehensive and pre-arranged plan. As is remarked in Section 25, even when in the last century the question of improving the streets of London was taken in hand, "the attention of the authorities was devoted to the removal of particular evils which could no longer be overlooked, rather than to the adoption of a comprehensive plan which would provide both for immediate and future wants." And even in these partial improvements the lesson as to the insufficient width of London streets had not been taken to heart, and it is only in its most recent proposals that the London County Council has had the boldness to contemplate anything wider than a 60-ft. street as a necessity. If the Report of the Commission does nothing else, it has at least the merit of having put forcibly the absolute necessity of carrying out improvements on a definite system instead of by piecemeal operations having no necessary connexion with one another.

In regard to what may be called the interior traffic of London, as distinguished from traffic between the centre and the suburbs, the difficulties are well summed up in the words of Section 65 of the Report:—

"65. At the root of the problem of London locomotion lies the fact that many of the streets of London are too narrow, not a surprising fact when it is remembered how London grew without method or control. It affects all kinds of locomotion in a greater or less degree. Vehicles move more slowly because they move in a too



confined space; so much so that we learn that the speed of vehicles, such as omnibuses and cabs, falls from about 8 miles an hour while the streets are fairly free to about 4½ miles an hour during the busy hours of the morning and afternoon. It is more difficult, on the crowded surface to find room for tramways, and more difficult to find room for railways just beneath the surface in addition to the numerous lines of pipes which are there already. No argument is needed to show that immediate action is necessary to secure that all streets to be constructed hereafter shall be of sufficient width. That can be provided for by regulations. It is equally clear that, if it be practicable to pierce new arterial streets and to widen existing streets, every kind of locomotion will be facilitated; the question is how far it is practicable to do this and how fast it can be done."

In the course of the evidence brought before them the Commission received a great many suggestions for dealing with this difficulty. One of these was the construction of a circular road 75 miles in length, at a radius of 12 miles from St. Paul's; a futile suggestion, since people do not want to go round London; they want to go through it. Providing alternative streets parallel to crowded thoroughfares is a more reasonable and more possible suggestion; and we read that, besides these, a multitude of particular works in the way of widening have been pressed on the attention of the Commission. As to the details and the feasibility of these schemes we can form no opinion until we have the volume containing the evidence. But the Report implies that the Commission do not think it necessary to enter on these schemes, as they have a report from their Advisory Board of Engineers, which was compiled after full consideration of all these proposals, and embraces all that require particular notice. This Advisory Board consisted of Sir J. Wolfe Barry, Sir Benjamin Baker, and Mr. W. Barclay Parsons, the chief engineer to the New York Board of Rapid Transit Railway Commissioners, who, besides his New York experience, is said to be well acquainted with London. This Report will be contained in one of the future volumes, so that we must wait for that to know all the details of its suggestions, and the reasons for them. In the meantime we have in the present Report the outline of their recommendations, and these are sufficiently startling. The principal one is stated in Section 69:—

"69. By far the most important of their recommendations is a proposal for the construction of two Main Avenues through London, one from west to east to connect Bayswater-road with Whitechapel and passing through the City of London in the neighbourhood of London Wall, the other from north to south to connect Holloway with the Elephant and Castle, passing by a new bridge across the Thames near the western boundary of the City. The precise route which these avenues should follow is not definitely fixed, and would have to be laid out when the time for construction comes. Each avenue would be 140 ft. in width from house to house, with subway for water mains and so forth, and would afford space for carriage under the footpaths. It is also intended that there should be four lines of tramway on the surface and four lines of railway a few feet below the surface, so as to allow express trains and local stopping trains to be run on different rails. Both tramway and railway are intended to be worked by electricity.

The design is that the tramways on each of these Main Avenues should be connected with the tramway systems at both ends, and also afford interchange of traffic with the various systems of tramways crossed on the route, so as to provide through communication with all parts of London and its suburbs."

That such a scheme would pretty nearly put an end to the difficulties of internal locomotion in London seems

obvious; but can it be considered to be a scheme within the region of practical and practicable undertakings? The north and south road would not be so appalling a problem as the east and west one, and on the other hand it is not quite so important. But what is to be said as to the proposal to drive a street 140 ft. wide through the City? Independently of the enormous cost of such an undertaking, it would involve such an interference with existing property and vested interests that it may be questioned whether, in the eyes of owners of property in the City, it would not be regarded as a campaign against them rather than a public benefit. It is true that the Advisory Board do not contemplate that such a scheme could or should be carried out at one coup; they only recommend it as a scheme to be laid down on the map of London and gradually worked up to, piece by piece; and they suggest, as a method of meeting the expenditure, an extensive purchase of back lands near one of the selected routes at present values; a great land speculation, in fact, which it is suggested might prove remunerative in the end. Granting that it might, the question naturally occurs, how long would it take before such a scheme could be carried out and commence to repay itself? And is it certain that circumstances would not have changed so much before that time, that what was entered upon as a public necessity or convenience might in the end be regarded as a Utopian enterprise which had over-reached itself? Throughout the Report it is assumed that street traffic and crowding in London will go on increasing in the same ratio as heretofore; but is that certain? Is it not possible that a re-action against the tendency to crowd into London may set in? We are not sure that signs of such re-action are not already in the air; and if there is any chance of that, we can hardly expect those who discern it to give support to an immense scheme, in the face of a doubt whether in the end it is really a necessity. There is such a thing as looking too far ahead, and we are inclined to think that this scheme of the two avenues is open to that objection. It would have been a splendid thing to do in laying out a new city; whether it can be carried out in an old one is quite another matter.

The Advisory Engineers' Report, however, may do real good if it lead the authorities and the public to appreciate the importance of maintaining a much higher standard of width for new streets. They propose that new streets or widened streets should be laid out according to the following standards of width from house to house, according to their importance and probable amount of traffic:—

Main avenues . . . . .	140
First-class arterial streets . . . . .	100
Second-class streets . . . . .	80
Third-class streets . . . . .	60
Fourth-class streets . . . . .	40 or 50

It is amusing to see that in this schedule the London County Council's width for best streets is reduced to the fourth in the descending scale. But on this point at least we are entirely with the "Advisory Engineers." Their widths are not one whit too great; and even if their grand scheme of the

two avenues is too large to be carried out the laying out of new or widened streets according to that schedule of width would work a considerable improvement in the course of time.

After the question of width of streets and in some degree bound up with it comes that of the nature and connexion of the means of locomotion. Leaving railways on one side for the moment we find that the Commission lays great stress on the importance of the further development and connecting up of the tramway system. The Report draws attention to the curious fact that, while there is a considerable tramway system both east and west of London, there is no connexion between them, and that no one is able to go from east to west of London except by a change of conveyance. It is urged by the Advisory Engineers among other things, that the Euston and Marylebone roads, though at some points too narrow, have at present a great capacity for widening owing to the existence along a great portion of them of fore-courts or gardens in front of the houses, part of which could be taken for widening the roadway without much expense; and that there would be no very great outlay necessary to render this line of road a wide east to west avenue, capable of carrying a line of tramcars. We think the forming of such an avenue, though quite practicable, would be both a longer and a more costly business than is calculated in the Report, but we quite agree that it is a thing to be kept in view, and that with this object the roads in question should be carefully watched so that any further advance of the building line over the existing open spaces should be prevented. The Advisory Engineers also draw attention to four other routes on which, with the same object, an eye of authority should be kept—viz.: the Bayswater-road; the Hammersmith-road; the Fulham-road; and the King's-road, Chelsea. These routes, they say, "are especially important, not only because of the great traffic which they already carry, and its probable increase, but because also they are routes specially suited for tramway service." By "specially suited" we suppose is meant in the sense of direction, for it is hardly to be maintained that King's-road, Chelsea, as it exists is suitable for tramway service; it is in many parts much too narrow. But all these are no doubt good routes for tramway services taking people from the centre to the circumference of London.

This, however, leads us to the consideration, what is really the best means of traversing the crowded streets in the centre of London? The Report of the Commission, coupled with that of the Advisory Engineers, appears to lay great stress on the development of the tramway system; but it must always be remembered that unless we can get wide streets for a tramway surface, the trams not only cannot get along at any great speed themselves, but are a serious obstruction to the other traffic. The immense tramcar system of Paris, with its arrangement of "correspondances" from one line to another, is no doubt a notable example of systematic working, but until one gets well outside the centre of Paris it is



exceedingly slow; in fact, in the crowded parts of Paris it is really about the slowest means of getting about that one can employ. In speaking of trams we almost pre-suppose them to be electric trams, for we do not think the horsed tramcar will last very much longer. Now, it is of no use expecting the best results from such a tram-service except in streets which are wide enough to afford a free circulation on each side of the tram-lines. All driving in a crowded street is a matter of give and take between the different vehicles, and to introduce into such a street a set of cars which claim to run a straight line through everything is at once to introduce inevitable blocking, delay, and confusion. And we put it, therefore, that the real function of electric tramcars is not to circulate in the crowded centre of London, but to take people from that centre to the suburbs. For that purpose of traffic it is invaluable, but it is quite out of place in a crowd. The Report speaks strongly of the disadvantage and inconvenience of having to change your vehicle at a certain point. That, however, would be inevitable in many cases, even if we had tramcars all over London, since it is impossible to arrange a service where the same line of tramcars would serve all directions. And we put it that the changing is a lesser public inconvenience than would be caused by choking up with a tram-route streets which are not wide enough for it. Keep the electric tram for radiating routes from the centre to the suburbs; and for the centre, wait a little and see what the motor-omnibus will effect. That vehicle is only feeling its way at present, but there can hardly be a doubt that it is destined to supplant the horsed omnibus before very long. The motor-omnibus has a greater capacity for speed (where there is opportunity for it); it seems to be even more manageable, in the matter of steering, than the horsed omnibus; and if it is kept within a certain maximum of length (and that ought to be officially seen to), it occupies less room than the ordinary omnibus and horses. That appears to us to be the best way of meeting the difficulty of wheeled locomotion in the centre of London, for which the tramcar is most certainly not suited. At the same time, we agree with the recommendation that the present power of "veto" of a tram-route by the authorities of a district should be cancelled. If it can be shown that such a route is a general public advantage, it is unreasonable that a special authority on a portion of the route should prevent it being carried out.

It is surprising to find that no serious and practical proposal is made in the Report towards getting over one of the greatest inconveniences in regard to wheeled locomotion in London—the obstruction of what ought to be fast traffic by slow-moving vehicles, such as carts and vans. The manner in which a single lumbering goods van is allowed at present, often, to set the pace for a whole street, and keep a line of cabs and carriages crawling in its rear, is perfectly absurd; and the Commissioners seem to have totally failed to grasp the real remedy for it. They suggest the futile idea that slow-moving traffic should be compelled

to keep close to the kerb. How can it, when at every hundred yards or so a cart will find another cart or a carriage lawfully at a standstill at the kerb, and will therefore have to wheel out into the centre of the street, progressing by a kind of zig-zag course? The real and much simpler remedy is to limit slow-moving traffic to certain hours—say, from 3 a.m. to 3 p.m. The out-door life of the London social world—the world which uses carriages and cabs, does not begin to wake up till 3 p.m. at the earliest; it is at its fullest swing from 4 to 8, and again from, say, 10.30 p.m. to 1.0 a.m. Stop the slow traffic, in all principal thoroughfares, after 3 p.m., and one of the most serious obstructions to wheeled locomotion would be removed with no real hardship to any one. It is really surprising that this remedy, which has been publicly suggested over and over again, should apparently have entirely escaped the notice of the Commissioners.

Other very important suggestions of the Report, in regard to railways, street-crossings, new streets and bridges, etc., we must consider in another article.

#### NOTES.

Moving the Abbey Monuments.

THE Office of Works have decided to ask Mr. Bodley to design the architectural portion of the monument to the Marquis of Salisbury which it is proposed to place in Westminster Abbey. So far good; we quite agree that Lord Salisbury merits a monument in the Abbey, and that Mr. Bodley is an architect especially well qualified to design the architectural portion of a monument to be placed in Westminster Abbey. But when we hear that the Cornwall monument now standing under the north arch of the Consistory Court is to be displaced in order to put the Salisbury monument where the Cornwall monument now stands, we must protest most strongly against such a course, which is breaking faith with the past generation. We may not think that Cornwall was worth so sumptuous a monument, but his contemporaries, who knew more about him than we do, thought so; and his monument having been erected, those who procured its erection had a right to expect that it should remain there permanently. How do we know that a future generation will appreciate more seriously the monument to Lord Salisbury, or that they will not in their turn take upon them to remove it, if once this example is set? Many of the monuments in the Abbey are no doubt very bad art, and unnecessarily large and rampant in style; but they are part of the history of England and of English taste, and to interfere with them is to interfere with both private and public history, and is setting a very bad example for future generations.

Rights over Natural Streams.

THE case of Sharp and Others v. Wilson, Rotheray, & Co. is of interest, since cases relating to the rights of riparian owners to the waters of natural streams do not often come before the courts. The plaintiffs were the owners

and occupiers of farm lands abutting upon a natural stream, the Wyke Beck, and they brought an action for an injunction and damages against the defendants, the occupiers of some dye works a little higher up the stream, for diverting the water and also for polluting it. The defendants set up a somewhat unusual plea that they were returning water from wells and a colliery sough in place of that they were taking. This defence was of no avail, since it is obvious that the plaintiff could not insist on such a supply, even if it was adequate, being continued, whereas he had proprietary rights in the water of the natural stream. The riparian owner has the right to the uninterrupted flow of the water, subject to the ordinary user by other riparian owners, and if an extraordinary user is made of the water it must be such as does not interfere with its quantity or quality to any sensible degree. This right to water is to some extent a proprietary right, and not merely an easement such as exists in the case of light and air, and thus the plaintiff is not compelled to prove such pollution as to cause a nuisance. The extent of the abstraction or pollution is a question of fact in each case, and in this case the court found that the flow of water was not only visibly and materially diminished, but that on occasions the flow of water was stopped altogether for some hours, besides being polluted from time to time, and the plaintiffs succeeded in their action.

NOTWITHSTANDING the large sums of money which have been expended in the construction of dykes, or "levees," along the shores of the Mississippi, the problem of controlling the floods of that great river still awaits solution. Some engineers maintain that the levee system represents the correct treatment, while Professor Haupt and others believe that it is high time to stop the construction and raising of levees, as works of this kind afford merely temporary relief. A scheme by Mr. H. Van Meerten for improving the Mississippi is put forward in the current issue of the *Journal of the Franklin Institute*. The proposals made therein are that the river should have a continuous road-bed gradually increasing from source to mouth; that well-defined summer and winter beds should be formed, both unencumbered by levees, buildings, and other structures; that in places where the river is too wide the impounding of its road-bed should be effected by cribs at regular distances; and that the bed should be straightened by crib work or dredging, according to circumstances. The essential feature of this programme is the creation of a wide stretch of level land on either side of the summer channel. These lands would constitute the winter or flood bed, cultivable in summer, but not to be obstructed by any permanent buildings or anything that might retard the flow of water in winter. The system proposed is very simple, but would involve enormous outlay and probably at least a century for its complete realisation. In view of the unsatisfactory character of prevailing methods, we have no doubt the suggestion of Mr. Van Meerten will evoke some



interesting expressions of opinion from American engineers.

ONE of the most interesting presidential addresses of recent years is that delivered by Mr. C. C. Schneider, at the annual convention of the American Society of Civil Engineers, on "The Evolution of the Practice of American Bridge Building." The development of bridge construction throughout the world has been largely dependent upon the introduction of new materials, and upon the requirements of newly-developed transport systems. So far as concerns masonry bridges, comparatively little progress has been made since the days of the Roman empire, and America has done practically nothing in this direction. Some of the first high timber trestle railway bridges were built in 1840, and this form of construction was the prototype of the American iron viaduct. After the railway system had taken root about 1850, a noteworthy epoch commenced in the history of American bridge-building. As Mr. Schneider states, the earlier metal bridges were of cast-iron, wrought-iron being used only in tension members. In 1859 came the first wrought-iron bridge, and in 1879 the first bridge built entirely in steel. It should be noted that the extensive use of the latter material did not commence until as late as 1890. The address presents an excellent review of the whole subject, and shows that, in spite of the wide differences formerly existing between European and American practice, the interchange of ideas between the Old and the New World has been so extensive that at the present time no vital difference is revealed by comparison of the designs by the best bridge engineers in Europe and America.

WE have seldom read a more practical and refreshingly candid paper than that contributed by Mr. W. Doig Gibb to the *Proceedings* of the Institute of Gas Engineers. In the present note we only comment upon one or two of the many points discussed, hoping that our readers will obtain copies of the paper for perusal at leisure. In designing cast-iron columns it is not only important to provide for the utmost possible uniformity of thickness of the metal, but also to strengthen all overhanging capitals and projecting bases by interior ribs. The author shows that serious disaster may follow the absence of such reinforcement, as the replacement of direct compression by shearing stress will greatly reduce the resistance of the member. On the subject of "slovenly and incomplete specifications," the belief is expressed that nearly all the disputes occurring between engineers and contractors arise from careless specifications and drawings. Even if disputes are avoided, bad specifications lead to bad work. We quite agree that the better class of contractor wants neither one nor the other, and desires more than anything else accurate information so that he may prepare a fair estimate, and be in no manner of doubt as to the basis upon which the work is to be executed. Another thing is that the general clauses of specifications

are frequently too one-sided. In such cases the personality of the engineer has a detrimental effect on prices, unless the contractor is willing to run considerable risk. There are points here that we fear apply also to many architects' specifications.

#### Municipal Electricity.

THE papers recently read at the meeting of the Municipal Electrical Association were nearly all too technical to be of general interest. The papers, however, by Mr. Hoadley on street lighting with Nernst lamps and by Mr. Sillar on prepayment meters and free wiring were exceptions. Mr. Hoadley has used 350 Nernst lamps for lighting the streets of Maidstone, and after three years' experience reports very favourably on them. The average life of the lamps works out to 676 hours, but he has noticed that the later lamps are much better than the earlier ones. He states that clear glass globes are used, as the ratepayers prefer a brilliant lamp to a good illumination. We have found in practical work that prismatic globes in outdoor use require constant cleaning, and the cost of this labour is an appreciable item in estimating the relative advantages of smooth and prismatic globes. Mr. Hoadley points out that any appreciable reduction of the cost of the electric light must come by using improved lamps, as there is little hope of reducing the costs of production much further. He briefly considers, therefore, the prospects of the mercury vapour, the osmium, and the tantalum lamps. Mr. Sillar, the Borough Electrical Engineer of Colchester, has found that it is profitable to install "free wiring" in workmen's houses and to provide them with prepayment meters. The meter is the most expensive item in the installation, but he rightly insists on the importance of it being thoroughly trustworthy. In Colchester, as in London, the great demand is for shilling-in-the-slot in preference to penny-in-the-slot meters. The meters are visited once a month in winter and every three months in summer. Ordinary consumers pay at the rate of 4½d. per unit, but the "free wiring" consumer pays 5½d. per unit, the difference of a penny per unit going towards the repayment of the cost of the installation.

THE case of Midwood & Co. Limited v. Mayor, etc., of Manchester is one of considerable importance to electric lighting companies and corporations. The plaintiffs sued the Corporation for damages caused by a fire which arose on the plaintiffs' premises by reason of the fusing of one of the defendants' mains, which occasioned the bitumen in which it was laid to volatilise and explode. The plaintiffs brought an action alleging that the system of electric lighting adopted by the defendants constituted a nuisance, since the system was all linked up, which made it difficult to discover a leak. The plaintiffs also said the defendants had been guilty of negligence. The defendants relied upon the special powers conferred upon them by Act of Parliament and Provisional Order, and upon the fact that their system was approved by the Board of Trade. The

jury found for the plaintiffs, and the Court of Appeal have allowed the judgment that was given to stand, but with certain limitations. The ground of the judgment seems to be that a nuisance was established as far as the plaintiffs' premises were concerned, and that being so the defendants were not protected, since Section 70 of the Provisional Order provided that "Nothing in this Order shall exonerate the undertakers from any indictment, action, or other proceeding for nuisance in the event of any nuisance being caused by them." The Court held that this section protected the public from a nuisance created in the working of the undertaking, and was not made subject to the other provisions, which conferred certain privileges on the defendants, but the Court reserved an opinion upon the larger question as to whether the particular system as adopted and worked by the defendants constituted a nuisance. The special provision quoted above rendered it unnecessary to consider the difficult question of law as to what degree of liability attaches to companies carrying on the undertaking in pursuance of statutory powers.

#### Electric Lamps and Fire Risks.

AT a time when colliery disasters are so un happily prominent, attention may appropriately be called to the necessity for exercising great care in the use of incandescent electric lamps. It is common knowledge that the bulbs of such lamps become distinctly hot after the current has been switched on for a short time, but comparatively few are aware of the fact that the heat developed is sufficient to cause the ignition of inflammable substances in contact with the glass. A fire that took place at a colliery in the North of England some time ago, was finally traced to a 16-candle-power lamp, which had been placed upon a heap of coal dust in one of the workings, and only a few days later a serious explosion of fire-damp at a colliery in Belgium was caused by the bursting of a similar lamp. Mr. Henry Hall, one of H.M. Inspectors of Mines, has recently placed on record the results of some experiments bearing upon this subject. In one case he found that a 16-candle-power lamp, with a thin covering of coal dust, acquired the temperature of 370 deg. F. in two minutes, and exploded at the temperature of 450 deg. F. in four minutes; and a noteworthy fact revealed by the experiments is that, after a certain temperature has been reached, the process of spontaneous combustion is commenced, and temperature continues until the material bursts into flame, even in the absence of the original source of heat. The subject of this note possesses practical interest to architects, because inflammable materials in dwelling-houses and other buildings may conceivably be set on fire by contact with incandescent lamps for a sufficient period of time.

#### Colebrook Cottage, Islington.

"I AM in Colebrook Cottage, Colebrook-row, Islington, close to the New River, end of Colebrook-terrace," writes Charles Lamb to Southey on November 21, 1823. A commemorative tablet will shortly be



affixed on that house—the first whole one of their own—in which Lamb and his sister, on quitting No. 20, Russell-street, Covent Garden, lived during a few years before they went to Chase Side, Enfield. The house, which contains six rooms, is often visited by Americans. It was named "Elia" until fifteen years ago, and having latterly been No. 19, Camden-terrace, is now renamed "Colebrooke Cottage" and renumbered 64, Duncan-terrace. In Lamb's time the house was detached, standing beyond the north end of the block on which is a tablet: "New-terrace, 1791." New-terrace with the three houses (built in 1882) next north were latterly known as Camden-terrace; they are now absorbed in Duncan-terrace. A comparison with a woodcut in the *Illustrated London News* of January 6, 1849, shows that in the present cottage the windows of the dining-room and the "lightsome drawing-room" (Lamb to Bernard Barton, September 2, 1823) are altered; the palings were put up, it is said, by Lamb, the willow-tree by the river-side is gone, the stone steps from which George Dyer walked into the New River are now turned from the left to the right, and the spacious garden "to delight the heart of old Alcinous" has been converted into a stable and van-yard. The New River flowing between Duncan-terrace and Colebrooke-row on the opposite (east) side is now covered over, and the southern portion of the enclosure is preserved as an open space and recreation ground by an arrangement made in 1893 between Lord Calthorpe and the Metropolitan Public Gardens Association. A tablet, inscribed "Colebrooke Row, 1768," on Colebrooke House, commemorates the building of Colebrooke-row, upon ground belonging to Sir George Colebrooke, lord of the Manor of Highbury and owner of a considerable part of the parish of Islington. The older houses in the row, since extended southwards for postal purposes, are distinguished by their carved wooden door-frames and other old-fashioned features. The R.C. church of St. John in Duncan-terrace, by J. J. Scoles, 1842-3, is illustrated in the *Builder* of April 1, 1843.

excellent results, as also should the lithography. Coloured woodcuts are shown, and much else that is interesting in the by-ways of artwork. Stained glass, embroidery, modern jewellery, chasing, engraving, and die-sinking, to say nothing of metal work, architectural design, book illustration—all receive attention. The result of such work as this should have far-reaching effects, not only in improving industrial art, but also in giving art-workers fresh openings for gaining a livelihood.

In Mr. Hewlett's last exceedingly picturesque story, "The Fool Errant," which is chiefly concerned with the doings of the more disorderly and Bohemian classes in the Italy of the early XVIIIth century, there is a reference to the Medici tombs of Michelangelo which is very piquant in its suggestion of the effect of such works on the uneducated mind. In danger from the authorities, the hero and his peasant mistress take refuge in the church of San Lorenzo, when she promises him that they may hide all night safely in the Sagrestia Nuova (the New Sacristy), "whither nobody goes but a grand-duke—and he only when he is dead"—if they could only find the passage leading to it. Accordingly, she cajoles a peasant boy half-asleep in the empty church—"Carino, tell me how to reach the Sagrestia, where the monsters lie sleeping and waking. . . . We followed a flagged corridor for some distance and found ourselves in the Sagrestia Nuova with Michelangelo's monsters sprawling and brooding in the half light." The hero of the story, who was a gentleman fallen to low estate, had heard of Michelangelo's name; his peasant companion had not; the sublime figures were to her only "the monsters." It is a characteristic touch worth notice.

#### WORKING-CLASS DWELLINGS COMPETITION, PARIS.

THE jury for the competition organised by the Committee of the "Fondation Rothschild" for plans and designs of buildings to contain small sanitary and economical dwellings for the working classes, examined last week the twenty-five sets of drawings sent in for the final competition, and has given its decision. The drawings were again exhibited to the public on Monday and Tuesday in one of the large rooms of the Hôtel de Ville. The Committee had placed a sum of 50,000 francs at the disposal of the jury for awarding as premiums and indemnities, but, owing to the excellent results which the competition is considered to have given, and the really serious efforts made by all the competitors, the Committee decided to increase the amount to 80,000 francs. Premiums have been awarded to the authors of seven out of the twenty-five schemes submitted, and indemnities of the amount of 2,000 francs given to each of the other eighteen competitors.

The first premium of 10,000 francs was awarded to M. Adolphe Rey, "architecte diplômé du gouvernement," author of the designs marked "Pour le Peuple." M. Henry Provensal, "architecte diplômé," whose drawings were marked "Utile Dulci" carried off the second premium of 9,000 francs, and M. Wilfred Bertin took the third premium of 7,000 francs for his designs marked "Tout sur Rue." Premiums of 6,000 francs each were awarded to MM. André Ventré and Léon Besnard, both "architectes diplômés," and 5,000 francs each to MM. Gustave Majou, V. Eichmüller, and Gaston Le Roy, all also "architectes diplômés." The other eighteen competitors received each a sum of 2,000 francs as indemnity, instead of the 1,500 francs originally intended.

The members of the jury were MM. H. P. Nénot, Président of the Société Centrale des Architectes, and P. Wallon, a member of that society; Louis Bonnier, Président of the Société des Architectes Diplômés, and Roussi, a member of that society; Laloux and Pascal, both architects elected by the competitors; five members of the Committee of the "Fondation Rothschild," and the Secretary of the Committee.

The piece of ground chosen as the site for the construction of these dwellings is situated in one of the poorer quarters of Paris, and is a triangular piece bounded by the Rues de Prague, Roussel, and Beaudelaire, with frontages of 145 metres, 90 metres, and 85 metres respectively. The drawings required for the final competition were:—A general plan of each floor; the façades on each street with sections, all to the scale of 1 c. per metre (about  $\frac{1}{4}$  in. to the foot); a detail of one of the façades at double that scale; a summary description; and a general estimate of cost and revenue.

Of the premiated schemes, that by M. Rey, to whom the first premium was awarded, appears certainly the most interesting in every way, although it is very possible that the method of planning would not appeal to English architects who make a speciality of economical dwellings. M. Rey places his principal façade on the Rue de Prague, with a central block divided from the other buildings by a staircase on either side forming a feature, and two small return ends on each of the side streets. Two wings at right angles to the main front, placed on either side of the central block, reach as far as the further ends of the side streets, with small return ends on these streets. A large central courtyard and two smaller courtyards on the side streets, to be planted with trees, and to contain benches and shelters, afford a free circulation of air on all sides of the buildings, which are six stories high, with mansard roof and flat above. The ground floor is divided up into shops of various dimensions for food supplies on the co-operative principle, and several workshops and ateliers for the electric lighting of the buildings, and for supplying motive power for the workshops on the upper floors. The ground floor of the central block on the Rue de Prague contains a large restaurant for the tenants, a library, and a reading-room. The basement contains the store-rooms for the shops, the heating batteries, a bathing, and a lishment, with hot and cold baths, and a laundry for the tenants. The mansard roof above the sixth floor is specially arranged and reserved for linen drying-rooms. All the six floors are alike in plan, and comprise a series of compact dwellings, each consisting of a kitchen, dining-room, and two or three bedrooms, with a water-closet for each dwelling. A wide staircase, lighted at both ends, serves each set of four dwellings per floor, two on either side, and these staircases thus divide up the buildings into blocks containing four to six dwellings per floor. The façades, which show a tendency towards a modern style, are plain, without any mouldings or strings from ground floor to roof, but a good effect is obtained by the breaking up of the roof line, which is higher over the blocks than over the staircases dividing each block. The over the staircases dividing each block are relieved in a perfectly plain manner by the projecting bay-windows of the dining-rooms covered with red tiles. It is not easy to judge from the drawings the materials with which the façades would be constructed; from the appearance of the drawings they would be of dressed stone throughout, but as stone would form a too expensive item for these buildings if employed in a wholesale manner, it is probable that the author of the designs intends building with brick, with stone dressings here and there, the whole surface of the brick being covered with one of the coloured cement mortars now largely employed at Paris. The plain surfaces of the bay-windows are relieved by a colour decoration of flowers and fruit, probably in relief.

M. Provensal, who received the second premium, places a long façade on each street, with a large central courtyard or garden planted with trees, having at its centre an oval building, containing a bathing establishment and the electricity supply. The ground floors of the main façades are arranged for

County Council  
School of Arts  
and Crafts.

#### THE Annual Exhibition of the London County Council

Central School of Arts and Crafts. Students' work was held last week at the school in Regent-street. It seems a pity that this exhibition, containing so much interesting and clever work by students, some of whom will doubtless be well known in the future, should only be open for such a short period. The principles of instruction are well illustrated in the section devoted to elementary work done in secondary schools, aided by the Council. Studies are based on plants, shells, and insects, objects of still life; there are pencil and water-colour copies of designs—birds, medals, and book illustrations; alphabets and decorated letters, and heraldry. Some of the modelling by members of the central school is excellent, notably a number of statuettes by Miss A. Wilkins, Miss Leon, F. Lessore, and others. That entitled "Beatrice" shows careful study of drapery. The copies of medieval jewellery and tapestry from South Kensington should lead to



shops, and the upper floors contain dwellings, comprising kitchen, dining-room, one large bedroom, and two small bedrooms for children. The planning is good and the dwellings compact, the staircases numerous and easily available; the plans and façades are not broken up in any special manner; the façades are simple, and are characteristic of the usual Parisian architecture. M. Bertin, the winner of the third street front with about half the length of each street front with his façades, joining the blocks on the longer street with those on the side streets by two diagonal blocks, thus leaving a large central courtyard with a frontage well open to the street, and two smaller courtyards open to the side streets. The ground floor contains a number of shops on the street fronts, and dwellings in the diagonal blocks on the courtyard sides, an establishment for baths, and a crèche for minding the younger children during the day. The basement contains a large meeting-hall, a laundry, and the heating arrangements. On the six floors are sets of dwellings, comprising kitchen, dining-room, and two or three bedrooms, with separate water-closets. The façades are of brick, with stone dressings, and are quiet and simple in appearance.

#### THE LIÈGE INTERNATIONAL EXHIBITION.\*

Here, again, Belgium is well to the front with an admirable collection of boilers, engines, and miscellaneous machinery. Eight travelling cranes have been erected here, four having a lifting capacity of 30 tons, and the others of from 10 tons to 12 tons. These machines were furnished by the Société John Cockerill, the Société Titan Anversois, the Compagnie Internationale d'Electricité, the Société Stuckenholz, the Société Gilain, Gustin Fils, and the Westinghouse Company. Out of the 36,000 sq. yds. covered by the Halles des Machines the celebrated Société John Cockerill take up an area of nearly 1,500 sq. yds. The exhibits of this company are all upon a grand scale, including gas-engines of 800 h.p. and 1,200 h.p., a large compound steam-engine, direct-coupled to an electricity generator, a propeller shaft 50 metres long, marine ordnance, and a 10,000 h.p. rolling mill engine. The latter was built for the joint and rail-rolling train at Seraing, and deserves careful inspection. The engine has three high-pressure cylinders of 1.35 metres diameter, and three low-pressure cylinders of 0.90 metres diameter, the stroke being 1.30 metres. The connecting rods are attached to cranks on the main shaft, each separated by an angular distance of 120 deg., and balanced by massive counter-weights. At one end of the main shaft is a coupling for direct connexion with the rolling train, whose operations will be controlled from an elevated platform where the starting and stopping levers are placed conveniently for the use of the driver. The floor space occupied by this engine is about 15 metres by 11 metres, and the height from ground level, apart from the elevated platform, about 4.50 metres. Notwithstanding its enormous size, the proportions of the engine are so good that the visitor fails to realise how great are its dimensions until he begins to compare them with those of surrounding objects. The Belgian display of machinery includes several large sets of generating plant. The Société St. Léonard, of Liège and Herstell, show a 600 h.p. gas-engine and dynamo using producer gas generated in the Halle des Chaudières; MM. Caréls Frères exhibit two generating sets of similar size, one operated by steam and the other by petrol, the generators being made by the Ateliers de Constructions Electriques de Charleroi; the Ateliers de la Meuse have a compound tandem engine coupled to a 450 kilowatt generator; the Société van den Kerchove, of Ghent, in conjunction with the Compagnie Internationale d'Electricité of Liège show another set of about 600 h.p.; and there is a further set of similar capacity by the Société Preudhomme and the Ateliers Jaspas. In addition to the foregoing nearly two dozen sets of from 250 h.p. up to 400 h.p. are to be found in the Belgian section, the names of the chief makers being the Société Maison Beer, the Compagnie Internationale d'Electricité, the Ateliers de Constructions Electriques de

Charleroi, the Société d'Energie, the Ateliers Jaspas, the Société Liégeoise, M. Heinrichs, the Société de Gilain, the Société du Thiriau, the Société le Phoenix, the Société the Société des Moteurs, the Lachaussée, the Société des Moteurs, the Ateliers Walschaerts. Several of these firms also exhibit motors and electric-lighting apparatus in considerable variety.

Some excellent types of pumping machinery are shown by several local firms. Among these we may specially mention the electrically-driven high-pressure pumps for deep mines on the stand of the Ateliers de la Meuse; and a neatly-designed 125 h.p. electrically-driven high-pressure pumping set by the Société Liégeoise. Winding machines, mining tools and lamps are also strongly in evidence, as also are steel and wood pulleys, valves, automatic oiling appliances, and engineering sundries in great variety. There are also good selections of bakers' machinery, textile machinery, machinery for metal working, and steam-boilers. Taking the Belgian exhibits in this department alone, they must be regarded as a most striking demonstration of the varied and important industries conducted in this small but enterprising country. Still further proofs of industrial activity are given by the adjoining Halle des Chaudières, where more than twenty-four steam-boilers of different types are installed for the generation of power. As shown by the following list of exhibitors' names, nearly all the boilers are of Belgian make—MM. Mathot et Fils, Bailly Mathot, Bouchon, Chaudronneries Liégeoises, Ateliers du Thiriau, Chaudronneries Piedbœuf, De Naeve et Cie, Herman, Grille et Cie, Roser, Ateliers de Bousso, Fétu-Defize, Smal et Rasquinnet, and Babcock et Wilcox. In addition to these boilers, which are of the Cornish, Lancashire, and water-tube types, the Halle des Chaudières contains a complete producer plant for the provision of gas to the motors of the Société St. Léonard. Those who wish to examine the details of boiler construction can do so in a section of the Halle des Machines, where seven or eight firms have spaces.

The next sections to be visited are those of France, England, the United States, and Germany. The French section is of much general interest to engineers, including steam and gas engines and machinery by most of the leading makers in that country. The English section is very small, and all the exhibits taken together occupy less space than the stand of the Société John Cockerill in the adjoining hall. The chief exhibitors are Messrs. Armstrong, Whitworth, & Co., Thomas Robinson & Son, Alfred Herbert, Jones & Lamson, Reavell & Co., the Robins Belt Conveyor Company, and W. & T. Avery. Although these and other exhibitors adequately uphold the reputation of British workmanship, the small dimensions of the collective exhibit cannot give foreign visitors any correct idea of our great engineering industries. The American section is of still more meagre dimensions, possibly owing, in some measure, to the fact that many engineering firms in the United States are directly represented by Continental houses and agencies. The German section is of considerable extent, covering an area of more than 5,000 sq. metres, and including numerous exhibits of engines, electrical machinery, flour and baking machinery, mining, hoisting, and other apparatus. The prominence of the German display indicates the importance attached to this exhibition by industrial firms in the Fatherland. As a matter of fact, the geographical position of Liège makes the present exposition almost as useful to Germans as if it were held within their own boundaries.

The last part of the Halle des Machines remaining for exploration is that reserved for railway rolling stock and material. Just outside the building several installations of signalling apparatus deserve inspection, and along the same wall, but inside, is a very interesting model, exhibited by the Administration des Chemins de Fer de l'Etat Belge, consisting of a miniature railway line, on which run models representing the first and last locomotives used on the State railways. On the occasion of our visit this line was not in running order, but M. J. B. Flamme, Inspecteur-Général de l'Administration, was good enough to open the cases containing the locomotive models and to explain the exhibit. It is interesting to recall the fact that the first locomotive used in Belgium,

and at the same time the first employed on the Continent, was made in 1835 by Robert Stephenson, of Newcastle. Another circumstance on which British engineers may congratulate themselves is that the type of locomotive now being adopted over the Belgian State railways is copied by permission from the designs of the engineer to the Caledonian Railway Company. A very fine collection of powerful engines will be found in this part of the hall, many of them having been made for the State railways by the Société Liégeoise and the Ateliers de la Meuse. The most interesting feature in the collection is the application of Schmidt superheaters to several locomotives built for the Belgian State Railways, this being practically a new departure so far as Europe is concerned.

Passing outside the Halle des Machines the visitor finds, along the bank of the Ourthe, several exhibits either in the open air or in small pavilions. One of the most striking is a novel form of travelling crane made by the Société Liégeoise. This appliance has a strongly-built tower on the right hand, from one top end of which extends a lightly-built lattice girder furnished with a travelling carriage at the further extremity the wheels of this carriage running on rails supported by steel trestle construction. The tower moves on rails laid on the ground, and at the top it carries a swivelling derrick crane for handling materials. For some purposes this crane would be very useful, and we should imagine its first cost to be far less than that of an ordinary Goliath.

Near by is a fine example of water-pipe in the form of a trophy by the Société des Vannes, and in the same neighbourhood are pavilions containing German well-borne apparatus, a new form of air filter for the ventilation of buildings and other purposes, welding by the autogenic process, and acetylene light apparatus. Then comes a fine pavilion dedicated to civil engineering, and a small one to crushing machinery. The portion of the exhibition was in a somewhat chaotic condition when we saw it, but we doubt everything is in order by this time.

Crossing the Pont de l'Étisme, we then enter the Quartier du Vieux Liège, which is interesting to those who desire to study reproductions of numerous historical houses and monuments formerly existing in the town of the Princes Evêques. Beyond the second bridge is the Quartier de l'Église, chiefly a place for amusement and entertainment. Still, it contains some exhibits of technical interest. One is a large steel structure, which at first sight appears to be a very feeble imitation of the Eiffel Tower, but really is the framework supporting an enormous boring machine erected by the German Mine Boring and Drilling Company. The Parc des Eaux et Forêts, and the Palais de l'Agriculture are decidedly worth visiting, and the latter contains some good examples of Belgian agricultural machinery. The Parc de la Cointe, constituting the fifth section of the exhibition, contains little worthy of special notice, but deserves a visit if time permits.

In conclusion, we may point out that the main feature of the exhibition is represented by the display of Belgian products, which constitutes a great object lesson to the world, and shows what can be accomplished by a very small country possessing miners, wealth and an industrious and enterprising population.

**BAPTIST CHAPEL, FRANT, KENT.**—The stone laying ceremony of the new Baptist Chapel at Frant took place recently on the site of the chapel, Myrtle-road. The work is being executed by Mr. Thos. Stanbridge, builder, of Tunbridge Wells, the architect being Mr. J. Bridger, also of Tunbridge Wells. The new church will be 40 ft. long by 25 ft. wide, and will have an estimated accommodation for about 250 persons. The building will be of red brick, with stone dressings.

**ALL SAINTS' CHURCH, BELFAST.**—The foundation-stone of an addition to this church in University-street was recently laid. The new addition consists of a chancel, vestry, organ chamber, and other accommodation. The style will be in keeping with the present building, which is designed in the early English period of Gothic architecture. The builders are Messrs. Hunt Laverty & Sons, Belfast, and they are under the supervision of Mr. W. J. Foranell, also of Belfast, who drafted the original plans.

\*Continued from page 63 ante



## DOORWAY TO STAIRCASE, DURHAM CASTLE.

THIS fine example of a small Norman doorway is on the second floor of Durham Castle, now part of the buildings of Durham University.

The illustration is from a drawing by Mr. Percy Robinson.

## THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A SOUTH WALES district meeting of the members of the Association of Municipal and County Engineers was held at Swansea on Friday and Saturday, July 14 and 15. The members assembled in the Council Chamber of the Guildhall on Friday morning, when they were received and welcomed by the Mayor (Ald. W. H. Spring), who was accompanied by other members of the Swansea Corporation.

Mr. A. E. Collins (Norwich), President, occupied the chair, and there were present: Messrs. J. T. Eayrs (Birmingham), J. S. Pickering (Cheltenham), G. Bell (Swansea), J. D. Bars (Bromyard), H. A. Clarke

(Briton Ferry), W. J. Davies (Blaine), J. Cox (Margam), T. Lloyd Edwards (Glamorgan), G. F. Gettings (Teignmouth), W. E. Clason Thomas (Neath), C. C. Hooley (Patricroft), H. L. Griffiths (Brecon), R. H. Haynes (Newport), M. Hoskins (Mumbles), J. Humphreys (Maesteg), D. M. Jenkins (Neath), W. P. Jones (Cymmer), J. Morgan (Ponterdawe), G. S. Morgan (Pontyclun), G. L. Morgan (Pontypridd), R. C. Mawson (Evesham), G. A. Phillips (Glamorgan), T. H. Tresseder (Cardiff), C. H. Priestley (Cardiff), H. D. Williams (Ogmore and Garw), M. Williams (Bridgend), G. Watkeys (Llanelli), P. R. A. Willoughby (Pontypridd), R. H. Wyrill (Swansea), and a number of members of the Swansea Corporation.

The Mayor heartily welcomed the Association to Swansea, and in doing so strongly approved of its aims and objects.

The President, in acknowledgment, said the object of the Association was to obtain knowledge, which was a benefit, not only to the members, but to the municipalities which they served.

Councillor Sinclair, Chairman of the Elec-

tricity Committee, also joined in the welcome, and said such meetings must be of great value to the municipalities.

The members then proceeded to inspect the destructor works, the electricity works, the new fire and police station, the tramway system, and the Mannesmann Steel Tube Works at Landore. The members had luncheon together at the Hotel Metropole.

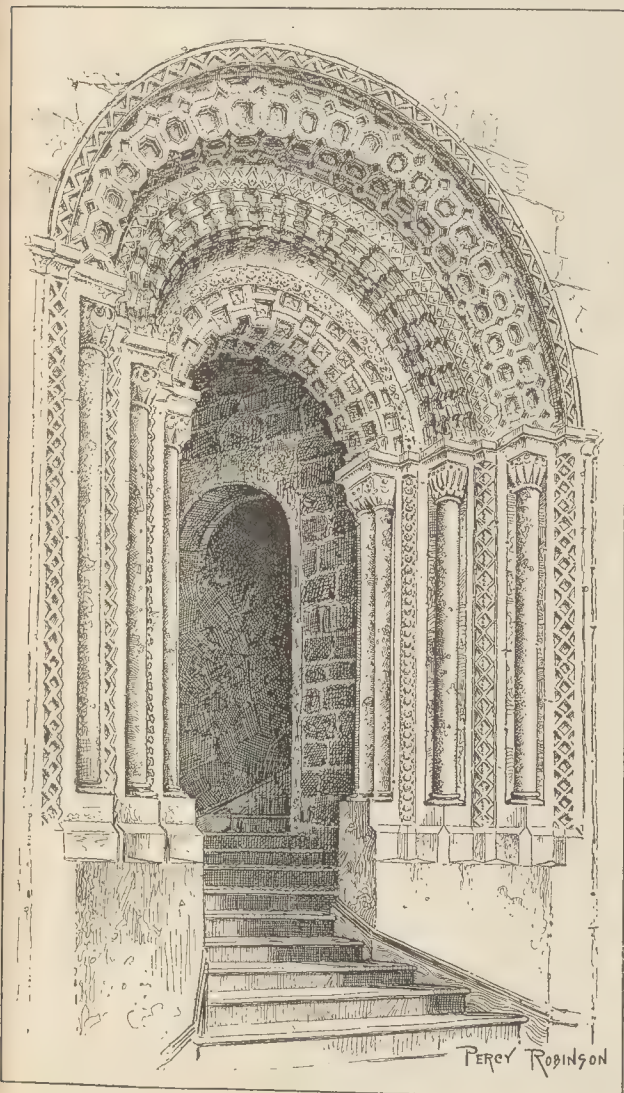
At the conclusion of the round of visits the business meeting was held in the Council Chamber, Mr. A. E. Collins presiding.

On the proposition of Mr. D. M. Jenkins (Neath), Mr. W. E. Clason Thomas (Neath) was re-elected Hon. District Secretary.

## Municipal Works in Swansea.

Mr. G. Bell, A.M.Inst.C.E., Borough Surveyor, presented a paper on "Some Municipal Works in Swansea." He said the town was picturesquely situated at the mouth of the river Tawe, on the shores of one of the finest bays in the kingdom. The configuration of the borough was of a very hilly and diversified nature, which, although presenting many features of natural beauty, made the carrying out of most of the municipal works which had to be undertaken more difficult and costly than would be the case in a flatter district. For a long time Swansea had been resorted to as a watering-place, and during recent years it had been steadily increasing in favour, and in the summer time the sands and parks were crowded with visitors from all parts of the country. The geological formation was part of the great coalfield of South Wales, the dip of the measures being generally very steep and in a northerly direction. The coal worked was highly bituminous, and the native sandstone was very good and largely worked, and used for building operations of all kinds. Swansea was at the present day, and had been for many years, the chief seat of the copper, spelter, and tinplate trades, and might claim to be one of the most important and progressive centres of business in the kingdom. The development of the port under the harbour trustees had kept pace with all requirements, the present wet-dock accommodation extending over 58½ acres, with 32 ft. to 34 ft. depth of water on the sill. The construction of a new deep-water dock had been commenced, to accommodate the largest class of steamships afloat, to deal with the increasing trade of the port. For this purpose it was intended to reclaim nearly 400 acres of land on the foreshore. The dock would have an area when completed of 107 acres, and the depth of water on the sill would be 40 ft. The estimated cost, with equipment, was 1,250,000. The first sod was cut by H. M. the King in July last year, and the dock was to be called the King's Dock. A new plate-girder drawbridge had just been completed by the harbour trustees over the north dock lock, which was necessary for the largely-increasing traffic between the east and west sides of the river. This bridge had a double line of roadway, on which tramways were laid, two footpaths, and a line of railway. Over the river Tawe a new lattice-girder swing bridge was erected by the harbour trustees in 1897, and had the same accommodation as the new drawbridge. Both these bridges were designed by Mr. A. O. Schenk, the engineer to the trustees, and constructed by Messrs. Handyside, of Derby. The area of the borough above high-water mark was 5,070 acres, and the population at the census of 1901 was 94,514, and was now estimated at 100,000. The number of houses was 19,487, giving an average number of 5.13 persons to one house. The present rateable value was 447,718*l.*, and the outstanding debt for sanitary purposes only 703,000*l.* The average number of new houses and shops erected each year for the past ten years was 164, and this year there had been plans for 282 new shops and houses. At the present time there was a considerable scarcity of houses, but this appeared to be likely to be soon overtaken, as shown by the largely-increased number of plans passed during this year to date. As opportunities had occurred in connexion with the expiration of leases and the rebuilding of premises, the Corporation had, since 1892, expended 12,555*l.* in purchasing property and carrying out the widening of various streets. In connexion with the widening of Castle-street, which had long been a much-needed improvement in the centre of the town, property

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Doorway to Staircase, Durham Castle.



costing 114,129l. had been acquired by agreement since 1895, and there now only remained five properties to be purchased, which would be dealt with compulsorily under the Corporation Act of 1902. Castle-street had a length of 400 ft., and at several points was only 18 ft. wide. It was intended to widen the street to 50 ft., which would give a wide main artery and enable the connecting link of the tramways to be carried out. A dust destructor had been erected for the Corporation by the Horsfall Company; the total cost of the work, including some extras, would amount to 11,000l. The destructor had five cells of the back-feed type, each having a grate area of 42 sq. ft. fitted to steam jets for forced draught.

The steam generated for the burning of the refuse was intended to be used chiefly for driving the electrical machinery for working portions of the tramways.

The destructor began work on June 27, 1904, and it was satisfactory to note that no nuisance from smell, smoke, or dust, either from the stack or the cells, had been caused so far from the burning of refuse.

The average quantity of refuse delivered and dealt with by the destructor since the time of working was 52 tons 14 cwt. per day, the largest quantity in one day being 80 tons 15 cwt.

The weight of residus produced had not yet been tested, but it was believed to be within the 33 per cent. guaranteed.

From tests made by the Borough Electrical Engineer, the average quantity of water evaporated in the boiler from the burning of the refuse was equal to 7,125 lb. per hour, reduced to 4,453 lb. per hour by the jets for forced draught, the pump, and the clinker engine, which would be equivalent to 222 indicated horse-power per hour available for use for electrical purposes at the stop valve of the boiler.

The mortar made from the clinker had amounted to 720 tons, and was used for all the purposes of the Corporation in the town. A quantity of the graded clinker had been used for making up roads and footpaths and as racking for granite paving.

The question of utilising the clinker for the manufacture of flags and bricks was under consideration by the Council, and tenders for the necessary plant had been obtained; but the matter was in abeyance for the present, or until it was ascertained how much, if any, steam could be spared for the purpose.

A trial was now being made at the destructor works with clinker of a hollow concrete block machine, manufactured by Messrs. Prestijohn Bros., of Terre Haute, Indiana. The machine was worked entirely by manual labour, and made hollow blocks 20 in. long, 7½ in. high, and 8 in. wide, as stretchers, and other sizes as halves, quarters, corners, etc. The faces of the block could be moulded rock-faced, fine-picked, or plain-chamfered, as required. Specimens of the blocks made and the operation of the machine, which was the first to be used in this country, could be inspected at the works. If the blocks turned out as stated, their manufacture would be the means of utilising a considerable portion of the clinker from the destructor, and might help forward the scheme which the Corporation had in hand for providing cheap and good dwellings for workmen, which were much required at the present time.

The intended culverting of the Burlais brook had long been contemplated by the Corporation as a very necessary sanitary improvement.

The burgesses were the possessors of a large and valuable estate, lying within the old town, which they acquired mainly under the Town Hill and Burrows' enclosure of 1762. Parts of the property had been disposed of from time to time for the construction of docks, railways, and other purposes.

The present area was about 645 acres, the bulk of which was included in old leases falling in between the years 1901 and 1920, when a considerable increase of revenue would accrue to the town.

As old leases had fallen in the property had been re-leased at greatly-increased rentals, and whenever opportunity offered old leases had been surrendered and new leases granted on equitable terms.

The number of leases or separate lettings, according to the register prepared in 1903, was 582, and the revenue 10,082l.

A considerable portion of the land which was in hand and could be dealt with had been let on lease and largely built over, and other parts of the estate had been laid out into streets and terraces, presenting very eligible sites for workmen's dwellings in proximity to some of the most important works in the borough.

As the urban sanitary authority, the town possessed another valuable asset in the surplus land which was acquired in 1876-9 for the improvement scheme under the Artisans' and Labourers' Dwellings Act. Under this scheme a large number of insanitary dwellings in the centre of the town were cleared away, the construction of new streets and the improvement of existing streets carried out, and a large portion of the new frontage created thereby leased and built over. The most important improvement was the formation of Alexandra-road, a new street 300 yds. in length and 60 ft. in width, upon which were erected the fine buildings containing the free public library, schools of science and art, and art gallery, and other large and important buildings.

The capital expenditure on this improvement scheme amounted to 121,992l., and the revenue derived at present from leases and other lettings amounted to 1,267l.

The new Central Police and Fire Brigade Station was completed in March last. Morrison red brick with Bath stone dressings were used in the elevations. The contract for the whole work was 7,764l., and this had only been very slightly exceeded.

Swansea was one of the six municipalities in the country which possessed a telephone exchange. There were now instruments and lines in operation on the Corporation service to the extent of 1,200.

The town had a free library, schools of science and art, and art gallery, and there were ten public parks, with an area of 103 acres.

The tramways were worked by a public company, and electric traction was adopted in 1898. Considerable opposition was taken by property owners and ratepayers in part of Oxford-street and Temple-street to the proposed lines in those busy and comparatively narrow streets (the carriageways of which varied from 20 ft. to 25 ft. in width; but since the work had been completed, double lines being laid, the policy of the Corporation appeared to have been entirely justified, as the tramway traffic and the ordinary traffic were carried on with very little, if any, inconvenience to tradesmen in these streets, and the advantages to the inhabitants generally in regard to these central lines were very apparent.

The lines were leased by the Corporation to the tramway company for terms of twenty-one years at rents which covered the interest and sinking fund on the expenditure, and were worked by the company in conjunction with the old lines.

The British standard specification and erections were adopted for the rails, those for straight track being 95 lb. to the yard and for curving track 101 lb. to the yard, both being 6½ in. deep.

A considerable portion of the track was paved with wood, mainly Yarrah, but for steep gradients creosoted pine was laid.

The President said he noticed with interest that the Swansea Corporation had found that a double track in roads of less than 26 ft. wide offered less obstruction than a single line of tramway.

Mr. J. T. Eayrs (Birmingham) proposed a vote of thanks to Mr. Bell for his paper. He said it was the practice of some county surveyors to use on main roads metal not broken to a uniform gauge throughout. The idea was that where they had modern appliances for scarifying and steam-rolling the necessity for uniformity of gauge was not so great as previous to the adoption of steam-rolling. The proposal to barge out to sea refuse which could not be taken at the destructor was an important matter to Swansea, having regard to the great fishing industry carried on there and in the neighbourhood. He did not know what steps had been taken as to possible pollution of the fisheries by barging this refuse to sea, but he should say that great care ought to be exercised in doing this, and he would like to know what steps, if any, had been taken

to ascertain what effect it was going to do on the fisheries.

Mr. Willoughby (Pontypridd) regretted the practice of allowing owners to do private street works in front of their own premises as objectionable.

Mr. J. S. Pickering (Cheltenham) was surprised to hear that Swansea had been far behind other towns in having only recently constructed a destructor. There were very few towns of that size but which had a destructor for years. Swansea was to be congratulated on coming into line with other towns which had been more progressive in that respect. The deposit of refuse on tips which later became building sites was a most insanitary thing, and the sooner it was done away with in every town where it was possible to erect a destructor the better. In Swansea the destruction of the refuse appeared to be carried out in a very efficient manner, and at the same time valuable use was made of the clinker.

Mr. J. Cox (Margam) said that, while paving was the cheapest form of paving, he found it perished in seven or eight years.

The President said he had some tar paving which had been down twenty years and was still sound. With the ordinary facing every three years, at the trifling cost of about 1d. per square yard, tar paving would last for a considerable time. It was not suitable for town roads, but for suburban roads where the traffic was of a moderate character he knew nothing better.

Mr. Bell, in reply, said the Corporation would take every precaution to protect the fishing industry. He did not think there was likely to be any nuisance at all, as it was proposed to take it three miles beyond the Mumbles Head, where the tide would go hold of it and carry everything away.

#### Electricity Undertaking, Swansea.

Mr. C. A. L. Prusmann, Borough Electrical Engineer, read a paper on the "Swansea Electricity Undertaking and Tramway Experiment." He said the Swansea Corporation had nearly completed some twelve miles of electric tramways and light railways, the bulk being now in operation, and the remaining section, it was hoped, would be opened in the near future.

The overhead equipment of these tramways and light railways had been carried out by span-wire and bracket-arm construction; no centre-poles had been employed, and no bracket-arms over 15 ft. 6 in. had been used. The line had been erected to straight under-running trolleys, with trolley-heads.

Owing to the peculiar atmospheric conditions which prevailed in Swansea, on account of the various works in the neighbourhood, it had been deemed advisable to use copper phosphor bronze for span and guard wires, as against the usual practice of steel wire, as it had been found that the life of a steel wire under the conditions in Swansea was very short indeed.

This course undoubtedly had added considerably to the cost of construction, but it was hoped that the maintenance of the overhead equipment would be very much reduced on this account and the life greatly prolonged.

The tramways and light railways in Swansea were interesting from one or two stand points. Prior to the laying down of the Corporation tramways and light railways, the electrical tramway system was entirely in the hands of the Swansea Improvement and Tramways Company, who owned the whole of the overhead equipment, cables, etc., and who supplied electrical energy to the tramways from their own generating station. The new tramways and light railways were leased to the company under certain conditions existing between the company and the Corporation; the company supplying electrical energy to certain portions of the new lines and the Corporation supplying the remainder, and a very considerable length of the old company's lines were now being supplied by the Corporation. It would therefore, be seen that the tramways and light railways in Swansea were supplied by means of three distinct generating stations, two of which were owned by the Corporation, the third by the company. The two owned by the Corporation were the main generating station, situated in the Strand, and at the destructor works. In the



ordinary course those sections of tramways which the Corporation had to supply with electrical energy would receive a supply from the destructor works. The main station would take up the supply on those occasions when the load on the tramways was too great for the destructor works to deal with or when the destructor works were shut down for repairs, overhauling, etc. As far as possible, arrangements had also been made to enable the tramway company's station to supply current to those sections which in the ordinary course received their energy from the Corporation works in the event of a breakdown happening at the Corporation works, and vice versa. By adopting this course it would be seen that the amount of standby plant was reduced to as low as possible, as the spare machinery at the Strand station would act as a standby to both tramways and lighting. The remaining points in connexion with the new light railways which should be mentioned were—

Running cars over the drawbridge spanning the north dock lock and the swing-bridge crossing the river Tawe. In the case of both these bridges the current was automatically disconnected and connected, when the bridges were open and closed, in such a manner as to make it impossible for a car to approach the dock or the river to within a dangerous distance while the bridges were open. He was not aware that a similar case had had to be dealt with in any town in the United Kingdom. The work of installing the overhead equipment had been entrusted to Messrs. Dick, Kerr, & Co. It was interesting to note that all the tramway poles had been made in the town by the Mannesmann Tube Company.

Mr. Willoughby (Pontypridd) asked, with reference to the electricity installation at the destructor works, whether any working arrangement had been come to between the two departments as to the benefit of the steam produced by the Health Department. That question had arisen in his district, where the Health Department had gone to the expense of the destructor, and the Electricity Committee were expecting to get the benefit of the steam produced. There was likely to be considerable friction.

The President said the details of the automatic connexion and disconnexion of the electric current for the tramways on the drawbridge and swingbridge crossing the river would be of great interest, as it was a difficult problem to solve.

Mr. J. T. Eayrs (Birmingham) deprecated any friction between the various departments of a municipality. All the departments should work together in harmony and concord, and not for one to try and get the better of the other.

Mr. Prusmann said the arrangement with the Streets Committee was to pay a certain price for the steam raised by the destructor, and he believed the arrangement would prove satisfactory to both the Streets and Electricity Committees. With regard to the trolley wire on the bridges, he did not think there was another place in the country where they had to deal with a drawbridge and a swing-bridge, and when the whole of the work was finished he would draw up a full description of the work and send it to the Association and the engineering papers.

On Saturday, July 15, the members travelled by special train to Cray to inspect the new reservoir and masonry dam. After the inspection of the works they were entertained to luncheon by the Swansea Corporation. After luncheon, the engineer read a paper descriptive of the works, which was briefly discussed.

#### Swansea Waterworks.

Mr. R. H. Wyrill, M.Inst.C.E., Waterworks Engineer, in his paper on "The Swansea Waterworks," after describing the present works for the supply of Swansea, said the yield from the existing reservoirs, being in an average year about 2,664,000 gals. and in a very dry year about 2,000,000 gals. per day, was quite inadequate for the requirements of Swansea, which had a population at the present time of about 100,000 inhabitants and many important manufacturing. The Swansea Corporation therefore determined boldly to face the difficulty, and to construct works which would give them an ample supply of pure water for many years to come, and would be entirely free

from all trouble as to mineral workings. In order to do this it was necessary to construct works nearly thirty miles' distant, and the river Cray was selected as being the best source, as the rainfall was known to be heavy, the elevation great, the watershed being entirely mountain pastures with only two small shepherd cottages, and the facilities for the construction of the works being good.

The watershed consisted of 2,640 acres of excellent gathering ground, in the wettest portion of South Wales.

Parliamentary powers to carry out the works were obtained in 1892, but, in passing through Committee, clauses were imposed by which any water authority, any part of whose district was within one mile of the main pipe-line might demand and obtain a supply for their requirements, leaving a prior right to Swansea of 25 gals. per head. The authorities referred to included the whole population of the Swansea Valley and the Swansea district. These populations were situated on the coal measures, and their local waterworks were also feeling the effects of the coal workings, which would in time destroy their springs as the coal was worked, and they would rely upon the Swansea works for their supply. This additional population at the present time numbered about 60,000, and was growing rapidly. The demands upon the Cray works were therefore much more extensive than was originally contemplated, and the lines had been increased in carrying power.

The Act of 1892 provided for the construction of a storage reservoir, tunnel, pipe line, and service reservoir; these works were now approaching completion.

The storage reservoir would contain 1,000,000 gals. of water, and be 100 acres in extent, being one and a quarter miles long and a quarter of a mile wide. The topwater was 1,000 ft. above the sea level, and the water was impounded by a dam 1,250 ft. long and of a depth of 144 ft. from foundation to top-bank level; the depth from overflow level to the surface of the rock at the old river course was 100 ft., the rock excavation in the centre of the dam being thus 37 ft. deep.

The whole of the gathering ground and the site of the works were on the old red-sandstone formation, but the site of the dam was found on examination to contain many minute cracks, which had been caused by ice pressure, this being a valley of ice denudation. These cracks had to be followed down and out; and this had caused considerable expenditure of time and money, there being nearly 50,000 cubic yds. more excavation in the dam than was contemplated. All these difficulties had now been overcome, and the work was now constructed up to a level of 15 ft. below overflow level.

The work was originally let by contract, but subsequently the Swansea Corporation took the work over, and had since carried it on by direct administration, and during the last two years great progress had been made under the works manager (Mr. B. MacKenzie), over 60,000 cubic yds. of concrete having been put in during twelve months.

According to the author's original design, the Cray dam was to be constructed of rubble masonry in cement mortar, with blocking facing from stone obtained from quarries on the ground, and being the blue beds of the old red sandstone; but it was soon found that, although there was an ample supply of stone on the ground, it was of such irregular shapes that it would be difficult and expensive to dress it for facing blocks, and it would also be expensive to dress it roughly for rubble. Therefore it was decided at an early stage of the construction to alter the character of the dam by constructing the hearting of cyclopean masonry and substituting blue Staffordshire bricks for the facing throughout. This had been done, and the author was of opinion that a great saving had been made in time and cost in the hearting and the facing. The author had visited many masonry dams on the Continent, and believed that brick had not been used as a facing for a masonry dam, with the exception of the water face of the small dam at Reinschied, in Germany, and the water face of the submerged dam at Rhyader.

Such a radical change in dam construction was not therefore undertaken without careful

consideration; but the author's experiments on the relative water-tightness, durability, and resistance to frost of stone and blue brick, which were carried on over several months, led him to the conclusion that this facing would be absolutely successful in every way and it offered undeniable advantages in speed and ease of construction.

The brick facing on both the inner and outer facing was of an average thickness of 13 in., carefully tied into the hearting. All external brickwork was of pressed blue-facing bricks, the inner being the best brindled bricks, all set in 3 to 1 cement mortar.

The hearting of the dam consisted of large blocks of stone as they come from the quarry, surrounded by Portland cement concrete, consisting of five of the crushed sandstone, two of sand, and one of cement; a richer concrete, with no plums, and consisting of 34 of crushed stone, two of sand, and one of cement, was laid all over the base of the dam and up to the water face of the dam.

The overflow water from the reservoir would pass over a granite weir crest 200 ft. long and down the back of the dam. This unusual length was provided to meet the violent floods which occur in the valley, due to the steepness of the surrounding hills, the water-tightness of the ground, and the very heavy rainfall. A roadway was carried along the top of the dam and crossed along the crest of the overflow in a series of brick arches.

A culvert, 13 ft. high and 8 ft. wide, was temporarily left through the dam to carry the stream during construction, and this culvert had been nearly filled with water during flood times. On completion of the work a 3-ft. cast-iron pipe, with a double set of 36-in. valves on the outer end, would be built in this discharge tunnel; the stopping at the inner end would be of brick in cement, and the remainder of the tunnel would be filled with concrete.

Compensation water to the extent of one and a half million gallons per day would be discharged through the 3-ft. pipes into the river Cray for the riparian owners and fishing interests on the rivers Cray and Usk.

The profile of the dam was lighter than was generally adopted, but was ample, the maximum stress being under eight tons per square foot.

The Cray reservoir, not being in the natural drainage area of Swansea, it was necessary to drive a tunnel commencing at the bottom of the reservoir and terminating in the watershed of the river Tawe, which passed down to Swansea. This tunnel was about three miles long, and was principally driven from the south, or Swansea end, and from a working shaft on the reservoir ground, or north end, these points being about 2,300 yds. apart. The headings met without any difference in level and within 4 in. from line, which was very satisfactory, as one heading had to be set out from a short base-line transferred down the working shaft, in which there was a considerable amount of water dripping. This tunnel was internally 5 ft. high and 3 ft. 6 in. wide, and was lined with three half-brick rings of brindled Staffordshire bricks in two to one cement mortar. The water flowing from the reservoir through this tunnel was regulated in a valve tower placed at the west side of the reservoir. The valves were placed in it in such positions as to decant water at 20 ft., 50 ft., and 80 ft. below overflow level; the upper valves would be 18 in. in diameter, and the lower valves 24 in. in diameter in duplicate, and were of the design known as roller-bearing valves. These valves were all worked from the valve-house built upon the top of the valve-tower, which was reached by a footbridge spanning from the valve-tower to an abutment on the side of the reservoir. After the water passed through the tunnel it emerged in a gauge basin, where screens were to be provided; after passing through which the water entered into the mains to Swansea. At the present time one main had been laid complete, and was 17 in. in diameter. It discharged 2,500,000 gals. per day into the service reservoir at Town Hill, which was at an elevation of 590 ft. above ordnance datum, immediately overlooking the town of Swansea. This main had been designed to stand the full pressure due to the water from the gauge basin; it was 23½ in. long, and on



completion there was not a single burst during the testing. The contractors for the pipe line were Sir John Aird & Son, the pipes being supplied by Messrs. D. Y. Stewart & Co., and the valves by Messrs. Glenfield & Kennedy, Ltd. The second line of pipes was now in contemplation, and would consist of a 24-in. main, which would deliver to a height of 350 ft. above ordnance datum into a service reservoir yet to be constructed.

The rainfall in the Cray watershed was remarkable, and the following particulars of the local distribution of rainfall might be of interest:—

The prevailing wind at Swansea was south-west. In the year June, 1899, to June, 1900, rain fell on 171 days, and out of these 171 days the wind was about south-west for eighty-five days. Again, taking the year 1903, it rained 223 days, and out of these the wind was between south and west for 112 days. Commencing at Swansea, they had 40 in., Morriston 45 in., Estalyfera 62 in., Nantyrwydd 75.15 in., Bwlch 112.91 in., Cray No. 2 75.69 in., Cray No. 1 71.78 in., Maescarnog 68.11 in., Brecon 48.50 in., Hereford 50.00 in.

Taking Swansea to Nantyrwydd, the increase of rainfall was about 1 in. per annum for every 26 ft. gained in elevation.

At the Velindre watershed the increase was 1 in. of rain for every 32 ft. of elevation.

The estimated cost of the Cray works was 566,000*l.*, of which 483,000*l.* has been expended.

Mr. C. H. Priestley (Cardiff), Mr. Harvey (Merthyr), and Mr. Haynes (Newport, Mon.) expressed their approval of the works and the economy with which they were being carried out.

#### PLANNING OF PUBLIC ELEMENTARY SCHOOLS.

The new edition of the document containing the requirements of the Board of Education in regard to the planning of public elementary schools contains very little that is really new, though it differs in title from the previous document, in a significant manner. The old title was "Rules to be Observed in Planning and Fitting up Public Elementary Schools." The title of the new document is—"The Building Regulations; being principles to be observed in Planning and Fitting up new buildings for Public Elementary Schools, together with Rules as to construction and certain requirements as to plans." Thus the new paper takes a wider view of the subject, and professes to expound general principles as well as to lay down rules. Thus, Section 1, most of which is new, goes into the general question as to what is required in a school building, having regard to the system of teaching employed.

Though the greater number of the old paragraphs are embodied in the new Regulations, their grouping has been altered, in order to render more obvious the distinction between "Principles" considered in Part I., and "Rules," which are relegated to Part II., though the distinction is not quite logically preserved. Among the new principles laid down is one we are glad to see, to the effect that "corridors should be fully and directly lighted and ventilated"; a much-needed reminder. One too often sees it assumed that corridors can do with "borrowed lights."

Section 8 in Part I. makes one or two suggestions in regard to infants' school-rooms and classrooms.

Section 10, referring to "Higher Elementary Schools," is for the most part new, and commences with the proviso that, though such a school should be planned in accordance with the principles applicable to an ordinary Public Elementary School, "it is important that the curriculum of the school should have been determined, and that it should have been generally approved by the Board before an architect is instructed." The list of special requirements for a Higher School is revised and altered in some particulars.

Among other points that are new is the memorandum (in Part II. "Rules") that "ample space is needed immediately outside a cloak-room"; a recommendation based, no doubt, on the experience of managers as to the crowding in narrow corridors in such a position. Another new and very necessary memorandum is to the effect—"The size of

the inlets and outlets must be carefully adapted to the method of ventilation proposed. A much larger area is required when no motive force is provided."

Rule 10, Part II. gives some useful and important directions in regard to "water supply," a subject which, it is strange to realise, was not even alluded to in the system of Rules which preceded the present one.

In regard to the submission of plans, there are some directions as to procedure which do not appear in the old Rules, and are inserted apparently to facilitate applications to the Board. The remainder of the "Requirements" in regard to plans stand as before, except that there is a concession that a scale of liminary plans may be drawn to a scale of  $\frac{1}{16}$  in., though the Board's final approval cannot be given except on  $\frac{1}{8}$ -in. plans; and in place of the words, "A detailed specification separated under the several branches of the building trade," we have only in the requirement "a draft specification."

There is a clause stating the conditions of the recognition of new buildings by the Board; this forms in itself Part IV. of the paper. There is also, under Rule 2, Part II., a statement as to the conditions under which the Board will sanction temporary school buildings, which runs as follows:—

"(f) The Board are only prepared to sanction the erection of schools of a lighter construction, e.g., in iron and wood, or other suitable material, in very special circumstances, as, for example, in colliery districts where, owing to mining operations, there is no site available upon which a building of the ordinary solid type can be safely erected; or where the population is not of a stationary character, as, for example, during the progress of a large piece of engineering work or in the neighbourhood of a mine likely to be soon worked out, or where temporary accommodation is required during the building of a new school, or the reconstruction of an old one. Where such buildings are proposed special care must be taken to ensure the comfort of the children with regard to warmth and ventilation."

#### A NEW SUGGESTION IN ARCHITECTURE.

(FROM A CORRESPONDENT.)

A BUILDING is now in course of erection in Cardiff, the design of which is very interesting. It is of rather unusual character, and one which may have useful suggestions for architects who are desirous of imparting some national feeling into their designs for Welsh work.

In Wales (and, of course, in Cardiff) there is a movement of archaeological, historical, or patriotic tendency now receiving much attention, and which leans towards the liking and the study of Celtic. It touches that revival of interest in the Celt—not in Wales only, but in Ireland, Scotland, Cornwall, Brittany, and elsewhere—which has become known as the "Pan-Celtic" movement. In it the ancient Celtic literature and folk-lore hold their due place, with which appreciation of those remnants of Celtic Art which are seen in such beautiful old metal work as the so-called brooch of Tara, of that intricacy of the illuminator's handiwork, revealed, say, in the Book of Kells, or of the incised stonework like that at Iona or at Margam and at many other places in the western edges of Great Britain.

There are certain crosses or memorials, etc., which have been made in recent years, more or less reproductions of the Old Celtic, but beyond these and the "Llimerleasse" work in burnt clay produced in Surrey under the happy influence of the late Mr. G. F. Watts, R.A., and Mrs. Watts, there has been little to excite the interest of the designer far enough to take hold of Celtic Art as a basis for use in any field of modern architectural design.

It is in this connexion that the buildings at Cardiff are noteworthy. The architect (Mr. Edwin Seward) is only working in the usual modern materials, and the buildings adapted are of ordinary type built half a century ago and now altered for commercial uses. Architecturally, therefore, scope is restricted, and Mr. Seward's designs rather regard the buildings as a ground work for Applied Art. This gives opportunities for some varying methods. For instance, a central archway is embellished with plates of hammered copper, some square tea wood pillars are partially covered with embossed metal, and parapets in the front are to be filled with panels of thick leaded glass. In these adaptations of Celtic work are introduced,

such as metal panels from the shrine of St. Molaise; of carvings from a shaft at Landough, near Cardiff, from the Great Wheel of Conbelin at Margam, from the Arthur, Pembroke-shire, and from Gollan Grove, Carmarthenshire, etc.

A short corridor of shops forms a part of the scheme of alterations, and although the inevitable plate-glass must dominate, there are places—recessed galleries and wagon-archways—where antique form and modern requirement will be found to blend satisfactorily.

The recent idea of roof gardens is worked out pleasantly in connexion with a few new dental flats which form a portion of the scheme, and the flower and evergreen holders are in the same spirit as to design.

Mr. Seward's "Celtic Corridor" experiment, when completed, will be interesting as new applications of Archaeological precedent. Not only architects, but many others, upward a high place—especially in Wales—the soundness and beauty of Celtic ornamentation, will recognise that its modern uses need not stop at the inscribing of stone or the decorating of missals.

#### RECENT RE-NAMING OF LONDON STREETS.

The London County Council have informed the Court of Common Council that they intend to change the name of Skinner-street, Shoreditch, to "Pindar-street." Skinner-street, next north to the Great Eastern Railway terminus, leads out of Bishopsgate-street Without, between Nos. 119 and 121, into Appold-street. Its new name will commemorate the house—latterly the Sir Paul Pindar's Head tavern—which was numbered 169, Bishopsgate-street Without, at the time of its demolition in November, 1890, for an extension of the station by the Great Eastern Railway Company, who presented the front of the house to the Museum at South Kensington. In the pulling down of the house it was found that the carved front was constructed entirely of oak, whitewashed over, and not of timber and plaster as was commonly supposed, and that the fine ceiling corresponded exactly with one in the adjoining house (south). That house, No. 170, was acquired for purposes of the Metropolitan Free Hospital; its ceiling was secured for the Museum at the instance of Mr. Alfred Marks and the Society for Photographing Relics of Old London. It seems, then, that No. 170 had also been together with the tavern, a part of the mansion, with a lodge and fruit garden in Half Moon-street at the rear, which Sir Paul Pindar, the opulent merchant, built for himself on his return from Italy at the close of Queen Elizabeth's reign. His epitaph at St. Botolph's Without describes him as "an inhabitant twenty-five years and bountiful benefactor to this parish." In 1611, James I., at the Turkey Company's request, sent Pindar to the Turkish Emperor; he returned greatly enriched after nine years' absence. Pindar was a patron of architecture, and gave the house, towards the screen and south transept for Inigo Jones's work at Old Paul's. He introduced into England the manufacture of alum; he lent large sums to James I. and Charles I., and died aged eighty-four years, in 1650. A drawing of his house will be found in Mr. Roland W. Paul's "Vanishing London," 1894; of the many earlier views we may instance those by J. T. Smith, 1792-1812, with details of the interior, Wilkinson, and Schnebbelius, with a plan of the old London Workhouse, the house, lodge, etc. The Transactions (1857) of the London and Middlesex Society contain the Reverend Thos. Hugo's description of the house, and of some richly-decorated plate ceilings in tenements at the rear. Alterations made during the past fifteen years involved the demolition of many houses, with alleys, courts, and yards, on the west side of the main thoroughfare, and there is now a gap in the postal numbers between Nos. 159 and 199. The forty-one houses of Devonshire-place, St. Marylebone, are to be incorporated with Upper Wimpole-street. The consequent re-numbering of the houses will affect the identification of the homes of William Beckford, author of "Vathek" (No. 4, Devonshire-place); and in Wimpole-street of Admiral Lord Hood (No. 12), Edmund Burke (after his marriage), Sir Elijah Impey



(No. 65), and Wilkie Collins (No. 82). But a Society of Arts' tablet is affixed on the red brick front of the present No. 50, Wimpole-street, and a similar tablet distinguishes No. 67, which Henry Hallam occupied during many years. That is the house, the home of A. H. Hallam (1811-33), which is cited in "In Memoriam" :—

Dark house, by which once more I stand,  
Here in the long unlovely street,  
Door where my heart was wont to beat  
So quickly, waiting for a hand.

Wimpole-street, however, is less dismal than it was in Tennyson's time, many of the house-fronts having been altered and otherwise rendered more cheerful. Of the several streets in east and central London which were named after Lord Collingwood, who sailed the *Royal Sovereign* into action at Trafalgar, that one which leads out of Brook-street into Broad-street, Shadwell, will henceforth be styled "Hecford-street" in honour of Dr. Hecford, the friend and benefactor of the poor in that quarter, and founder of the East London Children's Hospital and Dispensary for Women in Glamis-road.

#### THE BUILDERS' BENEVOLENT INSTITUTION.

THE fifty-eighth annual general meeting of the Builders' Benevolent Institution was held at 31 and 32, Bedford-street, Strand, W.C., on Wednesday, the 12th inst., at 3 p.m.

The minutes of the last annual general meeting were read; the Annual Report and the audited accounts for the past year were read and adopted. Votes of thanks were passed to the Past-President (Mr. William Downs), to the Honorary Treasurer (Mr. J. Howard Colls), to the Trustees (Sir Arthur C. Lucas, Bart., Messrs J. H. Colls, F. J. Dove, T. F. Rider, T. Stirling, and J. T. Bolding), to the Honorary Auditors (Mr. R. J. Ward, F.R.C.A., and Mr. J. T. Bolding), to the Executive Committee, Vice-Presidents, and Dinner Stewards.

Mr. Benjamin Hannen, jun. (Messrs. W. Cubitt & Co.) was elected President for the ensuing year, and Sir John Mowlem, Bart., Messrs. T. F. Rider, E. S. Rider, T. Stirling, jun., E. V. New, J. Cairnichael, and W. Downs were re-elected members of the Executive Committee.

#### THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

##### IV.—MIDHURST, SUSSEX.

FOR the fourth summer visit of the current session Midhurst and district were selected for the afternoon of Saturday, 15th inst., and the members of the Architectural Association who journeyed to this old Sussex town were more than repaid for the distance undertaken by the interest of the places seen.

Apart from the beauty of this South Down country, the district contains much that is valuable to the architect, for there are many excellent examples of ancient and modern domestic work, in addition to mediæval remains. Upon the present occasion, however, the visit assumed an archaeological character, whereof the chief interest lay in the well-known Cowdray House. Although remains of an early castle of the Bohuns are traceable, the existing house, now in a ruined state, may be said to have been one of the greatest XVth century English mansions. Built about 1530 by Sir William Fitzwilliam, this house was laid out on a generous scale, with numerous large and lofty apartments. Some idea of the magnificence of the place may be gained from the great width and height of the windows, some of which have as many as five transoms, and that richness of detail was generally to be found throughout the work is evidenced by the fan-vaulting of the porch, the carvings, and other decorative features. Elizabeth stayed in the house, Edward VI. visited it, and troops were stationed within its walls at various times. Towards the end of the XVIIth century a remarkable fate overtook the place. Fire broke out and destroyed all but the heavy stone walls, and the owner, at that period was drowned in the Rhine within a few days of the catastrophe.

Other places in Midhurst visited by the party were the church, the Grammar School, founded in 1672, and subsequently the insti-

tution where Richard Cobden received part of his education, and some old cottages.

Later the church at Easebourne was inspected, together with the remains of a monastery, now used as a granary, and finally several old village cottages. Time prevented an extension of the excursion to Woolbeding, where a charming village church, interesting dwellings, and magnificent trees are to be seen.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, at the County Hall, Spring-gardens, S.W., Mr. E. A. Cornwall, Chairman, presiding.

*Additions to, and Withdrawals from, the Selected List of Contractors.*—On the recommendation of the Education Committee, it was agreed :—

(a) That, subject to the conditions named below, the names of the undermentioned firms be added to the list of contractors selected to be invited to tender for the erection of schools and additions to schools :—Enness Bros., Erith, Kent; J. Shelbourne & Co., 70, Fenchurch-street, E.C. (for works to the value of 10,000.); S. N. Scole & Son, Sheen-road, Richmond (for works to the value of 15,000.); Waring White Building Company, Ltd., 25, Dover-street, Piccadilly.

(b) That, subject to the conditions named below, the names of the undermentioned firms be added to the list of contractors selected to be invited to tender for heating works :—Beeson & Sons, Rickmansworth, Herts (for works to the value of 1,000.); F. W. Brooke, 287, Shaftland-road, Paddington (for works to the value of 500.); Wm. Truswell & Son (on probation until they have completed contract now in hand for heating Shap-street School, Haggerston).

(c) That the name of Beeson & Son, Rickmansworth, Herts, be added to the list of contractors selected to be invited to tender for sanitary and drainage works to the value of 1,000.

(d) That the names of the undermentioned contractors be reinstated on the list of contractors selected to be invited to tender for cleaning and painting schools :—Enness Bros., Erith, Kent; Whitehead & Co., Portland-place North, Clapham-road.

(e) That the name of S. N. Scole & Son, of Sheen-road, Richmond, be added to the list of contractors selected to be invited to tender for structural alterations, repairs to school buildings, etc.

(f) That the name of James Banks, of 2, Howard's-lane, Putney, be added on probation for one year to the list of contractors selected to be invited to tender for repairs to buildings, etc., and that he be invited to tender for small contracts only.

(g) That the name of the Cadogan Ironworks Company, of Stanley Bridge, King's-road, Chelsea, be added to the list of contractors selected to be invited to tender for providing and fixing iron stair-cases.

(h) That the name of Messrs. W. Penn & Co. be retained on probation for one year on the list of contractors selected to be invited to tender for cleaning and repairing blinds.

(i) That the names of the undermentioned firms be removed from the lists of contractors selected to tender for works at London County Council schools :—Beeson & Sons, Rickmansworth, Herts (structural alterations and repairs); Galbraith Bros. (painting and cleaning); F. Gough & Co. (painting and cleaning); London School Furniture Company (partitions); Mackenzie & Son, Ltd.; Mather & Platt (heating works); H. J. Heathman & Co.; S. Polden, Camden Works, Woodstock, Sheen-road, Richmond; Sanitary Lead-lining and Pipe-bending Company.

(j) That the applications of the undermentioned contractors to be placed on the list of contractors selected to tender for the undermentioned works at London County Council schools be declined :—James Doe & Son, 2, Macroom-road, Paddington (cleaning and repairing blinds); Mark Duffield & Sons, Ltd., High-street, Slough (supplying and fixing heating apparatus); C. R. Gibbings & Co., 137, Albany-street, N.W. (structural alterations, repairs to buildings, cleaning and painting); Palowkar & Sons, 99 and 91, Queen-street, Chislehurst (supplying and fixing gas mains and fittings); W. Stringer, 27, St. James-street, Islington (supply of locks, etc.); C. Walker, 59, Victoria-road, Kentish Town (repairs to buildings).

*The Works Committee.*—The Works Committee brought up statements of works completed during the half-year ended March 31, 1905. In statement I. are included the accounts for works, completed in the half-year, in respect of which complete specifications and bills of quantities have been prepared. The net result of execution of the works included in the statement is a balance of cost of 5,548l. 14s. 9d., or 5.28 per cent. below the total of the final certificates. Eight out of nine works have been carried out at a cost below final certificate. As in previous statements, the total of the accepted estimates exceeds the total of the final certificates. In this case the total of the accepted estimates (109,932l. 12s. 2d.) exceeds that of the final certificates (105,084l. 18s. 4d.) by 4,847l. 13s. 10d. The cost of erection of the Old Kent-road fire station has exceeded the final certificate. The fire brigade remained in possession of the site during the erection of the station, and the difficulty of carrying out

the work under these conditions was not fully appreciated at the time of its acceptance. Some sewers, the existence of which was not known until they were encountered, also complicated the execution of the work. The extra cost incurred under these heads has partly been met by an allowance in the final certificate, which, however, leaves an adverse balance of 147l. 12s. 3d. In statement II. is included the cost of the erection of six cottages on the Totterdown-fields estate, which were erected at the desire of the Housing Committee on the basis of actual cost, as time did not admit of the preparation of bills of quantities, etc., it being desirable to expedite the matter with a view to the line of frontage being established in such a manner as to allow of the widening of Church-lane at a later date. Statement III. shows the results of the execution of jobbing works during the year 1903-4 and part of the year 1904-5. The cost of works executed in the year 1903-4 is 5,063l. 19s. 3d., or 9.3 per cent. below schedule value, and the balance of cost below schedule value in the case of the works executed in 1904-5 and now reported is 2,281l. 3s. 1d., or 14.8 per cent. The Committee, in their general observations, remark that :—"The total cost of the works included in the statements now presented does not represent the turnover of the department, because much of the expenditure on these works occurred previous to the half-year in question, while, on the other hand, much of the expenditure during the six months was upon works which are still unfinished. The approximate expenditure on works executed by the department during the half-year was 402,600l., as compared with 252,700l. in the previous half year. The number of estimated works referred to us for execution and not yet included in the half-yearly statements of completed works submitted to the Council is forty-five, representing an estimated expenditure of approximately 1,316,450l. In addition, works to the value of 61,880l. have been accepted by us, but are not yet referred to us by the Council for execution. As required by the standing order, we report that, so far as can at present be foreseen, the only case in which the accepted estimate for any work in progress will be exceeded is the erection of additions at Shoreditch technical institute."

*Waterloo Bridge—Reinstatement of Gas Lamps.*—The Bridges Committee reported as follows :—

"The Council on June 28, 1904, referred it to us to report immediately as to the removal of the original bronze lamp standards on Waterloo Bridge, and the substitution thereof of lamp standards wholly out of character with the bridge, and of particularly feeble design, and as to the possibility of the reinstatement of the original lamp standards." We have very carefully considered the advisability of adopting the course indicated in this reference, and in connexion therewith we have had the advantage of the advice of Mr. George Frampton, R.A., and Sir William Richmond, B.A., and also of Mr. E. J. Horniman, a member of the Council. The old lamps, which were removed, are still in existence, and practically intact, and we have had before us models showing an arrangement by which they can be substituted for the present electric light standards, and adapted for the use of incandescent gas light. We have, in the circumstances, decided to recommend the Council to take this course. The result will, in our opinion, be more artistic than that obtained by the present arrangement, and it will, moreover, be considerably more economical, as the cost of maintenance will be materially reduced. Half of the electric light standards are lighted by current supplied by the Charing Cross, West-end, and City Electric Supply Company in consideration of the way-leave granted to that company to lay mains over the bridge, and the other half of the lamps are supplied with current from the Council's generating station on the Victoria-embankment at the foot of the bridge. This does not amount to an annual estimated cost of 230l. This does not take into account the cost of the supply of the current from the Council's generating station, which, as regards actual work and material, amounts to about 100l. a year. If the old standards be replaced and fitted with two incandescent burners each, the annual cost of maintenance will be about 55l., while the Electric Supply Company will be prepared to pay the annual cost of rent of 65l. a year, thus reducing as way-leave a rent of 65l. a year. It will thus be seen that the reversion to the old standards, besides having the effect of bringing the lighting arrangements into keeping with the structure of the bridge, will result in a considerable annual saving of cost, while the light will be equally good. The cost of making the necessary alterations in the first instance will be about 650l."

The Committee recommended accordingly, but the paragraph was not considered this week.

*Proposed New Thames Tunnel.*—The Bridges Committee recommended that authority be sought in the next Session of Parliament to enable the Council to construct a footway tunnel to connect North and South Woolwich, at an estimated cost of



145,000. Lord Welby, on behalf of the Finance Committee, opposed the proposal, on the ground of the Council's present heavy commitments. On a division an amendment to refer the matter back was carried by fifty-one votes to twenty-four.

**Traffic Commission Report.**—Mr. Baker, the Chairman of the Highways Committee, announced that his Committee would, on Thursday, take into consideration the report of the London Traffic Commission, and, in due course, bring up a report to the Council.

**Trams Across the Bridges.**—Mr. Baker also announced that the House of Lords had rejected the Council's Bill for trams across Westminster and Blackfriars bridges and along the embankment by sixty-four votes to thirty-one.

The Council, having transacted other business, adjourned.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

**Erection of a Boundary Fence, Kidderpore-avenue and Ferncroft-avenue, Hampstead.**

**Hampstead.**—That the resolution reported to the Council on January 24, 1905, consenting to the erection of a boundary fence at less than the prescribed distance from the centre of the roadway on the eastern side of a footpath leading from Kidderpore-avenue to Ferncroft-avenue, Hampstead, be rescinded.—Agreed.

#### Lines of Frontage and Projections.

**Rotherhithe.**—One-story shops upon part of the forecourts of Nos. 43 and 45, Lower-road, Rotherhithe (Messrs. Weston & Sons for Mr. W. J. Paveley).—Consent.

**Kensington, North.**—Seven houses with bay windows on the western side of a street leading out of the south side of St. Quintin-avenue, Kensington, and the erection to the southernmost house of a bay window and pent roof (Messrs. Trant Brown & Humphreys).—Consent.

**Holborn.**—Additions to an iron and glass shelter in front of the main entrance to the Hotel Russell, Russell-square, Holborn (Messrs. J. W. Singer & Sons, Ltd., for the Fredericks Hotel Co., Ltd.).—Consent.

**Wandsworth.**—Buildings on a site abutting upon the west side of Sreathard-hill and south side of Drevstead-road, Wandsworth (Messrs. Taylor & Sons for Messrs. Meech & Goodall).—Consent.

**St. Pancras, North.**—A building with a one-story portion in front, upon the site of No. 73, Highgate-road, St. Pancras (Mr. S. P. Rees for Mr. W. S. Kydd).—Consent.

**Camberwell, North.**—The retention of five lantern lights on the forecourt of the public baths and washhouses, Old Kent-road, Camberwell (Mr. E. H. Payne for the Council of the Metropolitan Borough of Camberwell).—Consent.

**Camberwell, North.**—A projecting illuminated clock and case at the public baths and washhouses, Old Kent-road, Camberwell, to front upon Marlborough-road (Mr. E. H. Payne for the Council of the Metropolitan Borough of Camberwell).—Consent.

**Marylebone, West.**—A studio and external fireproof staircase at No. 2, Leuuard-place, St. John's-wood (Messrs. Blow & Billery for Mr. H. Spence).—Consent.

**Norwood.**—The retention of iron and glass porches at Nos. 162 and 164, Rosendale-road, West Dulwich (Mr. A. R. Vizard for Mr. J. Rutter).—Consent.

**Strand.**—A projecting lamp at No. 64, Suffolk-street, Strand (Messrs. Perry & Co. for the Royal Society of British Artists).—Consent.

**Woolwich.**—A house on a site abutting upon the southern side of Dalin-road and western side of a footpath leading from Dalin-road to Shrewsbury-lane, Woolwich (Mr. J. Bull for Mr. J. R. Turner).—Consent.

**Hammersmith.**—An addition at the rear of No. 55, Abdale-road, Hammersmith, to abut upon Ellerslie-road (Mr. G. W. Clarke for Mr. G. Smith).—Refused.

**Kensington, North.**—An addition and an iron and glass covered way in front of No. 24, Lansdown-road, Notting-hill, Kensington (Messrs. Preston & Perkin for Mr. F. F. Begg).—Refused.

#### Width of Way.

**Kensington, North.**—A club and institute building on a site abutting upon the eastern and southern sides of Blechynden-mews, Blechynden-street, Kensington (Mr. W. Wadman for the Committee of the Fawcett Liberal Club).—Consent.

**Rotherhithe.**—A one-story building at Dinorwic Wharf, Rotherhithe-street, Rotherhithe (Mr. A. H. Lains for Mr. J. J. Greenwood).—Refused.

#### Width of Way and Lines of Frontage.

**Southwark, West.**—An iron and glass shelter in the passageway on the north-eastern side of the Surrey Theatre, Blackfriars-road, Southwark (Messrs. Kirk & Kirk for Mr. T. West).—Refused.

**Fulham.**—A boundary wall at No. 6, Portland-street, North End-road, Fulham (The Excel Meat Company).—Refused.

**Marylebone, West.**—An addition to No. 1, Berkeley-mews, Seymour-street, St. Marylebone (Mr. G. Chappelow for Mr. A. Lichtenstadt).—Refused.

#### Line of Frontage and Formation of Street.

**Lewisham.**—Houses with shops on the eastern side of Springbank-road, Hither Green, between Nos. 11 and 53; and that an order be issued to Mr. P. Roche, sanctioning the formation or laying out of a new street, and in connexion therewith the erection of a bakehouse and stabling on a site at the rear of such houses with shops).—Consent.

#### Lines of Frontage and Space at Rear.

**St. George, Hanover-square.**—An addition to "Berkeley House," on the southern side of Hay-hill, St. George, Hanover-square, to abut upon Berkeley-street (Mr. W. Wonnacott for Mr. A. H. Young).—Consent.

#### Lines of Frontage and Construction.

**Hammersmith.**—An addition to a workshop at the rear of the "Red Cow" public-house, No. 157, Hammersmith-road, Hammersmith, to abut upon Collet-gardens (Messrs. Bull & Bull for the Ace Motor Syndicate, Limited).—Consent.

#### Width of Way and Space at Rear.

**Holborn.**—Buildings on the site of Nos. 8 to 14, Wild-court, Holborn (Mr. H. L. Florence for the trustees of the United Grand Lodge of England).—Consent.

#### Width of Way and Construction.

**Battersea.**—A workshop in a yard at the rear of No. 34, Surrey-lane, Battersea (Mr. J. Ritchie).—Refused.

#### Formation of Streets.

**Wandsworth.**—That an order be issued to Mr. A. Wellings sanctioning the formation or laying out of a new street for carriage traffic, to lead from Tooting Bec-road to Dalborne-road, Wandsworth. —Consent.

**Wandsworth.**—That an order be issued to Mr. E. B. Panssch, sanctioning the formation or laying out of a new street for carriage traffic to lead from Sunnyhill-road to Valley-road, Streatham (for Messrs. B. D. & L. D. Fisher).—Consent.

#### Space at Rear.

**Southwark, West.**—A deviation from the plans approved for the erection of a cart-shed, with four stories over, on the east side of Gravel-lane, Southwark, to extend over part of the open space at the rear of a stable building on the north side of Orange-street, so far as relates to an increase in the height of a portion of the stable building (Mr. E. Carritt for Mr. J. Sainsbury).—Consent.

#### Alterations to Building.

**Islington, North.**—An addition at the rear of No. 542, Holloway-road, Islington (Mr. R. Midworth for Mr. H. J. Bee).—Refused.

#### Buildings for the Supply of Electricity.

**Norwood.**—A steel flue at the generating station Bengough-road, Norwood (Messrs. Kinneid, Waller, Manville, & Dawson for the South London Electricity Supply Corporation).—Consent.

#### Means of Escape from the Top of High Buildings.

**Strand.**—Certain deviations from the drawings approved in respect of the means of escape in case of fire proposed to be provided from the fifth (top) and fourth stories of Nos. 1 and 1A, Cockspur-street, and Nos. 18 and 19, Pall Mall East, Strand (Mr. H. Tanner, junr.).—Consent.

#### Working-class Dwellings.

**Greenwich.**—A dwelling-house to be inhabited by persons of the working-class and proposed to be erected, not abutting upon a street, on a site at the rear of No. 92, The Stowage, Deptford (Mr. J. Webster for Messrs. May & Roberts).—Consent.

#### Means of Escape at top of High Buildings, Cubical Extent, etc.

**Strand.**—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the fifth (top) story of a new building for the Morning Post to abut upon Aldwych, Wellington-street, Strand, the upper surface of the floor of which story is above 60 ft. from the street level, for the persons dwelling or employed therein (Messrs. Mewes & Davis).—Consent.

**Strand.**—A new building for the Morning Post, to abut upon Aldwych, Wellington-street, and Exeter-street, Strand, with a division to exceed in extent 250,000 cubic ft. (Messrs. Mewes & Davis).—Consent.

The recommendation marked † is contrary to the views of the local authority.

#### ARCHITECTURAL SOCIETIES.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—The annual Report done by the Society for 1904-5 states that the number now stand as follows:—Three hon. members, thirty-seven Fellows, forty-eight Associates, fourteen students; eighteen lay members—total, 120, as compared with 117 last year. This the highest number on the Society's record. Owing to the transfer of students to the Society of Associates the number of the former diminished, and the Council trusts that the principals will point out to their pupils the importance of joining the Society as early as possible. Two prizes of books to the value of 2l. 12s. 6d. each were offered for the best common-place book kept during the year in each of the following subjects:—(1) Architectural Practice, (2) Surveying Practice. Only one competitor submitted work, the quality of which did not warrant an award being made. A prize of books to the value of 3l. 3s. was offered for the best epitome of the following book, "Building Estates" (Maitland). No work was submitted in response to this offer. A prize of 5l. 5s. for the best selection of measured drawings was awarded to Mr. J. M. Jenkins. His drawings not only give evidence of great industry, but their character is excellent; the measured scale drawings done on the buildings show that he has gone about the work with understanding, although in some cases the work has been somewhat hurried. The finished drawings exhibit care and accuracy as well as power and feeling. The offer of a prize of books to the value of 2l. 2s. for the best description, illustrated by sketches, of the places visited at the annual or any of the Saturday excursions arranged, did not meet with any response. Books to the value of 2l. 12s. 6d. were offered by the Society to students attending the classes of the Society, whose work, in the opinion of the Council, deserves recognition. These were awarded to the following students, whose work in the Designing Class showed progress and industry:—One guinea each to Mr. G. R. Bower and Mr. J. R. Trulove and half-a-guinea to Mr. D. H. Loukes. In regard to the question of Building By-laws, the Council wishes to put on record its concurrence with the opinions which have recently been so strongly expressed all over the kingdom, that many of the by-laws are too rigid, and some not only useless but harmful, as they rather tend to check enterprise than to suppress insanitary and unsafe building, which should be the principal objects of official restriction, and in which we are all most heartily in accord with the authorities. They hope their local authorities will suggest a code which will not be open to the criticisms so often rightly made in other places, and if this be done the Society would assure them of its loyal support.

#### Books.

*Wien am Anfang des XX Jahrhunderts.* Edited by PAUL KORTZ. Gerlach & Wiedling.

"VIENNA at the Beginning of the XXth Century" is the title of a book which is comprehensive in detail as it is excellent arrangement. It purports to be a guide to Vienna in matters technical and artistic, and fully accomplishes this object.

The work was undertaken by the Austrian Institute of Engineers and Architects, as it was felt that all those interested in the planning and building of cities would welcome a reliable book of reference recording the constructional development and architectural features of the beautiful Austrian capital.

From the high position it holds in public estimation, the Institute was able to secure the services of specialists in each branch of the subject, and the work consists of a series of articles all signed by men who are qualified to speak with authority. These articles are published in two volumes.

The first volume, which is under review, includes the general characteristics of the town and the engineering works. It contains 388 pages of printed matter, with 297 illustrations and seventeen plates. The second volume, which will appear at the end of the year, will deal with the development of architecture in Vienna during the last fifty years. Judging from its published list of contents, it promises to be compiled with the same care



that has been bestowed on the first volume, and hence it cannot fail to arouse the interest of the architectural reader.

Since the co-operation of architects and engineers is fortunately daily becoming more general, it follows that a hard-and-fast line cannot always be drawn between the work proper to each of their professions; consequently even the first volume contains much matter of value to the architect.

It is divided into two parts. The first part deals with the topography, hydrography, meteorology, and geology of the town and its neighbourhood, and the letterpress is supplemented by maps beautifully reproduced. Building materials, natural and artificial, form the subject of an interesting article in which is traced the influence of material on style. Apparently stone is not largely used except for engineering works; dwelling-houses being chiefly built of brick. The clay in the neighbourhood is of great tenacity and purity, and the Wienberger Brick Co. gives a yearly output of over 200 million bricks, which is a quantity far in excess of that of any other continental factory. Concrete and glass, in conjunction with iron, have noticeably come to the front, and result in a flat treatment, the modern Viennese style, which contrasts favourably with the heavy columnar and ornate style that flourished a few years ago. At the close of each section is given a list of the principal buildings constructed of the particular material under discussion.

The historical development of the town from Roman times to the present day is outlined in a chapter thirty pages in length, and the methods traced by which improvements were effected. In 1857, when an Imperial edict abolished the inner fortifications, the town was remodelled, and the fine Ring Strasse, 150 ft. wide, laid out on the site of the ramparts. Its rows of trees and monuments, its noble buildings, squares and gardens, combine to make it the pride of modern Vienna. At the same time building was encouraged and a great impetus given to the trade by thirty years' exemption from taxation being granted to newly-erected buildings. In 1893, the municipality sanctioned an admirable plan which has since regulated building in Vienna. This scheme includes four zones, in each of which the class of building that may be erected is specified, and the height regulated to which the building may rise. A plan of the town is reproduced which, by different colours, shows the various heights to which buildings are limited.

In the same year, in order to compass the widening of narrow streets, over 1,200 houses were marked down and their owners promised exemption from taxation for eighteen years, provided the houses were rebuilt on a new frontage line within a given time. Sixty per cent. of the houses were, in consequence, set back and the circulation in congested quarters was thereby much improved.

The scheme for enlarging the town shows an endeavour to avoid the mechanical uniformity of former extensions and to provide the greatest amount of individuality compatible with a harmonious whole. In the architectural character of flats and business premises especially a great change for the better has been effected. Formerly these classes of buildings affected the palatial style, and sought to appear other than they were; but their meagre proportions and inferior material lent no colour to the deception. Now the lack of taste and of object in such a proceeding is recognised, and buildings aim chiefly at expressing their purpose.

The second part of Volume I. deals with engineering works, and gives historical, technical, constructional, and financial data for all works relating to traffic, postal arrangements, street conservancy, drainage, water supply, lighting, open spaces, etc. There is hardly a page of letterpress that is not illustrated by some plan, section, or photograph of the methods in use for providing the town with the requirements of modern civilisation.

At the conclusion of each article is added a list of authorities consulted, so that any point may be readily referred to and studied at greater length if desired.

*A History of English Furniture.* By PERCY MACQUOID, R.L. Laurence & Bullen. 1901. Vol. I.

The first volume of this sumptuously illustrated

work is now completed. The volume brings to an end the first part of the work entitled by the author the "Age of Oak." The period covers the earliest existing furniture of this country from Gothic to Jacobean times; the next volume will deal with walnut furniture, which came into vogue with the Restoration. The volume before us shows the most interesting examples of that solid and enduring type of carpenters' furniture which was characteristic of the XVth and XVIth centuries. The pity is that so little of an earlier time survives; what there is excites our admiration by its quaintness of form and the liveliness of its decoration. The later forms of furniture shown are no doubt more comfortable and more shapely, but they lack the simplicity and directness of construction which charm in the earlier examples. The first three chapters have already been reviewed in these pages, the fourth deals with oak tables, dressers, and chests, with interesting sidelight upon the domestic history of the period; views are given of Nonsuch, besides illustrations of furniture from that palace. One of the most beautiful examples from Nonsuch is a marqueterie chest, the property of Sir Aston Webb. Chapter V. deals with oak chairs, most interesting among the illustrations of which is an oak grandfather chair, the property of the Duke of Leeds. After the chairs come beds, with their heavy and sumptuous hangings, are shown. It is interesting to notice that as far back as 1600 the oak for wainscot panelling was not of English growth, but imported from Denmark. Chapter VI. shows fine examples of Court cupboards and chests with drawers in them, some are very richly inlaid with materials other than wood. The best examples of upholstered furniture are the property of Lord Sackville, of which many illustrations are given. Unfortunately, very little of this class of work is left, owing to its perishable nature and to wholesale destruction during the civil war in the middle of the XVIIth century.

*Industrie Ardoisière—Carrières et Mines de Maine-et-Loire.* Par G. LARIVIERE. London: C. H. Broodbank.

Few districts in France are more plentifully endowed with mineral resources than the Department of Maine-et-Loire. The minerals occurring in the Department include various materials suitable for the construction and ornamentation of buildings. Among these products are slate, hard and soft stone, limestone, and clay, the two last-mentioned being largely employed in the manufacture of lime, cement, and brick. Further, the minerals of the Department comprise coal, iron ore, and arsenical, copper, and auriferous pyrites. The study of these mineral riches, and of the industries to which they have given rise, is of much interest, and if the subject were treated in full detail it would amply suffice to fill a volume of far more portly dimensions than the book written by M. Larivière. In this publication the author confines attention chiefly to a descriptive account of the slate industry, which is of particular importance to the Department of Maine-et-Loire, and, we may add, to the author himself as a member of the Commission des Ardoisières d'Angers. This association, formed in January, 1827, as a syndicate for the sale of the products of more than fifteen companies engaged in working the slate beds of Angers, has been extended in scope from time to time, and in 1891 effected the complete amalgamation of all the companies previously associated with the organisation. Some idea of the extent of the industry may be formed by the statement that the slate production of Maine-et-Loire is not less than 360,000,000 per annum, of which more than two-thirds is yielded by the quarries and mines of Angers.

As the depth of the formation in the vicinity of Angers reaches nearly 800 metres, the workings are of considerable depth, being conducted from the surface in some places and by mining in others. Briefly stated the mineral is worked by the following methods—

(1) By open excavation in vertical benches, adopted from the earliest times. (2) By subterranean working in vertical benches (Méthode Le Chatelier), first applied in 1832, but less used than formerly. (3) By removing the material from the under side of a vein (Méthode Blavier), first applied in 1877, and permitting the working of a layer of any desired depth by successive laminae. (4) By a combination of the two preceding methods. Each system has its peculiar advantages and disadvantages, and is selected or rejected according

to the conditions of the vein which it is proposed to work. From the descriptions and illustrations here given the works devoted to these industries appear to be well-equipped with modern machinery. The slate works have been supplemented by the addition of an enamelling workshop, where slate is finished in imitation of faience and marble and in various colours, as required for the fittings and decoration of buildings and other structures. The wire works are said to have amply attained the primary object for which they were founded, namely, the manufacture of wire ropes of such quality as to minimise the number of accidents in the quarries and mines of the Commission, owing to the breaking of cables employed for raising slate from the workings. In proof of this statement the author records the fact that from the establishment of the works up to 1903, only one fatal accident has been occasioned by rupture of the cables.

Altogether this is a most interesting volume, and, although published in the interests of a commercial undertaking, it makes no attempt to bring the business aspect of the subject to the front in the manner too often adopted by the writers of books which are put forward as independent scientific works.

*Stained-Glass Work: a Textbook for Students and Workers in Glass.* By C. W. WHALL. London: John Hogg.

THIS little volume, which forms the fourth of the series of technical handbooks edited by Professor Lethaby, is unique among modern works on stained glass in being the work of an artist who is also a thorough craftsman. Mr. Whall was among the first to realise that good stained glass cannot be produced by the factory system, on which too much stained glass is produced at the present day—by the separation, namely, not merely of designer and executant, but of designer, cartoonist, figure-draughtsman, ornament-draughtsman, "cut-liner," glass-cutter, tracer, flesh-painter, drapery-painter, border-painter, glazier (this is no exaggeration), each working only at his own particular portion of the process, with no knowledge of the rest. "Since the Middle Ages," says Mr. Whall, "the craft has never been taught as a whole"; so the author, and the little group of workers of whom he is one, have taken off their coats and learnt the craft as a whole, and this book may be taken as the result of their experience.

Mr. Whall is careful to state at the outset his belief that no craft can be taught from books alone, but within these limits the technical manual contained in Part I. is exhaustive and extremely clear. Most workers in stained glass will find useful hints in it, and those who do not will enjoy it as a chat about their craft by one who is such an enthusiastic lover of it. For love of the craft is the characteristic of the book from end to end—illuminating the commonest details, so that there is not a dull page anywhere, and rising to a height in the second part of the work, especially in the really noble concluding chapter, called "A String of Beads."

It is this, the second, part of the work in which Mr. Whall, leaving from time to time technical details, treats of design and the broad principles which govern all art, which will appeal most to the general reader. The chapter on "Colour" is extremely well done, and will be read with enjoyment by all artists or lovers of art. We do not know that the subject of colour composition has ever been better treated, a fact which seems to bear out the author's plea that the finest training for a colourist is a thorough familiarity with the possibilities of stained glass.

At the same time, however, he is careful to urge on the student the continual study of, and contact with, nature. Indeed, the whole purport of his teaching for the student is that Nature, his material, and a knowledge of what has been done will tell him what he ought to do. Again and again in the concluding chapters does Mr. Whall inculcate the great lesson of humility in the artist—humility in the expression of a thought, humility before the architecture he may have to adorn, and, lastly, humility in considering the wishes of his clients.

"You will get many requests," he says, "which seem to you unreasonable and impossible of carrying out—some no doubt are so; but at least consider them . . . treat the whole thing as 'raw material' and all surrounding questions as factors in one general problem."



It is a lesson much needed in these days, and one the neglect of which does more almost than anything else to throw the would-be patron of the crafts into the hands of the manufacturer.

Thanks to the efforts of Mr. Whall and others, there is enough trained talent in the country to-day, if we would only use it, to raise stained glass in a few years to something like its old level. The situation is very much in the hands of architects and clergymen, and one of the uses of this book ought to be to give those of them who can be induced to read it such an insight into the real nature and conditions of the art as to cure them for ever of trying to get what they want from "trade" firms.

**Horsham and St. Leonard's Forest.** By W. GOODLIFFE, M.A. London: The Homelands Association. 1905.

THIS is an excellent guide to a very interesting town standing in the picturesque district known as the Weald of Sussex. Additional attention has been lately drawn to it by the selection of a site near the town for the new buildings of Christ's Hospital, a detailed description of which is given in a chapter at the end of the book. Horsham possesses an interesting church with a fine east window, and several other many quaint immediate neighbourhood are many quaint old houses, particularly those forming the "Causeway." Another house roofed with Horsham stone stands near the station, and of it a good photograph is given. A chapter is devoted to a description of St. Leonard's Forest, and the four following deal with the villages lying within a radius of about five miles. Besides numerous excellent photographic illustrations, a map of the district is given to the useful scale of an inch to the mile.

**The Country Gentleman's Estate Book, 1905.** Edited by W. BROOMHALL. Country Gentleman's Association, Ltd., 2, Waterloo-place, London.

THE publication lives up to its reputation; the capacity of its editor is well proved by the fact that a considerable space is given to the questions of Rural Housing and Cheap Country Cottages, subjects of great importance and interest at the present time. The contents are as varied and useful as ever, and indicate that the book should be in the hands of every land agent.

#### ANCIENT EARTHWORKS AND-FORTIFIED ENCLOSURES.

THE Report of the Committee of Archaeological Societies in union with the Society of Antiquaries, presented to the Congress of Archaeological Societies, under date July 5, urges the secretaries of local archaeological societies to obtain schedules of the ancient earthworks and defensive enclosures in their respective districts, and to publish them in their *Transactions*, or as a separate pamphlet, hoping by these means to increase public interest in these priceless relics of our country's story. It is suggested that reprints of such schedules, accompanied, so far as possible, by accurate plans and sections of works of each class, should be distributed not only to landowners and occupiers, but also amongst the county, borough, rural, urban and district councils, whose members may be able to use influence to prevent the destruction or mutilation which from time to time threatens the remains of so many early fortresses, camps, and strongholds throughout the land.

It is observed that while in such schedules and plans no great amount of detail can be expected, it is desirable to adopt an exact method of delineation of the features, with information as to the levels and other details, not only of the artificial work, but of the immediately surrounding land. The Committee hopes shortly to issue specimen plans and sections to serve as models for similar work in the pages of archaeological societies' *Transactions*.

The earthworks of the following counties are in hand, both as to schedules and plans:—Essex, Lincolnshire, Oxfordshire, Warwickshire, Staffordshire, and part of Westmorland and Lancashire.

The editors of the "Victoria County Histories" have been in close touch with the Committee, and it is pleasant to state that, in addition to Essex and Bedfordshire remains, referred to in the Report of last year, those of Warwickshire have been recorded (by Mr. Willoughby Gardner) in the published volumes of the series. The Rev. E. A. Downman is contributing to the "Victoria History" plans of works in Northamptonshire, Dr. Cox is writing on those in Derbyshire, the remains in Berkshire are being

described by Mr. Harold Peake, and Durham and Sussex are ready for the press. The Essex Archaeological Society has issued a preliminary list of homestead moats, asking for information to complete the schedule. The Wiltshire Archaeological and Natural History Society has secured about fifty plans of the county earthworks, drawn to scale by the Rev. E. A. Downman, and it is hoped will issue a complete schedule of the remains in Wiltshire. The Cambridge Antiquarian Society hopes to publish a preliminary account of the works in that county with plans, by Mr. Harding; and Mr. G. G. T. Treherne, a member of the Cambrian Archaeological Association, is preparing fully detailed plans and sections of ten camps in the district of Carmarthenshire, known as Laugharnshire.

It is added that tumuli, barrows, and ancient boundary-banks and dykes deserve attention at the hands of those engaged in recording the earthworks of a county, and it is suggested that a list should be compiled. This is the more necessary as such remains disappear with even greater rapidity than earthwork camps and strongholds. In this connection it may be noticed that a remarkably full list of such works in Derbyshire will appear in the "Victoria History" of that county, 153 examples being recorded.

#### Correspondence.

##### "THE VENTILATION OF TUBULAR RAILWAYS."

SIR,—Thanks for your notice and comments in the *Builder* of July 15 in reference to my pamphlet on the above subject. In concluding the paragraph, you say:—"The general idea of the scheme is good, but we think as propounded its effects would be limited to the stations, and that the bulk of the fresh air would be ejected without doing anything to improve the condition of the tunnels." My reply to this is that the passage of a train through a tunnel practically sweeps all the foul air out of the next station, as can be proved by standing near the edge of a platform, when you can feel the volume of air issuing from the tunnel before you can see or hear the approaching train. The stations are like large caverns for holding the foul air, and are likely to be worse than the tunnels, the same air that is driven down the line passing through all openings to up-line, and never being changed.

When it is taken into consideration that many of the lift shafts are from 60 ft. to 90 ft. deep and contain three lifts being worked every few minutes, the enormous amount of work that could be done under my scheme of ventilation can be realised, as at all the points where the foul air collects it could be pumped out. By this system the air of the whole length of railway would be changed several times a day; also with the opening into the tunnel of the staircase air shaft (as shown in drawing) the passage of a train through the tunnel would greatly assist the inlet of air by suction. Considering the great improvement that would be made without any hindrance to business and no great structural alterations, the outlay would prove a good investment to the companies concerned by the increase of traffic and popularity of this means of travel; the amount of business lost can be realised by inquiries among the travelling public. Many people have told me they would like to travel by these lines as they are so convenient, but cannot do so on account of the state of the air and the headache it produces.

R. J. RUSSELL.

##### THE JAPANESE ARMOUR EXHIBITION.

SIR,—May I be allowed to make one or two comments upon your note of the 15th instant, the writer of which dissents from the statement that the design of ancient Japanese arms, in spite of their beautiful decoration, is entirely subservient to practical purposes?

The particular points adduced in support of his views were (a) the absence of a knuckle-guard upon the swords; (b) the smallness of the "shoulder-butt" of the old muskets; and (c) the design of the large stirrups.

Beyond saying that the large iron stirrups would give some protection against edged weapons in the hands of a man on foot, one cannot advance definite reasons for their use.

Most writers agree that Japanese horsemanship in the past has been poor, and Sir Rutherford Alcock, among some very unflattering observations on the subject, remarks that "it is vulgar and low to ride fast in Japan."

But upon the other two points there is more to be said. The butt of the Japanese matchlock was not meant to be put to the shoulder at all. Siebold states that the butt was held in the right hand, the ball of the thumb resting against the cheek, the butt being quite clear of the shoulder. Hokusai, in his "Manga," shows this method, and also shows that a rest for the muzzle was sometimes used. The weight of the piece, always considerable in proportion to

the bore (about  $\frac{1}{2}$  in. in fowling-piece), would prevent serious recoil.

As to the sword-hilt, it may be pointed out that the weapons for which they were in use were place designed were two-handed swords for men who wore armour. The disc guard, which did not glancing blows that might slide down the blade, and the hands of the swordsman were protected by plate and chain mail; so that the absence of knuckle-guard, while adding to the freedom with which the weapon could be used, would scarcely, if at all, increase the risk to the user. It will be remembered that the two-handed swords of Europe never had closed hilts, but were restricted to cross-bars of various kinds, with occasionally a "pus d'ane" in some shapes, the reasons being just those suggested above as having kept the Japanese hilt so simple.

MATT. GILBERT.

\*\* Of course one could not work a two-handed sword with a closed hilt; but all those exhibited were one-handed swords of the same size in modern arms. We do not think a European swordsman would approve of the form of the hilt, from a practical point of view.—Ed.

#### Illustrations.

##### COMPETITION DESIGN FOR WEST LONDON HALL, WESTMINSTER.

WE give this week the perspective view and two plans of the design in the Second Competition by Jas. A. Swan, of Birmingham.

The following are the author's notes in explanation of the design:—  
The estimated cost is 130,000. The building is designed in the Renaissance style with a simple treatment depending on the rather than enrichment for effect. Each part is so arranged as to be self-contained and capable of being used independently of the others. There are two tea-meeting halls, the basement, each to seat 500, with two rooms.

The ground floor contains the entrance hall, four committee-rooms, small hall, library, vestries and four cloak-rooms, lavatories. In a mezzanine are vestries, rooms for ladies and gentlemen of the choir. The first floor contains the great hall, seating 1,390 on the floor. There is a reception room and an orchestra retiring-room. At the principal front, right and left hand, are the reading-room and conference hall. On the west side are placed two blocks of offices, twenty-one for departmental purposes and sixteen "offices to let." On the second floor are galleries, accommodates 1,244, making a total seating accommodation in the great hall of 2,634.

On the upper floors are the library's caretaker's rooms and the remainder of the offices. Twelve separate blocks of staircases are provided.

The ground plan, which we were not able to include, contains what we thought the best point in the whole plan, the grouping together of the four large committee-rooms adjacent, two open areas, thus securing concentration and absolute quiet. We drew special attention to this in our general review of competition designs.

##### NEW PREMISES, ST. JAMES'S STREET.

THIS is the St. James's-street front of premises erected from the designs of Mr. Leslie W. Green, of which the *Bury-street* front was illustrated in our issue of July 8.

The general description of the building and the plan, were also given in that issue.

##### DESIGN FOR GRAMMAR SCHOOL.

THIS is the drawing by Mr. C. F. A. Voysey which is hung at the Royal Academy under the title "Proposed Grammar School, Lincoln."

We are not very much in favour of the quadrangle plan for a school, as we think it bad from a hygienic point of view; and we observe that in this case the plan has neither scale nor north point appended to it; an omission which seems to be of no consequence at the Royal Academy, but which we consider a rather serious one, especially in the case of such a building as a school in which lighting is of the greatest importance.

As a piece of picturesque building, however, it is very charming; and we are glad to publish it as such.

## SCULPTURE AT THE ROYAL ACADEMY.

We give some further illustrations of sculpture at the Royal Academy, from photographs lent to us by the respective sculptors.

That marked A is Miss E. M. Rope's bas-relief panel "Caritas," which hangs in the lecture-room. Near it hangs another decorative panel by Miss Rope, that marked D on the plate, and entitled "A Race Through the Surf." E, "A Sea-Chase," which is by the same artist, and part of the same series, is not, in fact, in the present exhibition, though we believe it was in a former one; but we give the two together as they are almost parts of the same subject. B is Mr. C. L. Hartwell's expressive head in marble, entitled "A Study." F is by a German sculptor, Herr Max Klein, of Berlin, the subject being "Hagar and Ishmael." It is a group on a small scale, and partially coloured. G is Miss Florence Steele's graceful silver rose-bowl, with a quotation from Herrick engraved round it in two bands. The centre subject, C, is Mr. Montford's large group entitled "The Flow," for Cardiff Town Hall.

We also give, separately, illustrations of two fine bronze busts by Mr. Alfred Drury; one an ideal bust, "The Spirit of the Night"; the other a study for a head of St. George for the monument at Clifton College.

## COMPETITIONS.

PUBLIC ELEMENTARY SCHOOL, LEIGH, LANCASTIRE.—A short time since the Leigh Corporation invited fourteen architects to send in designs for their proposed elementary schools; and on the nomination of the President of the Royal Institute of British Architects, Mr. Mervyn Macartney was appointed assessor. He has now made his award as follows:—1st—Mr. J. C. Prestwich, of Leigh; 2nd—Mr. Thornley, of Wigan and Darwen; 3rd—Messrs. Potts, Son, and Hennings, of Manchester and Bolton. The estimated cost is 9,000*l.*, and the accommodation is for 900 children.

BRANCH LIBRARY, CATHAYS.—The design for the new branch library and reading-room which it is proposed to erect at Cathays has been accepted by the Cardiff Free Library Museum Building Committee on the recommendation of the assessor (Mr. Lanchester), to whom twenty sets of competitive designs were submitted. The successful competitors were Messrs Speir & Beavan, Queen-street, Cardiff. The building will be erected at the junction of Whit-church-road, Fair-oak-road, and Crwys-road, and it will be triangular in shape. The interior arrangements comprise a vestibule, hall, a lending library in the centre, and a reading-room on either side, together with a ladies' reading-room, librarian's apartments,

etc. One of the reading-rooms will be set apart for children—a new feature in local free libraries. Both the reading-rooms on either side of the lending library will be 46 ft. long by 25 ft. wide, and will have a height of 25 ft. Supervision of the whole of the rooms will be obtained from the lending library, which will have cases for 12,000 volumes. The style of the architecture is of the Tudor period, and the building will be built of Newbridge stone, with Bath stone dressings and green slate roof. The estimated cost of the building and equipment is 4,400*l.*

## BOOKS RECEIVED.

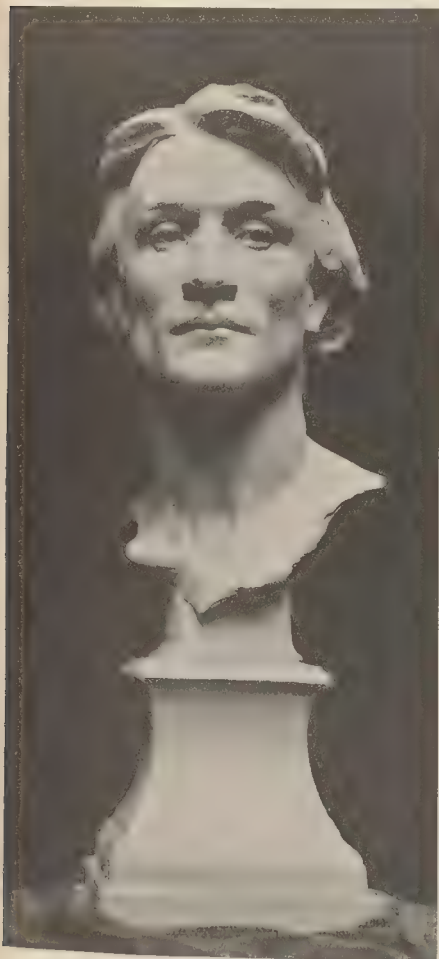
DRAWING FROM MODELS AND OBJECTS. By John Carroll. (Burns & Oates.)

WILLIAM HOGARTH. By G. Baldwin Brown, Professor of Fine Art in the University of Edinburgh. (The Walter Scott Publishing Company.)

COUNTRY COTTAGES: HOW TO BUILD, BUY, AND FIT THEM UP. By "Home Counties." (W. Heinemann. 6s.)

ARBITRATIONS. By the late Professor Banister Fletcher. Third edition; revised by Banister F. Fletcher and H. P. Fletcher. (B. T. Batsford.)

MODERN HOUSING IN TOWN AND COUNTRY. By James Cornes. (B. T. Batsford. 7s. 6d.)



Study for Head of Colossal Bronze Statue of St. George, Clifton College. Mr. Alfred Drury, A.R.A., Sculptor.



"Spirit of the Night": Bronze Head. Mr. Alfred Drury, A.R.A., Sculptor.

Sculpture at the Royal Academy.



## TRADE CATALOGUES.

The Phoenix Engineering Co., of Chard, send us a catalogue which deals principally with plant intended for road making, repairing, and cleansing. Several pages are devoted to tar, pitch, and bitumen boilers ranging in capacity from 10 gallons to 500 gallons. Road sweeping machines, road scrapers, and watering vans are also illustrated, as well as portable pumps of various types, and other requisites for contractors.

The Cincinnati Electrical Tool Co., of Cincinnati, U.S.A., send us a catalogue describing two useful tools. One is a portable electrical breast and hand-drill, a neatly-designed self-contained appliance, including a small motor operated by direct current, derived from any convenient source and transmitted through a flexible twin cable to the machine, the weight of which is only 20 lb. for the  $\frac{1}{2}$  in. size. The other tool is an electrical grinder, measuring  $10\frac{1}{2}$  in. by 8 in. by 6 in. overall, and driven by a motor forming part of the machine.

We have received a copy of Messrs. Johnson Phillips's French electric cable list, giving particulars in that language, and on the metric system, of their standard vulcanised rubber cables.

We have received from Messrs. Johnson & Phillips, of Old Charlton, Kent, an abbreviated price-list of the electric lighting cables they manufacture. The list is made into a neat little booklet convenient for the pocket, and contains a series of blank pages of sectional paper which will be very useful for contractors to make notes on. The specifications of all the cables are clearly described, and the book will prove very useful to electricians.

The Eglinton Brass Foundry (Glasgow) send us a small catalogue of their brass rollers and groovers for forming the surface of pavement, and their name plates and brass lettering for pavement inscriptions.

The Falcon Brass Works send us a catalogue and price list of their goods kept in stock—including various types of waste-preventing cistern, taps, bath fittings, plumbers' fittings, traps, valve closets, etc. The "Flood" waste-preventer, which has been selected for the London County Council's workmen's dwellings, appears to be a very efficient and simple form of flushing cistern.

Messrs. F. Hattersley, Pickard & Co., of Leeds, send us a circular illustrating the application of their patent screw fan to the ventilation of buildings and to the removal of steam and deleterious fumes from textile and other factories. This fan is of neat design, and is fitted with dust-proof bearings and an enclosed spindle. To provide for the different requirements of users, it can be supplied in any one of eleven distinct patterns of frame construction and with the arms in one of four arrangements, all these variations being illustrated in the circular. The fan is made suitably for driving by belt or for direct driving by steam engine or electric motor. Particulars will also be found of a hot-air apparatus with fan combined for warming and drying purposes.

Messrs. R. H. & J. Pearson send us their finely-illustrated catalogue of "Modern Fireplaces" executed by them. For the most part these are very well designed, and quite above the average of grates and chimney-pieces shown in catalogues of this kind. Some of the designs are a little too fanciful and odd in detail, but the majority are in very good taste, and the catalogue as a whole is highly creditable to the firm.

Mr. Harrison Ainsworth (Hammersmith) sends us a sheet of illustrations and prices of his drawing instruments, also of his "Conklin" fountain pen, which claims the merit of filling automatically on the pressing of a lever. It is impossible, of course, to judge of drawing instruments by illustrations in a catalogue; all that we can say with certainty is that the prices seem very low.

The Kitchen Fath Fitment Company (Sheffield) have sent us their catalogue of "artisan combination bath, sink, range, and wash-boiler fittings." The special feature is the arrangement of the bath, sink, and boiler in a small space, the bath being under the other fittings. In some of the fittings the bath is fitted with wheels, and has a swivelled outlet, on which it turns when the head is wheeled out; the boiler, heated by gas, is fixed over the foot of the bath, and the sink is fixed at one side. In another arrangement the bath is fixed, and the sink is hinged

at the back. A more elaborate combination has the foot of the swivelled bath under a hinged portion of the draining board, and hot and cold taps are fitted to the bath, hot water being obtained from the wash-boiler. An arrangement in which the boiler is supplied from the kitchen fire and automatically supplied with water from a small tank under the drainer of the sink, is, in many respects, the most convenient. The combinations are compact and ingenious, and cannot fail to be appreciated.

We have received from Mr. C. Clifford Potter a catalogue (printed in Germany) describing the asphalt roofing manufactured by "C. F. Beer Söhne, Cologne-on-Rhine." The material is an asphalted cardboard, and the methods of laying it are fully illustrated. For roofs nearly flat, square or triangular wood "rolls" are fixed to the boards about one metre from centre to centre, and the edges of the cardboard are turned up against these and covered by a separate capping piece. Full details of cardboard and zinc flashings are given.

Mr. Alexander Gilchrist (Glasgow) has sent us a small catalogue of the brasswork required by concrete-paving manufacturers, including toothed-rollers for indenting paving, straight and diagonal crimp rollers, joint rollers, gutter-groovers, name-plates, etc.

We have received from Messrs. Arthur L. Gibson & Co. a catalogue of the "Kinneair" patent steel rolling shutters, which were introduced into this country (apparently from America) four years ago. The peculiarity of the invention lies in the shape of the steel slats, the section having a concavo-convex central portion, and a forward and upward bend along the lower edge, and a backward and downward bend along the upper edge; the slats are simply connected by fitting these bends together, so that they form what may be termed a loose-welded joint, with sufficient play to allow the shutters to revolve. Malleable iron stops are fixed at the ends to prevent lateral movement of the slats, and to provide a good wearing surface. The illustrations show various methods of fixing the rollers, etc., and also a number of buildings in which the shutters have been used.

We have received from Mr. W. Baumann a four-page circular, containing some illustrations and descriptions of his spring-roller blinds, shutters, etc. These are made of wooden laths fixed to flexible galvanised-steel bands, and some of them are fitted with a projecting apparatus so that they can be pushed out to form Italian blinds. The text refers to illustrations which are not printed in the circular. The application of the same method of construction to screens is a useful innovation.

Mr. W. Duncan Tucker (South Tottenham) has sent us an interesting catalogue of eighty-eight pages, containing a large number of illustrations of plain and ornamental conservatories, etc., erected by him in various parts of the country. Some of the designs are so good that we are inclined to think that they were prepared by architects, but no architects' names are given. There are very few practical details in the catalogue, and the "specifications" are very vague. Attention may be drawn to the wood anti-drip roof-bars, with condensation channels ploughed in the two sides, but if this is a patent the patent is certainly being infringed by other horticultural builders.

We have received from Mr. Robert Adams a catalogue of 154 pages, containing hundreds of illustrations of builders' hardware. Door-springs and checks, gate hinges and fittings, fanlight and skylight openers (geared and otherwise), reversible window fittings, casement and other bolts, casement and sash fasteners, weather-bars for windows, metal casements, etc., are shown in considerable variety. The catalogue will prove a handy reference-book for architects as well as builders.

Messrs. Jones & Campbell (Larbert, Scotland) have sent us two catalogues, one of which contains examples of kitcheners and fire-grates, and bears at the head of the title-page the legend, "Concerning the reputation and pockets of architects, builders, corporations, and municipal ratepayers." Architects may elect to take care of their own reputations by selecting fire-grates from a larger and more artistic assortment than the four illustrated in this catalogue. The second

catalogue includes illustrations of garden rollers, and more or less florid restaurant tables, garden seats, umbrella stands, and other cast-iron work; from an artistic point of view, the garden rollers are an easy first.

Messrs. Bolton & Laughlin (Ipswich) have sent us their new catalogue, containing full size sections of the moulded bricks, copings, etc., which they manufacture and sell. There are also some illustrations of chimney pots, and of carved panels of their red rubbers, and the catalogue draws attention to their red and white Suffolk facings, and bricks, etc.

A sixteen-page price list of varnishes, stains, paints, etc., has been sent us by Messrs. Rowley & Son. There are only four pages of descriptive matter, and of these two are occupied by a flattering account of the "Adamantine" water-paints manufactured by the firm: "their many virtues," we are told, "are not unbalanced by a single risk," but this probably is not quite what was meant.

The Adjustable Cover and Boiler Block Company (Reading) send us a list containing illustrations and dimensions of Marsh's fire brick boiler-seating blocks and covers for main downtake and side flues. The seating blocks are rebated, so as to prevent the escape of heated gases into adjacent flues; the two curved blocks which form an arch for the main flue are also rebated at the crown; and the chief advantage of the downtake and side flue-covers is that they can be lifted without trouble whenever desired. The latter is a desideratum affording great facility for examination of the boiler shell.

The Municipal Engineering and Contracting Company (Chicago) send us a pamphlet entitled "Instructions to Agents," which we learn from the letterpress is one of "a short series of talks to those who are to act as our agents." The first objects of this "talk" are to make clear the properties of concrete, the best proportions to adopt, and the superior quality of machine-mixed concrete. These objects are satisfactorily attained. The last, and, of course, the most important, object of the pamphlet is to convince agents that the concrete-mixer made by the firm is the best in the market. As a mixing machine this apparatus is exceedingly simple, and the absence of internal beaters and other mechanism obviates stoppages at intervals for the purpose of cleansing.

We have received from Mr. Percy Pitman, Bosbury, Ledbury, Herefordshire, a leaflet describing Pitman's combined water-motor and dynamo. It consists of a small dynamo directly coupled to a small turbine, and it is stated that it is suitable for charging ignition accumulators for motor-cars and motor-bicycles. It will work with the house water supply, the pressure being not less than 40 lb. per square inch, but if the pressure be less than this a special set with a belt-drive is provided. Special sets have been supplied which will work with a pressure of only 6 ft. of water. Judging from the photographic block, the machine seems well designed, and is not likely to get out of order.

The Fireproof Company sends us a pamphlet describing and illustrating in a very complete manner their "Dovetail Corrugated" system of fire-resisting construction. A good deal of space is devoted to particulars of various kinds. The distinctive feature of such constructions consists of sheet steel corrugated so that its cross section represents a key pattern with projecting and entering dovetails occurring alternately on both sides. The sheets, which are made in different sizes, gauges, and with different depths of corrugation, are intended for erection between upright H-bars to form the base of the partition, which is completed by the addition of any suitable plaster, or of Portland cement mortar. As partitions may have to resist pressure from either side the dovetail section is distinctly good from the structural point of view, and affords an excellent key for plaster of any kind. In addition to numerous photographic views, the pamphlet includes several pages giving drawings of details relative to erection and methods of fixing joinery. As will be readily understood, the same system lends itself very well to ceiling construction, and it has been applied to the design of complete buildings, several of which may be seen in our new



London. One of the most noteworthy among these is the temporary two-story building containing eighty-eight cells for the reception of prisoners awaiting trial at Newgate Prison.

# The Student's Column.

## STEAM BOILERS AND PIPES.—IV. SELECTION OF BOILER TYPE (continued).

As we stated in Article III., the efficiency of a boiler is very much affected by the manner in which it is installed. The influence of this factor is variable, because some boilers are self-contained, requiring no brickwork and working with a short steel chimney, while others require elaborate brick-setting and a tall brick chimney.

Boilers which come within the second category are exposed to influences from which those in the first category are exempt, and experience shows that the manner in which the brickwork is designed and executed has a great deal to do with the satisfactory performance of the boiler.

Vertical boilers, locomotive, and other independent boilers simply require to be placed on the sites chosen, and, providing the site to be suitable, and the boiler to be efficiently covered with non-conducting material, and provided with a chimney of the required dimensions, the installation may be regarded as having been made in the best possible manner.

Watertube, Cornish, Lancashire, and some types of tubular and semi-tubular boilers necessitate more or less elaborate brick setting, and, as a general rule, require a chimney shaft of considerable height to ensure adequate draught.

A very prevalent impression is that the work of boiler setting can be safely entrusted to any bricklayer or builder. We readily admit that numerous building contractors are quite competent to undertake such work, having had the necessary experience and being in a position to keep in their employ men who are skilled boiler setters. Still, the fact should not be overlooked that many builders possess very little knowledge of this special branch of their art.

Boiler setting and chimney design are subjects which deserve more than passing mention, and, as we propose to deal with them in separate articles, attention is here limited to the discussion of such matters as belong to the part of our subject with which we are at present concerned.

Every architect who has had experience in the heating and ventilation of buildings is aware of the fact that brick walls permit the passage of air in considerable volumes notwithstanding the small effective head causing circulation. In the case of a steam boiler encased in brickwork having internal flues in connexion with a chimney giving a draught equivalent to from  $\frac{1}{4}$  in. to 1 in. of water, it is easy to understand that very large quantities of air may be drawn through the masonry.

Comparatively little attention has been given to leakage in this manner. Mr. Bryan Donkin's work on "The Heat Efficiency of Steam Boilers" contains particulars of the tests in connexion with which measurement was made of the volume of air passing through the brickwork of Cornish boilers. In three cases quoted the leakage through the brick walls was found to average about 1 lb. per pound of coal consumed, thus representing a considerable addition to the volume of gases passing up the chimney shaft.

The reader should bear in mind, however, that air so gaining admission does not reduce the initial flame temperature nor does it dilute the gaseous products passing through the chimney, causing reduction in their temperature and giving the chimney more work to do. Owing to reduction of temperature, the gases inside the chimney are increased in weight, and thus an increased motive power. The moral is that one of the most impermeable character of boiler flues, and Portland cement could be used instead of lime mortar. Glazed brick should be thought too

expensive, the outer walls of the setting should be built of hard-pressed brick. In boiler plants already built the infiltration of air may be prevented by painting the brickwork up to the foot of the chimney until it is rendered airtight, or by casing it with sheet-iron or steel.

A point of direct interest to the architect in connexion with the infiltration of air is that the dimensions, and, consequently, the cost of the chimney shaft must be increased if this part of the installation has to lift and convey an additional and perfectly useless volume of gas to the outer air.

Finally, we may remark that, as the outer flue walls of a single boiler present a far greater proportion of surface liable to admit air than the outer walls of a battery including two or more boilers, the smallest plants are those requiring the greatest attention.

Having referred to the disadvantages following the inward penetration of air into the flues of a boiler, we will next consider the losses due to the outward transmission of heat to the atmosphere.

It is evident that the actual net efficiency of a boiler is represented by the fuel efficiency, less the amount of heat transmission through the shell and brickwork. Under average working conditions the heat lost by radiation from steam boilers adequately covered with non-conducting material and worked under the most favourable conditions may be taken at 6 per cent. for internally-fired boilers and 12 per cent. for externally-fired boilers.

Let us assume that two boilers of identical construction are in use under equal steam pressure, but that one boiler (A) is worked at, or near its full capacity and the other (B) at half its full capacity. Then, as the temperature of the surfaces exposed to the surrounding air will be the same for each boiler, the amount of heat dissipated by radiation must also be equal.

Let 100 denote the amount of heat received by boiler (A), 50 the amount of heat received by boiler (B), and 6 the loss of heat at

compute the losses for different forms of boiler, and so to arrive at values which, as shown above, are necessary for the comparisons of net efficiencies:—

TABLE V.—APPROXIMATE HEAT LOSSES FROM BOILER SURFACE AND BRICKWORK PER SQ. FT. PER HOUR FOR 1 DEG. F. DIFFERENCE OF TEMPERATURE BETWEEN THE INNER AND OUTER SURFACES OF THE MATERIAL.

Nature of Material.	Heat Loss B.Th.U.
Steel Plate Uncovered.....	8.0
" Covered 2 in. thick..	1.4
" 3 in. " " "	1.0
Brickwork 12 in. thick .....	0.8
" 18 in. " " "	0.6
" 24 in. " " "	0.4

With the exception of the front and a small portion of the top, Cornish and Lancashire boilers are entirely enclosed in brickwork which never attains a very high temperature, and where two or three boilers are laid down in a row radiation from the flue walls is very small.

Even where only one boiler is used, the loss of heat through the brickwork can be reduced to a minimum by placing the boiler near one wall of the building and providing an enclosed air space between the wall and the boiler setting and by building the exposed wall of the setting with an interior air space.

Table VI. contains some comparative results by Mr. Strohmeier which indicate generally the radiation losses from four representative types of steam boiler. It should be noted that all the values are based on the assumption that the boiler is being worked at a steady rate, and that the brickwork, where used, is maintained at uniform temperatures. Comparison of cols. 7 and 9 of this table shows very clearly the proportionately heavy radiation losses resulting from underworking the different boilers:—

TABLE VI.—COMPARISON OF ESTIMATED HEAT LOSSES BY RADIATION FROM VARIOUS TYPES OF BOILERS (Strohmeier).

No.	Type.	Dimensions.		Heating Surface.	Available Heat.	Heat Loss.	Available Heat.	Heat Loss.
		Length.	Diameter.					
		ft. in.	ft. in.	sq ft.	B.Th.U.	p.c.	B.Th.U.	p.c.
1	Cornish .....	25 0	5 0	430	3,220	4.4	1,610	8.8
2	" .....	28 0	8 0	1,890	4,840	4.6	2,170	9.1
3	Lancashire .....	28 0	6 6	770	5,780	3.6	2,890	7.2
4	" .....	30 0	7 6	1,010	7,580	3.3	3,790	6.6
5	" .....	30 0	9 0	1,170	8,780	3.6	4,390	7.2
6	Marine .....	8 9	11 0	1,080	8,160	4.7	4,550	9.5
7	" .....	9 8	12 0	1,260	9,440	4.7	4,720	9.5
8	" .....	10 0	13 0	1,630	12,200	4.2	6,100	8.3
9	" .....	9 9	14 6	1,890	14,200	4.2	7,100	8.3
10	Watertube .....	19 0	7 3	735	6,520	9.7	2,760	18.0
11	" .....	23 0	5 0	1,610	12,150	6.4	6,075	11.8
12	" .....	23 0	8 6	2,832	21,390	8.9	10,695	7.3

6 per cent. of the heat received by boiler (A). We then get the following comparison:—

Boiler (A) ..... 100 — 6 = 94  
" (B) ..... 50 — 6 = 44

Therefore the proportionate loss from boiler (B) is more than double that from boiler (A).

This means a very serious diminution of efficiency in boiler (B), and it is clear that economy is to be secured by employing boilers of such size that they may be worked fairly up to their full capacity. The practice of laying down excessively large boilers with a view to providing for future requirements not only involves capital expenditure which might be avoided for some years to come, or perhaps entirely, but it also involves uneconomical working.

For the purpose of comparing the probable losses by radiation from boilers of different types, it is necessary to use really reliable data in calculations. Many experiments have been made upon various types of non-conducting material applied in different ways. The results of such tests are not applicable to steam boilers, because it has been proved by experience that the amount of heat lost by steam boilers is fully double the amount suggested by tests of steam pipes.

In Table V. we give, in terms of British thermal units, the approximate amount of heat radiated per hour from boiler surfaces and brickwork.

By the aid of this table it is easy to

The last point remaining to be discussed in this article is the influence of furnace design on the efficiency of a steam boiler.

As a general axiom, it may be taken that boiler makers know far better than the average architect or engineer how to design a boiler furnace. For this reason the purchaser will generally do well to accept standard designs unless otherwise advised by an expert.

There are, however, some types of boiler for which the furnace has to be specially built. For example, the externally-fired multitubular boiler is delivered in separate parts comprising the boiler proper, fire grate, and ironwork to be built into the brick setting. The watertube boiler is another type requiring a brick-built furnace.

These and other forms of externally-fired boilers are sometimes set with efficient, and sometimes with inefficient, furnaces, the design of which is not necessarily governed by the dimensions of the furnace fittings supplied by the makers.

Again, take Cornish and Lancashire boilers. Both of these types are supplied with self-contained furnaces, presumably of correct form. But, as the partly-consumed furnace gases have to pass along a water-cooled flue, the conditions are unfavourable for completing the process of combustion. Matters are still worse when such boilers are fitted with cross tubes containing water which, by presenting additional cooling surface, render secondary combustion still more difficult. Various devices suggested for







reading-rooms. The public hall is reached from the front elevation by a stair to the left, off the vestibule, on each side of which is provided a moulded handrail of birch, French polished, and carrying balusters of ornamental cast-iron. It is continued round the landing, and up to the gallery, in which accommodation is provided for about sixty persons. The hall, with a floor space of 48 ft. by 28 ft., is furnished with a pitch pine dado, moulded and plain alternately, extending to the height of the window sills, and finished off at that level with a top moulding. The contractors were—Mason work, Mr. Edgar Gault, Aberdeen; carpenter work—Messrs. Davidson & Son, Hutton; plaster work—Mr. James Greig, Peterhead; plaster work—Mr. Alexander Kelman, Peterhead; and plumber work—Mr. John Davidson, Peterhead.

**BRANCH LIBRARY, ALMONDBURY, YORKSHIRE.**—Alderman J. A. Brooks laid the foundation-stones, on the 8th inst., of a new branch free library at Almondbury. The building is being erected from designs prepared by Mr. K. F. Campbell, M.Inst.C.E., Borough Engineer, on a site in Church Walk. The building has a frontage to Church Walk of 58 ft. 8 in., and to the intended new street of 39 ft. 8 in. The elevations facing the street named are to be built of pitch-faced wall stones from Ellwath; the other elevations of outside wall stones from Crosland Hill, all with tooled ashlar dressings from Crosland Hill quarries. The principal front is broken up by the two square bays and doorway, which are carried up as gables, and finished with moulded finials with panel over doorways carved and carved. "Public Hall." The building is formed over-hanging, and is to be covered with dark green Westmoreland slates, finished with red ridge tiles and ornamental finials. The principal entrance is from Church Walk into a vestibule which gives access into a hall 12 ft. by 12 ft., from which the several rooms are entered. To the left is the new room, 12 ft. by 18 ft., to the right the magazine or committee-room, 18 ft. by 18 ft., and lending library, 20 ft. by 15 ft. In the basement librarian's store-room and heating apparatus rooms are provided. The whole of the internal fittings are in pitch-pine, and all rooms are boarded round to a height of 4 ft. 6 in. The various rooms are divided from the hall by elliptical arched openings, filled in with moulded and glazed screens. The lighting throughout is by electricity, and the whole of the interior wood-work is to be stained and varnished. The estimated cost of the building is 1,600*l.*, and the various works have been entrusted to the following contractors, viz.:—Masons' work, J. W. Boothby, Almondbury; joiners' work, J. W. Styles & Sons, Lockwood; plasterers' work, Thos. Longbottom & Sons, Lockwood; plumbers' work, J. Marsden & Co., Huddersfield; slaters' work, Alfred Bower, Crosland Moor; heating engineers' work, Thos. Arncliffe, Huddersfield; and painters' work, Lunn & Cardno, Huddersfield.

**PROPOSED NEW POST-OFFICE, ST. IVES.**—It is proposed to erect a new post-office on the site of the old Manor House in Tregenna-place. The accommodation on the ground floor will consist of a public hall, nearly 29 ft. by 24 ft., and a sorting-room 37 ft. by 20 ft., with a portion 21 ft. by 14 ft. at right angle to it. The larger portion of this room, in line with Chapel-street, will be single story, with a large light in its roof. The main entrance will be from Chapel-street. On the ground floor there will also be a room—17 ft. by 10 ft. 6 in.—for the postmaster, retiring-rooms and lavatories for the male clerks, postmen, and boys, and lock-up rooms for criers, etc. In a court at the rear, with approach from Chapel-street, will be a shelter for trucks. There will be a side entrance to the premises opening into a hall affording further approach to all the apartments on the ground floor, also to the staircase, which is to give access to the upper rooms, etc. The upper floor will be arranged for instrument-room, telephone-room, battery-room, retiring-rooms and lavatories for the postmaster and for the female clerks, also boys' waiting-room—all at a wide corridor. The architect is Mr. Henry White, of Kew, and the contractor is Mr. Hea Moor, R.S.O., under whose supervision the building will be erected by Mr. J. R. Sandry, of St. Ives.

**CATTLE MARKET, LISKEARD.**—The new cattle market at Liskeard is now nearly completed, and is to be opened shortly. Accommodation is provided for 1,100 sheep and 300 cattle. The whole of the area to be occupied by the sheep and cattle is being laid with impervious pavement. In the bullock stalls granite chippings have been laid and grouted with cement. On the Dean-street side of the auction ring a large shed, 90 ft. long, moulded cows and calves. Further along is the weighbridge, with office and dealers' room, lavatory accommodation. The contracts for the ironwork for the cattle pens were secured by Messrs. J. C. & C. Isaac, of Liskeard, and this required. Mr. J. H. Davey, of Liskeard, has been entrusted with the contract for supplying the iron gates and railings at the two entrances; while Messrs. Rumsalls & Sons' tender was accepted for the construction of the sheds, lavatory, and office

accommodation. The market has been laid out in accordance with plans prepared by Mr. John Sansom, architect, of Liskeard, under the supervision of the Borough Surveyor (Mr. T. McMeiklan) at a total cost of 5,071*l.*

**BANK PREMISES, DOVER.**—New premises are about to be erected in the Market Place, Dover, for Loyds' Bank. The plans for the work have been prepared by Mr. F. W. Waller, architect.

**BATHS, BRADFORD.**—The Mayor of Bradford (Alderman W. E. B. Priestley) opened on the 18th inst. the new bath which has been erected in connexion with the Lapage-street Council School, Bradford. The main swimming bath is 60 ft. long by 20 ft. wide. For about a third of its length the bottom is almost flat and the water only about 3 ft. deep, with a floor of concrete, so that little children may find an easy footing. The remainder of the bath slopes down rapidly to 6 ft. 8 in. Around it are arranged forty-four dressing-boxes. In addition there are provided a douche bath specially for the school children using the swimming bath, and two slipper baths and three douche baths for public use. Mr. C. H. Hargreaves was the architect.

**NEW WARDS, LONDON HOSPITAL.**—The new maternity wards, which are on the second floor of Alexander wing, consist of three separate wards about 20 ft. square, for three beds each, with a cubic capacity of about 1,650 ft. per bed, and one smaller ward for a separation case. A labour room, 20 ft. square, with a large bath-room, adjoins; the suite is complete with scullery, sink rooms, testing lobby, etc., also a sitting-room for the sister-in-charge. The three wards, which are on the south side of the building, open out on to a balcony 8 ft. wide. The whole department is lined with opalite of a delicate green colour, and the labour room, bathroom and sanitary annex have mosaic floors. The doors are of "hospital" type, in teak, being plain slabs without panels. The labour room has a large bay window facing north and is specially ventilated, the air being drawn into the room by means of a fan through a gauze screen, and warmed by passing through a copper swing steam coil. The vitiated air is expelled by means of a fan on the opposite side of the room. The whole of the fittings to the sinks, etc., in this room are nickel-plated, to save the labour of cleaning. The work has been carried out from the designs and under the superintendence of Mr. Rowland Plimbe, who has been in charge of the whole of the rebuilding of the hospital.

**MODEL LODGING-HOUSE, SOUTH SHIELDS.**—A model lodging-house has just been erected in Saltwell-lane, South Shields. The site covers an area of 5,692 superficial ft., and the front entrance is in Spring-lane, where is erected the deputy's office. The dining-room, which adjoins, measures 36 ft. by 22 ft. 15 in. It is filled with a large hot-plate range, where a dozen dinners may be cooked at one time. There is also a large circulating cistern where hot water is always on tap. One other feature it possesses—that is, a private locker for each lodger. A number of hot and cold water taps are also provided and there are two bath-rooms. The reading-room and smoking room is arranged for. There are ten wash-basins, and under cover in the backyard, and the water-closets, of which there are a large number, are designed on the trough system. The sleeping accommodation is of a two-fold character—the bedrooms, of which there are twelve, and the cubicles, of which there are sixteen. In the latter the occupant is properly screened off from his neighbour, and he has a separate door to his apartment. The cubicles are arranged in rows, eight of them on the ground floor and eight on the first floor. They have open roofs. The bedrooms are 17 ft. by 22 ft. each. A broad fire-proof staircase unites the separate floors, and from one of these access is given to an independent corridor leading to the back of the premises where the main exit is provided. The building has been erected from the plans and drawings of Mr. F. M. Dryden, architect, Newcastle, and the work of construction has been done by Messrs. W. J. Robertson & Sons, contractors, South Shields, the sub-contractors being entrusted to Mr. A. Holmes for the painting, and Messrs. J. Dagless & Son, for plumbing.—*Shields Daily Gazette.*

#### STAINED GLASS AND DECORATION.

**WINDOW, SPELDURST CHURCH.**—At Speldhurst Parish Church recently a new east window, which has been placed in the east wall of the chancel, was dedicated. The new window is a representation of the Crucifixion, and has been carried out by the firm of Messrs. Morris, of Merton Abbey, Surrey, principally from designs by the late Sir Edward Burne-Jones, Bart.

#### APPOINTMENT.

**UNIVERSITY OF BIRMINGHAM.**—Professor Stephen M. Dixon, M.A., Assoc.M.Inst.C.E., who at present holds the Chair of Civil Engineering in the Dalhousie University, Nova Scotia, has been unanimously elected to the Chair of Civil Engineering, Birmingham University.

#### SANITARY AND ENGINEERING NEWS.

**WATER SUPPLY, TAUNTON.**—The new reservoir at Luxhay, which has been erected for the purpose of increasing the water supply of Taunton, was opened recently. The capacity of the reservoir is 120 million gallons, and its cost was 27,538*l.* Mr. W. C. Shaddock was the contractor, the engineer being Mr. F. W. Roberts. Mr. H. T. Coles was the manager and clerk of the works.

**ILKESTON SEWAGE DISPOSAL.**—Towards the end of last year some members of the Ilkeston Town Council were deputed to visit the new sewage disposal works at Hanley, in Staffordshire, designed by the Engineers to the Hanley Corporation, Messrs. Willcox & Raikes, at an estimated cost of 75,000*l.* A conference was the question of the sewage disposal of the Borough of Ilkeston, the outcome being that Messrs. Willcox & Raikes were also retained to prepare a scheme on similar lines for Ilkeston. Negotiations were immediately opened with landowners in the borough for the purpose of acquiring the area of land recommended by the engineers as most suitable on which to erect sewage disposal works. After fully considering various alternative schemes the Town Council decided, at a special meeting held on Wednesday last week, to proceed with the complete scheme, which provides for the purification of the sewage from a population of 30,000 by bacteria treatment in liquefying tanks and percolating filters. The engineers have accordingly been instructed to complete plans and estimates for forwarding to the Local Government Board.

**THE EDINBURGH WATER SUPPLY.**—The threatened water famine in Edinburgh is by no means improbable. The drought has been so protracted that it may be said to have lasted almost since August of last year, for the rainfall scarcely added anything to the permanent storage in the reservoirs, the contents of which were practically always the same. The scarcity of water is more severely felt now than it was a decade ago, for not only has the population grown greatly during that period, but there has been a largely increased demand for water for public works, the cable tramways, the electric light undertaking, the public baths, and other forms of municipal enterprise having brought about a much larger consumption of this commodity. It has also to be borne in mind that in addition to the quantity of water delivered in the city, about five million gallons are required daily for compensation, and that is drawn from the Moorfoots, the North Pentlands, and Glenclorse. Ten years ago the population of the district served was 385,700, as compared with 455,000 at the present time, or an increase of nearly 70,000, and yet the supply of water per head of the population is exactly the same—39.83 gallons in 1895, and 39.82 gallons in 1905. The rainfall at Gladhouse and Glenclorse up till Tuesday last week was only 26.23 in., as compared with 38.79 in. at the same period last year, and with 38.79 in. in 1903, so that there has been almost a half less rain than was experienced two years ago, when there were a thousand million gallons more water in the reservoirs, and the supply per head was slightly less, being 39.70 gallons. At no time during the past ten years has the storage of water in the reservoirs been so low as at the present time. At the corresponding date in 1895 the quantity was 1,915,410,000 gallons; now it is 1,406,080,000 gallons, or a decrease of 509,000,000 gallons, with, as has been said, an increase of 70,000 in the population. In 1896 the quantity of water stored was 1,938,860,000 gallons. It rose to 2,245,567,000 gallons in 1897, and for the following seven years it never fell below 2,000,000,000 gallons, but this year there was a drop in June to 1,777,204,000 gallons, and a further reduction this month to the figure already given. The delivery per day in Edinburgh has ranged from 15,368,000 gallons in June, 1895, to 18,120,000 gallons this month, the largest quantity delivered during that period having been in 1901, when the supply was 18,562,000 gallons. In only four years has the supply per head been greater than at present—in 1897, 1899, 1900, and 1901, when the figures were respectively 41.30 gallons, 41.95, 41.08, and 43.26, as against this month's supply of 39.82 gallons.—*Scotsman.*

#### FOREIGN.

**FRANCE.**—A new Society, having for its objects the defence of the rights of artists and of artistic copyright, has been started by the exertions of the Société des Amis de Luxembourg. A number of the leading French artists have joined it.—Thanks to M. Dujardin-Beaumez, the Under-Secretary of State for Art, the Ecole des Beaux-Arts will henceforth be open for students in wood-engraving, etching, and lithography.—A new hotel is to be built in the Avenue d'Orléans, on the site of the old Palais de Castille, once the residence of Queen Isabella of Spain.—A group of new schools has just been completed at Bois-Colombes, from the designs of M. Pasquier, and also a new theatre, of which M.



His lordship said he thought it was a matter which should be decided promptly.



In the result his lordship made an order for delivery of the statement of claim by the 19th instant, and for the action to go on the 26th instant, and for the trial on the 26th instant. In the meantime there would be cross-undertakings.

Order accordingly.

#### ACTION AGAINST THE MANCHESTER CORPORATION.

In the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Mathew, the hearing was concluded on the 13th inst. of the case of *A. H. Midwood & Co. v. The Lord Mayor, etc., of the City of Manchester*, on the application of the defendants for judgment or new trial on appeal from verdict and judgment at trial before Mr. Justice Laurance and a special jury in the King's Bench Division.

The action was brought by the plaintiff to recover from the defendants £777. 4s. 6d., an agreed amount for damages sustained by the plaintiffs owing to their stock-in-trade, merchandise, and other property at No. 81, Fountain-street, Manchester, being destroyed or damaged by fire on May 24, 1903. The plaintiff's case was that the fire was caused by the fusing of one of the electric cables or mains belonging to the defendants, the undertakers for the supply of electricity for lighting purposes in Manchester. The wires were laid in bitumen, and the fusing of the wires caused the bitumen to be volatilised, gas being generated, which resulted in an explosion and the fire. The plaintiffs contended that the defendants' system of electric lighting constituted a nuisance, as being a system which was rendered dangerous by reason of the difficulty of locating a leakage, and that the fusing of the wires was due to the defendants' negligence.

The defence was that the Corporation was empowered and compelled by their provisional order of 1890 to supply electrical energy for lighting purposes within Manchester, and that the system they adopted was the best system, and was approved by the regulations of the Board of Trade, and further, that the fusing of the mains was not due to their negligence.

It appeared that for the purposes of giving a constant pressure in the mains which was necessary for the proper supply of electricity in the area of supply the entire system was linked together, and energy was supplied to the mains by means of feeders. The plaintiffs allege that this linked-up system made it more difficult to locate a leakage than it did in a divided system, but this the defendants denied. At the trial the jury, in answer to specific questions left to them, found that the system adopted by the defendants constituted a nuisance by causing danger to persons having premises adjoining to the mains; that the defendants had been guilty of negligence in their adoption of the method of localising and dealing with faults, and that when the defendants became aware of the fault they did not deal with it for the purpose of preventing fire in a reasonable and proper manner. The learned judge entered judgment on those findings for the plaintiffs for the agreed amount of damages, and the defendants now appealed on the grounds that the verdict was against the weight of the evidence, and that the learned judge had misdirected the jury.

Mr. Fletcher Moulton, K.C., Mr. Macmorran, K.C., and Mr. J. W. Gordon appeared for the appellants, and Sir Edward Clarke, K.C., Mr. Dousfield, K.C., and Mr. Wood Hill for the respondents on the appeal.

In the result their lordships held that what had occurred was a nuisance, and that no express authority was conferred by the provisional order upon the defendants authorising them to allow a leakage so as to cause an explosion, and that the learned judge would not have been justified in withdrawing the question of negligence from the jury.

The appeal was accordingly dismissed with costs.

#### PATENTS OF THE WEEK.

##### APPLICATIONS PUBLISHED.\*

14,037 of 1904.—M. R. Green: *Safety Lock or Fastening Device for Windows.*

A safety lock or fastening device for windows, consisting of a metal base plate having an upper arm and a lower arm integral therewith. The base plate is securely fastened to the meeting rail of the bottom sash in such manner that the upper arm lies closely to the top or side plate of the upper sash whilst the lower arm lies parallel with and adjacent to the interior bead of the window frame. Upon the stile of the upper frame, metal face plates are fastened, the whole arrangement being such that by means of suitable pins or screws, which pass through conveniently-placed holes in the stile and also through the face plates, the upper and lower sashes are fastened together and are also fastened rigidly to the window frame.

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

14,487 of 1904.—F. BECK: *Heating by Means of Hot Water and Apparatus therefor.*

This invention relates to a process for increasing the circulation of water employed as a vehicle for heat. The invention consists of a hot-water boiler, the upper outlet from which extends to the upper part of a pocket from the bottom of which also extends the heating pipes, the said pocket being completely filled with water when the heat is moderate, and its upper part being provided with a U-shaped pipe, extending first downwards and then rising to the bottom of an expansion vessel open to the air, isolated from the circulation, and placed at any height above the heating circuits; the said expansion vessel thus formed constitutes the only outlet, towards which the water can be displaced by the formation of steam, the said pocket being placed so as to cause the steam to become motionless in the boiler, and a heat regulator operating under the action of a displacement of water.

13,834 of 1904.—O. THOR: *Concrete and Similar Pillars and the Like.*

This invention relates to the construction of concrete or similar pillars of any desired profile and cross section, either solid or hollow. The essential feature of the invention is that iron or other metal bars, rods, wires or the like are employed, of any cross section running longitudinal of the pillar, near the surface thereof, and similar members running crosswise, so that a kind of frame-work is formed, for the purpose of imparting strength.

17,563 of 1904.—J. S. WILKES: *Separators and Grinding Mills used in the Treatment of Clay or like material.*

According to the invention the separator consists of an inclined revolving screen with differently meshed portions, the central shaft of which is connected to a series of bosses, radial arms, and rings, and the latter parallel spacing bars for the several divisions of the separator, and also internal breaking-up longitudinal bars or plates.

17,831 of 1904.—P. ZIPPERLING: *Butt Hinges.*

A butt hinge for windows, doors, and the like, consisting in the combination with a movable hinge plate having a conical hinge socket, of a stationary hinge plate, and of a spindle for connecting the two hinge plates, the spindle having a conical part fitting into the conical hinge socket, and a quadrangular part within a correspondingly formed socket of the stationary hinge plate, and means for pressing together the two conical parts.

18,064 of 1904.—J. LEVIN: *An Electric Device for Indicating the Unauthorised Opening of Door Locks, Window Fasteners, and the Like.*

An electric device for indicating the unauthorised opening of door locks, window fasteners, and the like, characterised by the feature that an insulating plate is arranged inside the bolt bracket, and directly opposite the bolt, upon which plate is fixed, by means of one of the two screw bolts serving as terminals, a suitably-shaped bracket, against the free end of which rests the free extremity of a spring fixed upon the said plate by the second screw bolt or terminal, and adapted to be displaced or brought out of contact with the said bracket when the bolt is pushed in.

18,376 of 1904.—F. WALTON: *Manufacture of Floor Cloth, Wall Coverings, or the Like.*

The manufacture of floor cloth, wall coverings, or the like, consisting in mixing pieces or "tessels" of the material in the "scratched" form in the required variety of colours to suit those of the desired pattern, passing the same between two or more sets or pairs of rollers, of which the first set or pair revolves at a greater speed than the ensuing set or sets, then cutting the sheet into comparatively small pieces and supplying the latter to a mixing and conveying device, with or without further addition of other quantities of "scratched" material, forming this mixture into a sheet of the required thickness, and then cutting it into the pieces or tessels of the desired size and shape.

148 of 1905.—H. H. LANE (R. H. SCHALKEN-BACH): *Glazed Structures.*

A glazed structure comprising a resilient cap, means for supporting in cushioned relation sheets of glass upon astragal supports, means for retaining tapped or super-imposed sheets of glass in fixed cushioned relation, means for supporting in cushioned relation abutting sheets of glass arranged in the same plane, and means secured to the eaves of the structure adapted to hold the astragal supports in place.

751 of 1905.—T. S. FIELDS: *Sheet-Iron Cisterns or Tanks.*

A sheet metal cistern or tank with its top edges extended to form flanges, and each of said flanges folded inwards, downwards, and below or round a flat metal stiffening bar, or one of the members of a flat metal stiffening frame, and the several flanges and bars mitred at the corners of the cistern and joined to each other by riveted corner plates.

8,506 of 1905.—J. CABLE: *Casement Windows.*

A window in either wood, metal, or wood and metal, formed by a pair of casements hinged together and secured to the frame by small bolts sliding in screws at the head and sill, along which the casements travel during the process of opening and closing, the said casements opening downwards. When open they can be adjusted as to make the outer face of the glass accessible for cleaning purposes from the room itself, and by the same movement the ventilation can be regulated as desired, and when closed the inside ends fit into grooves at either jamb, thus rendering the window both draught and weather proof.

25,385 of 1904.—J. WILKINSON: *Material for the Paving of Roadways and Side Walks, and for other purposes.*

This invention has for its object to produce a pavement that shall be water-proof throughout, durable, and of a non-slipping character. In the application of the invention a given quantity of bitumen is melted. To the said bitumen, in a molten or plastic condition, is added five times its quantity of granite. Three parts of the granite are ground before adding to the bitumen to the extent sufficient to permit of passing through a sieve having apertures of a quarter to three-eighths of an inch diameter; the remaining two parts are reduced to a powdered condition. The completed mixture is cast in suitable moulds to form blocks of convenient size for transit. For use for paving it is melted down, and can then be spread over the road.

25,472 of 1904.—N. M. IMARRA: *Manufacture or Construction of Artificial Posts.*

An artificial post constructed of a plurality of metal strips disposed at or near the sides of a plurality of discs or the like at intervals in the edges of which the said metal strips are placed, metal mesh work or open work outside said strips, and cement, concrete, or mortar on the outside of said metal mesh work or open work, and binding with same, and arms or supports extending out from same, formed of strips of mesh work and cement, concrete or mortar, or the like, and forming an integral part with the post.

25,520 of 1904.—F. DE RARE: *Apparatus for Heating and Circulating Air.*

This invention relates to apparatus for heating and circulating air, consisting in combination of a fan and a tubulated box in which circulate the products of combustion from any hearth or fireplace while the air to be heated is driven through the tubes which connect the sides of the box.

26,148 of 1904.—T. AITKEN: *Apparatus for Distributing Liquids on Roads.*

A vehicle for forcing surface dressing into roads, consisting in the combination with a liquid supply tank and a receiver into which air and liquid are pumped under considerable pressure, of a regulating valve between the supply tank and the pump to control the proportion of air and liquid admitted to the receiver.

27,326 of 1904.—W. RICHARDS: *"Key" or Rough Backing to Glass or Pottery Tiles for the Purpose of Affixing Same to Bricks, Walls, and other surfaces.*

This invention relates to the production upon glass or pottery tiles of "key" or rough surfaces which are primarily intended to serve as an adhesive means for attachment of such glass or pottery tiles to bricks, walls, or other similar surfaces. In carrying out the invention a paste is made, composed of cement, powdered pumice stone, zinc white or oxide of zinc, borax, sal-ammoniac. This mixture is brought into almost a semi-fluid state by means of water and spirits of salts, to which are added granulated zinc and oxide of iron. For the purpose of producing the "key" on the glass, the paste is applied with a brush, and, while in a plastic state, crushed glass, marble, or the like, is sprinkled thereon, which penetrates into and adheres to the paste without the aid of any firing agent.

1,944 of 1905.—A. B. OEHMAN: *Detachable Strainer for Sink or Drain Funnel.*

A strainer for sinks formed with an open top and having its bottom, which is in the form of a steep, perforated cone, so placed that it is clean washed by the direct impact of the water from the tap each time the tap is turned on, so that the conical bottom is kept clean of solid matter, a channel formed between the lower part of the cone and the lower part of the side wall of the strainer and perforated with holes of smaller size than the openings situated higher up so that the solid substances will be better retained in the strainer.

2,424 of 1905.—L. SCHLENTHEIM: *Mosaic Pavings.*

This invention relates to mosaic pavings by means of which splitting is obviated. In carrying



the invention" into effect, instead of laying the mosaic in continuous sheets, it is divided into sections, which sections are separated from one another by strips of elastic mineral material such as asphalt. The said strips extend from the bottom or other part of the concrete or other bedding employed vertically upwards to the surface of the paving so that the upper surface of the said strips constitute a part of the treading surface of the paving.

17,736 of 1904.—M. LAU: Apparatus for Fixing Plaster Work to Ceilings.

An apparatus for applying moulded plaster work to ceilings, comprising a frame or support, a platform mounted on the support and adapted to support the plaster mould and means for raising and lowering the platform on its support to first apply the plaster to the ceiling and then withdraw the platform and plaster mould.

### TERMS OF SUBSCRIPTION.

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### SOME RECENT SALES OF PROPERTY:

#### ESTATE EXCHANGE REPORT.

July 5.—By BEAUFORT & SON (at Dulverton). Yeo Mill, Devon.—"Bagley Pit" and "Bisheton Farm," 19 a. f. . . . .	£1,000 2,550
"Coombe and Hildbrook Farm," 151 a. f. . . . .	1,190
"Overwell Farm," 65 a. f. . . . .	1,270
"Guphill Farm," 11½ a. f. . . . .	455
Four freehold cottages . . . . .	
By PROTHROPE & MORRIS (at the Estate). Hockley, Essex.—Main rd., four plots of land, . . . . .	148
Main rd., two blocks of land, f. . . . .	133
July 6.—By MADDOCK, MILLS, & MADDOCK (at Harewood). Mendham, Suffolk.—"Botwright's Farm," 33 a. 0 r. 26 p. f. and c. . . . .	370 165
"Footpath Meadow," 2 a. 3 r. 4 p. f. . . . .	
July 8.—By G. DUNN & SON (at Norwich). Burgess St. Peter, Norfolk.—"Burgess Hall Farm," 221 a. 2 r. 12 p. f. and c. . . . .	3,500
Tott Monks, etc., Norfolk.—Freehold and copyhold farm, 125 a. 3 r. 15 p. . . . .	1,500
Haddiscoe, Norfolk.—Freehold marsh land, 4 a. 0 r. 20 p. . . . .	105
By WRIGHT & SORBY (at Cambridge). Willington, Cambs.—Two enclosures, 15 a. 1 r. 18 p. f. . . . .	570
Residence, Homestead, and 0 a. 1 r. 27 p. f., Garden Grounds, 13 a. 1 r. 5 p. f. . . . .	230 1,350
Over, Cambs.—A bare fen, 4 a. 1 r. 31 p. f. . . . .	185
July 10.—By J. BAKER, COOKE, & STANDEN. Edgware, Middlesex.—Deansbrook-lane, "Orange Hill" and 10 a. 1 r. 36 p. f., y.r. 804. . . . .	6,500
Deansbrook-lane, enclosure of land, 25 a. 1 r. 9 p. f. . . . .	8,100
Deansbrook-lane, enclosure of pasture, 10 a., f. and c. . . . .	600
Deansbrook-lane, freehold building estate, 21 a. . . . .	4,000
Deansbrook-lane, enclosures of building land, 25 a. . . . .	6,300
Deansbrook-lane, a freehold site, 1½ a. . . . .	600
1 and 2, Deansbrook-villas, area 2 of an acre, f., y.r. 724. . . . .	950
By E. HILL CLARKE. Mitcham.—3 and 4, Glebe-villas, u.t. 64½ yrs., g.r. 181, y.r. 711. . . . .	605
July 10.—By FULLER, MOON, & FULLER. Godstone, Surrey.—Tilburton Hill, a freehold site, 4 a. . . . .	200
Tandridge, Surrey.—Main rd., a freehold site, 7 a. . . . .	400
By A. SAYLE & SONS. Waltham Cross, Herts.—Main rd., "Waltham House" and 9 a. 0 r. 31 p. f., l. p. . . . .	4,100
July 11.—By DEBENHAM, TEWSON, & CO. Obeam, Surrey.—Sandy-lane, "Mayfield" and 1 a. 2 r. 16 p. f., u.t. 51 yrs., g.r. 254, l. p. . . . .	1,000
By DUNN, SOMAN, & COVERDALE. Mill Hill.—1 and 2, The First, f., y.r. 701. New Barnet, Herts.—1 to 4, Ellabrook Cottages, f., y.r. 984. . . . .	800 850
By HAMPTON & SONS. Notting Hill.—38, 40, and 42, Portobello-rd. (stabling), l. p. . . . .	1,100
By HOOKER & WEBB. Hackney.—183 and 185, Hertford-rd., u.t. 45 yrs., g.r. 304, y.r. 621. . . . .	800
By KROENIG & CO. Hendon.—Canfield-parade, a freehold shop plot . . . . .	260
By ROGERS, CHAPMAN, & THOMAS. Wandsworth.—31, Bolingbroke-gt., f., y.r. 381. By A. J. BURROWS (at Ashford). Kennington, etc., Kent.—Portions of the Ken- nington Hall Estate, 351 a. 2 r. 2 p. f. (in lots), including the Mansions of Raymonds and Falconhurst . . . . .	575 9,425
By SLER, SON, & CARMEN (at Masons' Hall Tavern). Strand (No. 354).—The "Lycæum Tavern," u.t. 44½ yrs., y.r. 2001, with Goodwill . . . . .	14,160

July 12.—By BROAD, WILTSHIRE, & PENNY. Ilington.—39, High-st. (s) and warehouse in rear, beneficial lease for 14½ and 6 yrs. y.r. 241, with goodwill, fixtures, etc. . . . .	2,280
Clerkenwell.—58, Emouth-st. (s), beneficial lease for 7½ yrs., y.r. 541, with fixtures, etc. . . . .	590
Stoke Newington.—188 and 188A, High-st. (s), beneficial lease for 8 yrs., y.r. 520, with goodwill, fixtures, etc. . . . .	550
Tottenham.—467 and 469, High-st. (s), bene- ficial lease for 9½ yrs., y.r. 1551, with goodwill, fixtures, etc. . . . .	180
III Albans, Herts.—27, Market-place (s), with beneficial lease for 17 yrs., y.r. 1001, with goodwill, fixtures, etc. . . . .	165
By CARTWRIGHT & BROTHERS. Bath.—4, Ryde Vale-rd., u.t. 69 yrs., g.r. 151, r. r. 301. . . . .	600
By DANN & LUCAS. South Darenth, Kent.—"The Jolly Millers," p.h., with land adjoining, f., y.r. 961. . . . .	5,800
By DOLMAN & PRAGER. Haverstock Hill.—4, Parkhill-rd Studios, u.t. 45 yrs., g.r. 141, y.r. 504. . . . .	425
By HIND & BONS. Forest Hill.—10 and 12, Manmore-rd., u.t. 78 yrs., g.r. 111 10s., y.r. 641. . . . .	650
By HUMBERT & FLINT (first day). Marlow, Bucks.—Riverside f.g. 261, reversion in 77 yrs. . . . .	650
3 and 4, High-st. (s), f., y.r. 301. . . . .	925
24, High-st., f., y.r. 241. . . . .	460
27, 28 and 29, High-st., f., y.r. 961. . . . .	2,320
High-st., f., y.r. 241. . . . .	
West-st., two freehold shops and . . . . .	900
461, freehold residence and shop, y.r. . . . .	645
371, freehold residence and shop, y.r. . . . .	1,030
West-st., five named residences, y.r. 371 10s. . . . .	
West-st., four freehold cottages, w.r. . . . .	820
230 a. 8 a. 8 d. . . . .	
By C. H. MASON. Harenden.—17 to 23, 29 to 49 (odd), 47A and 49, High-st. (s), f. . . . .	28,075
Wood Green.—Lordslip-lane, f.g. rents, 481 12s. reversion in 58 yrs. . . . .	1,820
Peckham.—82 and 84, Peckham-rd., f., y.r. 881. Clapham.—King-rd., "Oakfield," u.t. 20 yrs. g.r. 251, r. r. 101. . . . .	1,620 250
By CROOKS (at Sevenoaks). Sevenoaks, Kent.—70, High-st., shop, black- smith's forge, and two cottages, f., y.r. . . . .	2,150
72, 74, and 76, High-st. (s), f., y.r. 1401. . . . .	250
By G. LOVETT & SONS (at Nuneston). Springfield-ter., f.g. 181, reversion in 76½ yrs. . . . .	450
By DOUGLAS YOUNG & CO. Battersea.—32, Auchterlonie-rd., f., y.r. 361. Peckham.—82 and 84, Peckham-rd., f., y.r. 881. Clapham.—King-rd., "Oakfield," u.t. 20 yrs. g.r. 251, r. r. 101. . . . .	440 1,420 450
By CROOKS (at Sevenoaks). Sevenoaks, Kent.—70, High-st., shop, black- smith's forge, and two cottages, f., y.r. . . . .	1,450
72, 74, and 76, High-st. (s), f., y.r. 1401. . . . .	2,960
By G. LOVETT & SONS (at Nuneston). Bedworth, Warwick.—Freehold brick works, 19 a. 2 r. 32 p. (as a going concern) . . . . .	8,800
By A. J. BURROWS (at Sandwich). Sandwich, Kent.—Five enclosures of market garden ground, 18 a. 1 r. 3 p. f. (in lots) July 13.—By BAKER & BAKER. Horley, Surrey.—"Edmondbury Farm," 22 a. 2 r. 20 p. f., l. p. . . . .	965 1,975
By CHERRYBROOK & SONS. Kennington.—Cottensmore-gardens, f.g. 71, reversion in 28 yrs. . . . .	1,260
Eldon-rd., f.g. rents 181 12s., reversion in 39 yrs. . . . .	1,715
Victoria-rd., f.g. 121, reversion in 28 yrs. Stanford-rd., f.g. rents 311, reversion in 39 yrs. . . . .	1,590 1,985
By DEANWORTH & ARSELL. Haleham, Sussex.—The Horsebridge Flour Mills, area 4½ acres, f. (as a going concern) "Myrtle Cottage," f., l. p. . . . .	8,000 275
By NEWSON, EDWARDS, & SHEPARD. Tottenham Court-road.—12, Warren-st., f., y.r. 421. . . . .	870
Hampstead-road.—81, Stanhope-st., u.t. 16½ yrs., g.r. 31, y.r. 401. . . . .	330
Ilington.—12, Cleveland-rd., u.t. 40½ yrs., g.r. 61, y.r. 401. . . . .	380
58 and 60, St. Paul-st., u.t. 21½ yrs., g.r. 81, y.r. 741. . . . .	460
Hoxton.—20, Napier-st., u.t. 33 yrs., g.r. 161 10s., y.r. 321. . . . .	125
Barnsbury.—41, College-st., u.t. 10½ yrs., g.r. 71, r. r. 361. . . . .	135
Stoke Newington.—Victoria-gr., f.g. 161, u.t. 39 yrs., g.r. 31. . . . .	110
Clissold-rd., f.g. rents 221 12s. 6d., u.t. 45 yrs., g.r. 831. . . . .	2,350
Tottenham.—40, St. Paul-st., f., y.r. 261. Bow.—Court-rd., f.g. 121, reversion in 47 yrs. . . . .	210 155
47 yrs., g.r. 131 11s. 6d., reversion in 47 yrs. . . . .	295
St. Dunstons-rd., f.g. 281, reversion in 47 yrs. . . . .	610
Homerton.—Templar-rd., f.g. 41, reversion in 59 yrs. . . . .	105
Victoria Park.—10 and 12, Brookfield-rd., y.r. 801. . . . .	955
119 and 120, Cadogan-ter., f., y.r. 861. . . . .	710
Clapham.—36, Cedars-rd., u.t. 8½ yrs., g.r. 201, r. r. 801. . . . .	805
Batham.—1, Harbourside-rd., u.t. 80 yrs., g.r. 61, r. r. 961. . . . .	215
Walworth.—31 to 47 (even), Thurlow-rd., u.t. 29½ yrs., g.r. 251, w.r. 1831. 6s. . . . .	910
61 and 63, Thurlow-rd., u.t. 45 yrs., g.r. 101, w.r. 741. 2s. . . . .	470
47 and 49, Taville-rd., u.t. 45 yrs., g.r. 101, y.r. 781. . . . .	440
Willadean.—2, 10 and 11, Taylors-lane (s), u.t. 97 yrs., g.r. 101 10s., y.r. 1181. . . . .	780

By FARNBROTHER, ELLIS, & CO. Merton.—Kingston-rd., f.g. 201, reversion in 54 yrs. . . . .	254 yrs.
Dupont-rd., f.g. 401, reversion in 93 yrs. . . . .	
Shepherd's Bush.—Goldhawk-rd., two corner building sites, area 13,600 ft. . . . .	
By HUMBERT & FLINT (second day). Marlow, Bucks.—Quintessence, two freehold cottages, w.r. 161 13s. 8d. . . . .	254 yrs.
Oxford-rd., warehouse or store room f., y.r. 71. . . . .	
Oxford-rd., house, smithy, and cottage, f., y.r. 321. . . . .	
West-st., seven freehold shops, f., y.r. 801. 2s. West-st., shop, workshop, stabling, etc., f., y.r. 801. . . . .	
Spital-st., shop, slaughter-house, and cot- tage f., y.r. 371. . . . .	
Spital-st., three freehold houses and shops, y.r. 411 4s. . . . .	
Dean-st., a freehold house, y.r. 101. . . . .	
Dean-st., The "Chairmakers' Arms," p.h., f., y.r. 121. . . . .	
Dean-st., a freehold cottage, q.r. 131. . . . .	
Trinity-la., three freehold cottages, w.r. 251 7s. . . . .	
West-st., three freehold cottages, w.r. 251 7s. West-st. (off), two freehold enclosures, 2 a. 1 r. 16 p. . . . .	
By HARRY STACY (at Ruislip). Redhill, Surrey.—Ladbroke-rd., a plot of land, Lynwood rd., two plots of freehold land . . . . .	
Earlswood, Surrey.—Barnbrook-rd., two plots of land, f. . . . .	
Beigate, Surrey.—8 Holmesdale-rd., f., p. . . . .	
July 14.—By FURBER. Marylebone.—10, Buckingham-st., u.t. 6 yrs., g.r. 321, w.r. 1501 12s. . . . .	
150, Great Titchfield-st., u.t. 7 yrs., g.r. 881. w.r. 1501 16s. . . . .	
170, Great Titchfield-st., u.t. 24 yrs., g.r. 251, w.r. 1321 12s. . . . .	
Clerkenwell.—144, Clerkenwell-rd. (s), 24 and 2A, Back-hill, u.t. 1 to 12, Albion buildings, u.t. 6 yrs., g.r. 251, y.r. 481 12s. . . . .	
By G. HEAL & CO. Bromsbury.—45, Exeter-rd., u.t. 992 yrs., g.r. 141 p. . . . .	
By HUNTER & HUNTER. Shepherd's Bush.—33, Gayford-rd., f., w.r. 331 10s. . . . .	
Harlesden.—33, Casselden-rd., f.g. 61, 6s. reversion in 85 yrs. . . . .	
By PROTHROPE & MORRIS. Leytonstone.—1, Wadley-rd., u.t. 231 12s. By REYNOLDS & BAKER. Putney.—117 to 127 (odd), Putney Bridge-rd. (s), f., r. r. 3501. . . . .	
Clapton.—20 and 22, Nightingale-rd., u.t. 56 yrs., g.r. 81, y.r. 921. . . . .	
Wrotham, Kent.—"Bishop's Lodge Temper- ance Hotel," with shop, stabling, etc., f., y.r. 521. . . . .	
By SALTER, BREE, & CO. Hampstead.—54, 55, 56, and 57, Oakley-eg., u.t. 40½ yrs., g.r. 281, y.r. 2861. . . . .	

Contractions used in these lists.—F.g. for freehold ground rent; l.g. for leasehold ground rent; l.p. for improved ground-rent; g.r. for ground-rent; r. for freehold; c. for copyhold; i. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; y.a. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cor. for corner; ad. for adjoined; g.s. for gardens; yd. for yard; h. for house; b.h. for beerhouse; p.h. for public-house; o. for office; a. for shop; ct. for court.

### MEETINGS.

SATURDAY, JULY 22. Northern Architectural Association.—Annual Re- solutions—Barnard Castle and Baby Castle.	
TUESDAY, JULY 25. Junior Institution of Engineers.—Visit of Inspectors New Vauxhall Bridge Works. 6.30 p.m.	
SATURDAY TO MONDAY, JULY 29-31. Institute of Sanitary Engineers, Ltd.—Summer Outing to Southampton.	

### TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters and papers read at meetings rests, of course, with the authors.  
We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other communications, or for models or samples, sent to or left at our office, unless he has specifically asked for them.  
Letters or communications (beyond mere news items which have been duplicated for other journals) are not DESIRED.  
All communications must be authenticated by name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.  
We are compelled to decline pointing out bona fide errors.  
Any communication to a contributor to write an article or to execute or lend a drawing for publication, is subject to the approval of the article or drawing received by the Editor, who retains the right to reject if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply acceptance.  
All communications regarding literary and artistic matters should be addressed to THE EDITOR, who relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## PRICES CURRENT OF MATERIALS.

\* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

## BRICKS, &amp;c.

Hard Stocks, 1 10 0 per 1000 alongside, in river.

Rough Stocks, 1 6 6 " " " "

Facing Stocks, 2 2 0 " " " "

Shippers, 2 2 0 " " " "

Flintons, 1 7 0 " " " "

Red Wire Cuts, 1 14 0 " " " "

Best Parham Red, 3 12 0 " " " "

Best Red Pressed, 5 0 0 " " " "

Buckton Facing, 5 0 0 " " " "

Best Blue Pressed, 4 2 6 " " " "

Staffordshire, 4 7 6 " " " "

Do. Bilcote, 4 7 6 " " " "

Best, Staffordshire, 4 0 0 " " " "

Fire Bricks, 4 0 0 " " " "

GLAZED BRICKS.

Best White and Ivory Glazed, 13 0 0 " " " "

Stretchers, 11 0 0 " " " "

Quoins, Balloons, and Flats, 16 0 0 " " " "

Double Stretchers, 19 0 0 " " " "

Double Headers, 18 0 0 " " " "

One Side and two Ends, 19 0 0 " " " "

Two Sides and one End, 20 0 0 " " " "

Splays, Chamfered, Squints, 20 0 0 " " " "

Best Dipped Salt Glazed Stretchers, and Header, 12 0 0 " " " "

Quoins, Balloons, and Flats, 14 0 0 " " " "

Double Stretchers, 15 0 0 " " " "

Double Headers, 14 0 0 " " " "

One Side and two Ends, 15 0 0 " " " "

Two Sides and one End, 15 0 0 " " " "

Splays, Chamfered, Squints, 14 0 0 " " " "

Second Quality, 2 0 0 " " " "

White and Ivory Glazed, 2 0 0 " " " "

Thames and Pit Sand, 7 0 per yard, delivered.

Thames Ballast, 5 8 " " " "

Best Portland Cement, 27 0 per ton, " "

Best Ground Blue Lias Lime, 20 0 " " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime, 12s. 6d. per yard, delivered.

Scourbridge Fireclay in sacks 27s. 6d. per ton at rly. dep't.

## STONE.

BATH STONE—delivered on road waggon, s. d.

Quoins, Paddington Depot, 1 6 6 per ft. cube.

Do. do. delivered on road waggons, 1 8 2 " " "

PORTLAND STONE (20 ft. average)—

Brown Whitbed, delivered on road waggons, Paddington depot, Nine Elms depot, or Fulham Wharf, 2 1 " " "

White Bashed, delivered on road waggons, Paddington depot, Nine Elms depot, or Fulham Wharf, 2 2 2 " " "

Amster in blocks—1 11 per ft. cube, deld. rly. depot.

Beer, 1 6 " " " "

Drury Dale in blocks, 1 10 " " " "

Red Corshill, 2 5 " " " "

Blackburn Red Freestone, 2 0 " " " "

Red Mansfield, 2 4 " " " "

Grey York—

carried random blocks 5 0 per ft. cube.

in. sawn two sides, landings to sizes (under 40 ft. super.) 2 8 per ft. super.

ditto, ditto, 2 6 " " " "

in. sawn two sides, ditto, ditto, 0 11 2 " " " "

in. to 24 in. sawn one side, ditto, ditto, 0 7 2 " " " "

in. to 24 in. ditto, ditto, 0 6 " " " "

HARD YORK—

carried random blocks 5 0 per ft. cube.

in. sawn two sides, landings to sizes (under 40 ft. super.) 2 8 per ft. super.

ditto, ditto, 2 6 " " " "

in. sawn two sides, ditto, ditto, 0 11 2 " " " "

in. to 24 in. sawn one side, ditto, ditto, 0 7 2 " " " "

in. to 24 in. ditto, ditto, 0 6 " " " "

Age, 0 5 " " " "

OPTION WOOD (Hard Red) in blocks 2 0 per ft. cube.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

in. sawn both sides, landings to sizes, deld. rly. depot.

## SLATES (continued).

m. in. best. 20 x 10 best. Eureka, 15 37 6 per 1000 of 1800 at r. d.

20 x 12 " " " " " " " " " " " "

18 x 10 " " " " " " " " " " " "

18 x 8 " " " " " " " " " " " "

20 x 10 permanent green, 11 13 6 " " " " " "

18 x 10 " " " " " " " " " " " "

16 x 8 " " " " " " " " " " " "

## TILES.

Best plain red roofing tiles, 42 0 per 1000 at rly. depot.

Hip and Valley tiles, 3 7 per doz. " " " "

Best Broseley tiles, 50 0 per 1000 " " " "

Do. Ornamental tiles, 32 6 " " " "

Hip and Valley tiles, 4 0 per doz. " " " "

Best Buxton red, brown, or brindled do. (Edwards), 57 6 per 1000 " " " "

Do. Ornamental do. brand, 50 0 " " " "

Hip tiles, 4 0 per doz. " " " "

Valley tiles, 3 0 " " " "

Best Red or Mottled Staffordshire do. (Peakes), 51 9 per 1000 " " " "

Do. Ornamental do. brand, 54 8 " " " "

Hip tiles, 4 1 per doz. " " " "

Valley tiles, 3 8 " " " "

Best "Rosemary" brand plain tiles, 48 0 per 1000 " " " "

Best Ornamental tiles, 50 0 " " " "

Hip tiles, 4 0 per doz. " " " "

Valley tiles, 3 8 " " " "

Best "Hartshill" brand plain tiles, sand faced, 50 0 per 1000 " " " "

Do. pressed, 47 6 " " " "

Do. Ornamental do. brand, 50 0 " " " "

Hip tiles, 4 0 per doz. " " " "

Valley tiles, 3 6 " " " "

## WOOD.

At per standard.

Deals: best 3 in. by 11 in. and 4 in. s. d. s. d.

by 9 in. and 11 in. 13 10 0 15 0 0

Best 3 in. by 9 in. 13 0 0 14 0 0

Battens: best 2 in. by 7 in. and 3 in. 11 0 0 12 0 0

8 in. and 3 in. by 7 in. and 8 in. 10 0 0 11 0 0

Battens: best 2 in. by 6 in. and 3 in. by 6 in. 10 0 0 11 0 0

Do. second, 1 0 0 less than best.

Battens: seconds, 0 10 0 " " " "

3 in. by 4 in. and 2 in. by 6 in. 9 0 0 10 0 0

3 in. by 4 in. and 2 in. by 5 in. 8 10 0 9 10 0

Foreign Saw Boards: 1 in. and 1 1/2 in. by 7 in. 0 10 0 more than battens.

3 in. 1 0 0 " " " "

At per load of 50 ft.

Fire timber: best middling Danzig or Memel (average specification) 4 10 0 5 0 0

Seconds, 4 0 0 4 10 0

Small timber (8 in. to 10 in.) 3 10 0 3 15 0

Small timber (6 in. to 8 in.) 3 0 0 3 10 0

Swedish balks, 2 10 0 3 0 0

Pitch-pine timber (30 ft. average) 3 5 0 3 15 0

## JOISTS, GIRDERS, &amp;c.

In London, or delivered

Rollad Steel Joists, ordinary sections, 6 0 0 " " " "

Compound Girders, ordinary sections, 7 10 0 " " " "

Steel Compound Stanchions, Angles, Tees and Channels, ordinary sections, 7 10 0 " " " "

Fittick Plates, 7 15 0 " " " "

Cast Iron Columns and Stanchions including ordinary patterns, 6 12 6 " " " "

## WOOD (continued).

Prepared Flooring, etc. (continued)— Per square.

1 1/2 in. by 7 in. white, planed and matched, 0 15 0 " " " "

3 in. by 7 in. yellow, matched and beaded or V-jointed brds., 0 11 0 0 13 6 0

1 in. by 7 in. do. do. do. 0 14 0 0 16 0 0

3 in. by 7 in. white do. do. 0 10 0 0 11 6 0

1 in. by 7 in. do. do. do. 0 12 9 0 15 0 0

6 in. at 6d. to 9d. per square less than 7 in.

## METALS.

Per ton, in London.

Iron—Common Bars, 7 0 0 " " " "

Staffordshire Crown Bars, good merchant quality, 7 10 0 " " " "

Staffordshire "Marked Bars", 9 10 0 " " " "

Mild Steel Bars, 8 5 0 " " " "

Hoop Iron, basis price, 16 10 0 " " " "

Galvanized, 16 10 0 " " " "

(\*And upwards, according to size and gauge.)

Sheet Iron, Black—

Ordinary sizes to 20 g., 9 0 0 " " " "

24 g., 10 0 0 " " " "

26 g., 11 15 0 " " " "

Sheet Iron, Galvanized, flat, ordinary quality—

Ordinary sizes—6 ft. by 3 ft. to 3 ft. to 20 g., 12 10 0 " " " "

Ordinary sizes to 22 g. and 24 g., 13 0 0 " " " "

26 g., 14 0 0 " " " "

Sheet Iron, Galvanized, flat, best quality—

Ordinary sizes to 20 g., 15 10 0 " " " "

22 g. and 24 g., 16 0 0 " " " "

26 g., 17 10 0 " " " "

Galvanized Corrugated Sheets—

Ordinary sizes 6 ft. to 8 ft. 20 g., 12 10 0 " " " "

22 g. and 24 g., 13 0 0 " " " "

26 g., 13 15 0 " " " "

Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker, 11 0 0 " " " "

Best Soft Steel Sheets, 22 g. and 24 g., 13 0 0 " " " "

26 g., 13 10 0 " " " "

Cut nails, 3 in. to 6 in., 9 0 0 " " " "

(Under 3 in., usual trade extras.)

## LEAD, &amp;c.

Per ton, in London.

Lead—Sheet, English, 3 lb. and up, 16 7 6 " " " "

Pipe in coils, 16 17 6 " " " "

Soil pipe, 19 7 6 " " " "

Compo pipe, 19 7 6 " " " "

Zinc—Sheet—

Victoria Mountains, 30 5 0 " " " "

Silesian, 30 0 0 " " " "

COPPER—

Strong Sheet, per lb., 0 0 11 " " " "

Thin, 0 1 0 " " " "

Copper nails, 0 0 11 " " " "

BRASS—

Strong Sheet, 0 0 10 " " " "

Thin, 0 0 11 " " " "

Tin—English Ingots, 0 1 1 " " " "

Solders—Plumbers', 0 0 8 " " " "

Tramway, 0 0 9 " " " "

Blowpipe, 0 0 9 " " " "

## ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds, 23d. per ft. delivered.

fourths, 24d. " " " "

21 oz. thirds, 24d. " " " "

fourths, 25d. " " " "

26 oz. thirds, 24d. " " " "

fourths, 25d. " " " "

32 oz. thirds, 24d. " " " "

fourths, 25d. " " " "

Fluted Sheet, 15 oz., 24d. " " " "

21 oz., 24d. " " " "

Harley's Rolled Plate, 24d. " " " "

25d. " " " "

## OILS, &amp;c.

Per gallon.

Raw Linseed Oil in pipes, 0 1 6 " " " "

in barrels, 0 1 8 " " " "

Boiled, 0 2 0 " " " "

in pipes, 0 1 11 " " " "

in barrels, 0 2 0 " " " "

Turpentine, in drums, 0 3 9 " " " "

in drums, 0 3 11 " " " "

Genuine Ground English White Lead, per ton, 19 15 0

Best Lead, Dry, per cwt., 0 6 6

Best Linseed Oil Putty, per barrel, 1 12 0

Stockholm Tar, per barrel, 1 12 0

## VARNISHES, &amp;c.

Per gallon.

Fine Pale Oak Varnish, 0 8 0 " " " "

Pale Copal Copal, 0 10 6 " " " "

Superfine Pale Elastic Oak, 0 12 6 " " " "

Fine Extra Hard Church Oak, 0 10 0 " " " "

Superfine Hard-drying Oak, for seats of Churches, 0 14 0 " " " "

Fine Elastic Carriage, 0 12 6 " " " "

Superfine Pale Elastic Carriage, 0 16 0 " " " "

Fine Pale Maple, 0 15 0 " " " "

Finest Pale Durable Copal, 0 16 0 " " " "

Extra Pale French Oil, 0 15 0 " " " "

Eggshell Flattening Varnish, 1 4 0







TENDERS.—Continued on Page 109.



## CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
81 tons of 8-in. C.I. Spigot & Socket Pipes, Brampton.	Brampton B.D.C.	H. W. Taylor, Engineer, St. Nicholas-chamb., Newcastle-on-Tyne
Locomotives with Tenders	South Indian Railway Co., Ltd.	H. W. Notman, 55, Gracechurch-street, London
Cottage, etc., at Westerhope, near Newcastle-on-T.	Horwich U.D.C.	G. Wright, West-avenue, Westerhope
Goods and Materials	Bradford Education Committee	W. H. Thorp, Architect, 61, Albion-street, Leeds
Basement of Y.M.C.A. Premises, Albion-st., Leeds	do.	Clark & Moscrop, Architects, Darlington
Farm Buildings at Walton Grange, near Eton	Islington Borough Council	Architect's Department, Education Office, Manor-row, Bradford
Furniture for Technical Schools	do.	J. Patton Barber, Borough Engineer, Town Hall, Upper-st., N.
Joiner's Work, Classrooms at Hanson Sch., Byrom-st.	Leyton U.D.C.	do.
Wrought-iron Shingle Bins and C.I. Orderly Bins	do.	W. Dawson, Surveyor, Town Hall, Leyton
600 super. yds. of Tar Paving	West Ham Corporation	do.
1,000 lineal yds. of Fencing for Marsh Lands	Town Council	Ross & Macbeth, Architects, Inverness
Public Street Works	East Indian Railway Co.	G. R. Morley, Borough Engineer, Town Hall, West Ham, E.
Additional, etc., at Olney Hill Hydro, Torres	Hull Corporation	Burg Surveyor, Town Hall, Burntisland, N.B.
MAKING-UP BRADFELD-ROAD	N.E. Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.
Municipal Buildings, Brantford	do.	do.
Rails and Fishplates	Hebburn U.D.C.	do.
Cast-Iron Plate Sleepers	Beckenham U.D.C.	do.
Wooden-Paled Fences, Walton-street, West Park	Sowerby Bridge U.D.C.	do.
Additional to Permanent Way Shops, Hull	Cardiff Corporation	do.
Stationmaster's House at Castleford	do.	do.
Asphalting Roads of Hebburn Park	Llantrisant & Llanwit-Fardre R.D.C.	do.
*EXTEN. ELECTRIC LIGHT WKS., ARTHUR-RD.	Cwr Coch Building Club	do.
Painting Town's Buildings	Wood Green U.D.C.	G. S. Morgan, Surveyor, School-street, Pontyclun
Painting Clarence Bridge over the Taft	Guilford Corporation	Council's Surveyor, Town Hall, Wood Green
Widening District-road	Bradford Corporation	B. L. Pritchard, Surveyor, 22, Castle-street, Brecon
18 Dwelling Houses, Aberbargoed	Market Bosworth R.D.C.	B. F. Holland, Engr., etc., 11, Parkinson's-chbrs., Huestlegate, Bradford
*UNDERGROUND PUB. CONV., LORDSHIP-LA.	Bradford Corporation	W. M. Sykes, Surveyor, Church-street, Tostock
Paint Work and Barriers at Frisky-road Stables	Hammersmith Borough Council	C. G. Mason, Borough Surveyor, Tuns Gate, Guildford
422 yds. 8-in. Barrow, Pipe Sewer, Newbold Yard	do.	W. M. Sykes, Surveyor, Church-street, Tostock
Alterations, etc., City Hospital, Leeds-road	Prescot Guardians	Bradford Corporation
*ALTERS. TO ELECTRICITY WKS., FULHAM-RD.	Sir J. Miller, Bart.	Hammersmith Borough Council
*NEW SAILORS' HOME AT WEXMOUTH	The Corporation	Chickney & Sons, 13, Victoria-street, Westminster, S.W.
Cleaning and Painting Board-room, etc., Whiston	Meath Hospital & Dublin Infirmary	J. Gandy, Architect, St. Helen
Water Tanks, Pump House, etc., Ladywell, Duns	Market Guardians	J. A. Leslie & Reid, C.E., 72A, George-street, Edinburgh
Oil or Gas Engine and Pump at Ladywell	Mr. C. Glendon	do.
Paving Derwent Water-road, Galshead	Dudley Corporation	N. P. Pattinson, Borough Engineer, Town Hall, Gateshead
Nurses' Home	New-T. Asylum Visiting Comtee	J. F. Fuller, P.S.A., 179, Great Brunswick-street, Dublin
Alterations to Kitchen, etc., at City Lunatic Asylum	Inverness-shire C.C.	F. H. Pritchard, Surveyor, 22, Castle-street, Brecon
Milton Burn Division Scheme, Newtonmore	Bradford Corporation	B. F. Holland, Engr., etc., 11, Parkinson's-chbrs., Huestlegate, Bradford
Granite Setts	Stockport Corporation	W. A. Scott, Architect, 74, Hollybush-road, Drumcondra
Warehouse, Croft-street, Newcastle-on-Tyne	Barry U.D.C.	R. P. Wilson, Engineer, 68, Victoria-street, Westminster
Intake Works and Gravitation Main	Reckenhall U.D.C.	City Property Surveyor's Department, Town Hall, New-on-Tyne
Smallpox Hospital, Weycock-road, Barry	Cardiff Corporation	J. Wedderburn, Engineer, The Castle, Inverness
Apparatus for Summoning Firemen	do.	J. H. Cox, City Surveyor, Town Hall, Bradford
Manganese Steel Points and Crossings, etc.	do.	Oliver, Leeson, & Wood, Archts., Bank-chbrs., Mosley-st., N'castle
Alter., etc., to the Sluden Air View Schs., Kailghay	West Riding Education Committee	E. Mansergh, Engineer, 6, Victoria-street, Westminster
Kerbing, Artificial Stone Paving, etc.	Lewisham Borough Council	J. C. Pardoe, Surveyor, 160, Holborn-road, Barry
Steel Rails and Steel Fishplates	Southern Mahatras Railway Co.	F. Stevens, Clerk to the Urban District Council
Medical Officer's Residence, etc., Castleknock	North Dublin Guardians	R. Gordon Nicol, Harbour Engineer's Office, Aberdeen
Pumping Station at Kildare	Nass No. 1 R.D.C.	J. Vickers-Edwards, County Architect, County Hall, Wakefield
*EXTEN. WERM, ETC., HARROW-RD. WKEISE	Paddington Guardians	Surveyor's Department, Town Hall, Carlisle
Purification Works, etc., Bacheats	Bathgate Town Council	E. E. Thomson, Secretary, 48, Queen Anne's-gate, S.W.
*ADDS. & ALTERS. TO STOREDRAIN COUNTY OF	H.M. Office of Works	J. O'Neill, Clerk, North Brunswick-street, Dublin
Cornish Type Boiler	Ipwich Guardians	F. B. Fergin, Engineer, Beechgrove, Kildare
*REBUILD. CHANDEL ST. MARY'S, NUNBATOEN	Building Committee	E. J. Smith, Archt., Parliament-mansions, Victoria-street, S.W.
First Brigade Station, Clyde-st.	H. Brakspear, Architect, High-street, Conisburgh	M. J. Fredericks, 42, Frederick-st., Edinburgh
Sewage Disposal Works	Gaston Town Council	H. M. Office of Works, Storey's Gate, Westminster, S.W.
Road Improvements	Ebbw Vale U.D.C.	H. J. Kent, Clerk, 19, Tower-street, Ipswich
*ALTERATIONS TO LINGFIELD SCHOOL	Survey Education Committee	H. Brakspear, Architect, High-street, Conisburgh
Fire Escape, 40 ft. High	Town Commissioners of Mullingar	J. Bryce, Borough Engineer, 1, Maxwell-street, Partick
*ELEC. CAR SHED AT HAMMERSMITH STA.	Southall-Norwood U.D.C.	H. Elliott & Brown, Engrs., Burton-buildings, Parliament-st., N'ham
Pumping Engine at Sewage Works	Directs. of Gt. Western & Metro. Rys.	T. J. Thomas, Surveyor and Engineer, Ribb Vale
*NEW COTTAGES, ETC., AT WATERWORKS	Bishop's Stortford U.D.C.	J. Jarvis & Richards, 38, Victoria-street, Westminster, S.W.
Storage Reservoir, etc., Castle Carrock Beck	Borough of Ryde	P. J. Carroll, Town Clerk
*CONCRETE & STEEL SERVICE RESERVOIR	Carlisle Corporation	B. Brown, Engineer and Surveyor, Public Offices, Southall
*FIRESTATION & READING-RM., HAMPTON HILL	Brumby and Frodingham U.D.C.	Engineer's Office, Paddington Station, W.
*ALTERS. & ADDS. TO BARNET WORKHOUSE	Hampton U.D.C.	T. Swadlow, Clerk, 7, North-street, Bishop's Stortford
Alterations to Ice-Making Plant, etc., at Abattoirs	Barnet Guardians	Borough Engineer, Town Hall, Ryde
*ALTRS. TO LAUNDRY, S.E. HOSE, NEW CROSS	Bury Corporation	J. Mansergh & Sons, Engineers, 5, Victoria-street, Westminster
Waterworks Scheme	Metropolitan Asylums Board	A. Atkinson, Engineer, Bridge
Electric Lighting and Waterworks Scheme	Municipal Board of Mussoorie, India	White, Son, & Pili, 13-15, High-street, Barnet, Herts
Detached House, Stables, etc., at Chapel-in-le-Frith	do.	A. W. Bradley, Borough Engineer and Surveyor, Bank-st., Bury
Laundry at Workhouse, Brampton	Mr. A. Giddings	Office of the Board, Embankment, E.C.
Vicarage at Pontymermet, near Bridgend	Brampton Guardians	C. H. Shanau, Municipal Electrical Eng., Mussoorie, N.P., India
Alterations, St. Peter's School, Plymouth	Rev. H. Price James	do.
Cloakrooms and Offices at Grewelthorpe Nat. School	Horne Bay U.D.C.	J. B. Langley, Architect, 40, Deansgate, Manchester
*INF. SCH. AT BROWNHILLS, WALSAIL-WOOD	Staffordshire C.C. Education Com.	T. Taylor Scott, Architect, 40, Lowther-street, Carlisle

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments
*CHIEF ASSISTANT IN BUILD. TRADES DEPOT	Northern Polytechnic Institute	150 <i>l.</i> per annum	July
*JUNIOR ASSISTANT	Willesden D.C.	175 <i>l.</i> per annum	July
*SENIOR ARCHITECT'S ASSISTANT	Glamorgan C.C. Education Com.	2 <i>l.</i> 10 <i>s.</i> per week	July
*JUNIOR ARCHITECT'S ASSISTANT	Borough Polytechnic Institute	2 <i>l.</i> 2 <i>s.</i> per week	July
*LECTURER FOR PRE. CLASS FOR SAN. INSP.	do.	15 <i>l.</i> per session	July
*ELECTRIC WIRING & FITTING INSTRUCTOR	County Borough of Croydon	20 <i>l.</i> per calendar month	Aug.
*RESIDENT ENGINEER	East Sussex C.C.	3 <i>l.</i> 3 <i>s.</i> per week	Aug.
*ARCHITECT'S ASSISTANT	do.	do.	Aug.

Those marked with an asterisk (\*) are advertised in this number.

Competitions, —.

Contracts, lv. vi. viii. x.

Public Appointments xix.

LONDON.—For making-up the carriageway of Brill.

LONDON.—For making-up the carriageway of Bill-street, Fulham, for the Fulham Borough Council. Mr. Francis Wood, Borough Surveyor, Town Hall, Fulham, S.W.:			
J. J. Neave & Son	250	—	—
J. Mears	785	—	—
F. Powles	740	—	—
G. Wimpey	711	—	—
H. J. Greenham	874	—	—
A. B. Champness*	600	—	—
Borough Surveyor*	—	—	£240
LONDON.—For taking off present roof and forming new roof, etc., at 88, High-street, Peckham, S.E., for Mr. A. Garsar, architect and surveyor, 66, Oakhurst-gate, East Dulwich, and surveyor, 66, W. Coates			
W. Coates	£212	0	£174
W. T. Champion	188	0	£173
J. B. H.	178	0	10
LONDON.—For roadworks, part of Ermine-road, Letchworth, for the Letchworth Borough Council:—			
W. Pearce, Havock-street, Forest Hill	—	—	£388
LONDON.—For road works, part of Gabriel-street, Forest Hill, for the Letchworth Borough Council:—			
Fry Bros, Lion Wharf, Greenwich*	—	—	£265
LONDON.—For paving the footpath on the west side of Mayow-road, Sydenham, for the Lewisham Borough Council:			
Preston Granite Concrete Co. Ltd., Preston	—	—	£54
LONDON.—For painting works and repairs for Lambeth Borough Council:—			
	Painting Work	Cleaning External Stoneswork	
Franks & Simons	£240	0	£22
P. McCarthy	249	0	66
S. T. W. Mott & Co., 98, Arthur-street, Fulham-road*	278	7	25
Compton Bros.	310	4	48
W. H. Pearce	329	0	110
H. C. Payne	333	0	140
W. A. King	336	0	332
Crabb & Son	355	0	325
T. Laphmore & Co.	366	0	280
Hibbard Bros., Ltd.	394	0	194
W. H. Pearce	394	5	125
J. Scott Farr	412	0	97
A. T. Vior & Co.	419	0	298
H. Bouneat	424	12	155
W. Pearce	450	0	115
Spencer, Santo, & Co. Ltd.	465	0	105
R. C. Scott & Son	485	0	175
W. H. Pearce	495	0	120
R. Sandland	541	0	—
P. Kinnaird	561	0	153
LONDON.—For the erection of the Patent Office Works and Public Buildings:—			
			Yor
J. Smith & Sons, Ltd.*	—	—	19
H. E. Nightingale	—	—	19
C. H. Elgar & Co., Ltd.	—	—	19
B. J. Williams Ltd.	—	—	19
W. Downs	—	—	19
J. Chesnum & Sons	—	—	19
J. Christy	—	—	20
Higgs & Bill, Ltd.	—	—	20
E. Laurence & Sons	—	—	20
Palman & Fotheringham, Ltd.	—	—	20
J. Christy	—	—	20
Perry Bros.	—	—	20
F. Gough & Co.	—	—	20
F. Garrett & Sons	—	—	20
F. & H. P. Higgs	—	—	20
J. & M. Patrick	—	—	20
W. Smith & Sons	—	—	20
W. Vane, The Building, Ltd.	—	—	20
G. E. Wallis & Sons, Ltd.	—	—	20
Turtle & Appleton	—	—	20
G. Godson & Sons	—	—	20
J. Allen & Sons Ltd.	—	—	21
Martin, Wells, & Co., Ltd.	—	—	21
F. Mowlen & Co.	—	—	21
L. Holloway	—	—	21
H. Lovatt, Ltd.	—	—	21
Leslie & Co., Ltd.	—	—	21
Perry & Co., Bow, E.	—	—	21
F. J. Stannbury	—	—	22
H. Willcock & Co.	—	—	22
MIDDLESBROUGH.—For erecting Crescent-road Lidothous & S.B. architects, 62, Albert-road, Middlesbrough:			
	Excavator, etc.	Slator.	Plasterer
	£ s. d.	£ s. d.	£ s. d.
T. McNaughtan	9,324	8	692
Stephen Coates	9,423	0	692
L. Dickinson & Son.	—	—	692
H. Wilson Bros.	8,600	0	692
W. Anderson	8,827	8	704
W. J. & T. Davidson	9,068	0	720
W. Moss	8,074	12	784
Howe & Co.	8,821	9	680
W. Pearson	—	—	—
Crisp & Son	12,069	18	732
W. Eastman	8,999	10	693
W. Eastman	8,827	8	692
D. Doughty & Son	8,900	0	692
R. Rudge	8,488	0	692
D. Davison	8,677	0	700
G. Porteous	8,975	0	682
C. A. Atkinson & Son	9,399	13	715
W. Thompson Bros.	8,545	0	762

MANGOTSFIELD.—For erecting composite wood and iron school buildings, for the Education Committee of the Gloucestershire County Council. Mr. R. S. Phillips, Surveyor, Shire Hall, Gloucester. R. Bates, Ltd., 925 0 0 H. S. Crump, 2808 12 6  
M. C. B. Kitchen, 2808 0 0 J. Priest & Sons, 2808 0 0  
& Co., 2902 0 0 J. Mullings 785 0 0  
Brown & Lilly, Ltd., 874 10 0 J. Harrison, 785 10 0  
Humphreys, Ltd., 857 0 0 T. Hawkins & Co., 785 0 0  
Ginger, Lee, & Co., 819 0 0 E. S. Bennett, 688 0 0  
F. Smith & Co., 843 0 0 Darlington Construction Co., 689 0 0  
W. C. Blanton, 828 0 0 Ld., 615 0 0  
J. Browning, 828 0 0 Ld., 615 0 0  
W. Harbrow, 818 10 0

RIPON.—For widening and repairing Cundall Bridge, for the Wath Rural District Council. Mr. H. A. Johnson, engineer, 16, The Exchange, Bradford. D. Wilkinson, 2218 4 1 Kay, 2213 0

SELLY OAK.—For alterations at the Union Workhouse necessary for provision of lavatory and cloak-room accommodation, for the Guardians, Messrs. O. Whitwell & Son, architects, 29, Temple-row, Birmingham. G. Robinson & Son, King's Heath, 2385 10

SEETTY.—For erecting seventeen houses in Harroset, for the Third Seetty Co-operative Building Club. Mr. C. E. Ratner, architect, Bank-chambers, Heathfield-square, Swansea. Quantities by the architect. T. Richards, 24,120 0 11 & D. Jones, 23,950 0  
W. Evans, 4,120 0 C. M. a r l e s, 4,120 0  
T. D. Jones, 4,000 0 Swansea, 3,652 10

SLEAFORD (Lincs.).—For 870 linal yds. of 3-in. cast-iron mains, for the Rural District Council. Mr. F. J. Barnes, Sleaford, 74, Southgate, Sleaford, 2250

SWANSEA.—For erecting Libanus new Baptist church, Cwmbrwal. Mr. E. A. Ellis, architect, 29, Fisher-street, Swansea. Quantities by Mr. Bucknoll, Fisher-street, Swansea. J. & F. Weaver, Munstetson, Swansea, 24,100

THIRSK.—For erecting a new house, for Mr. H. Masterman. Mr. W. Hargreaves Bourne, architect, 29, Esplanade, Bricklayers and Masons: W. Jackson, Westgate, Thirsk, 2,676 4 0  
Plasterer: W. Jackson, Westgate, Thirsk, 103 14 6  
Painter: R. T. Smith, Bondgate, Darlington, 608 0 0  
Tilers: J. Harrison, Bondgate, Darlington, 608 0 0  
Wharf, Middleborough, 95 2 0  
Plumbers: Lishman & Son, 35, Bondgate, 261 0 0  
Painter: T. White & Son, Thirsk, 24 15 0

Pension (Furnival-street), for the Commissioners of H.M. Prison, "Shamrock" Stone. Old Materials.

s. d.	£	s. d.	£	s. d.	£	s. d.		
14	0	0	19,284	0	0	180	0	0
90	0	0	19,380	0	0	100	0	0
90	0	0	19,526	0	0	8	10	0
27	0	0	19,681	0	0	—	—	—
87	0	0	19,865	0	0	—	—	—
90	0	0	20,075	0	0	20	0	0
90	0	0	19,830	0	0	50	0	0
64	0	0	20,095	0	0	25	0	0
90	0	0	20,095	0	0	25	0	0
23	0	0	20,373	0	0	—	—	—
63	0	0	20,185	0	0	66	0	0
91	0	0	20,327	0	0	—	—	—
94	0	0	20,474	0	0	40	0	0
94	0	0	20,534	0	0	9	0	0
90	0	0	20,560	0	0	—	—	—
70	0	0	20,694	0	0	109	0	0
65	0	0	20,615	0	0	15	0	0
94	0	0	20,879	0	0	15	0	0
90	0	0	20,734	0	0	154	0	0
90	0	0	20,736	0	0	39	0	0
21	0	0	20,775	0	0	50	0	0
90	0	0	20,850	0	0	—	—	—
90	0	0	20,904	0	0	180	0	0
59	0	0	21,170	0	0	—	—	—
77	0	0	21,827	0	0	—	—	—
37	0	0	21,357	0	0	16	0	0
70	0	0	21,808	0	0	16,821	14	8
19	0	0	21,798	0	0	—	—	—
19	0	0	21,809	0	0	45	0	0
49	0	0	21,740	0	0	70	0	0
14	0	0	19,694	0	0	44	14	7
90	0	0	26,350	0	0	100	0	0

chools, for the Education Committee, Messrs. B. Plumber, etc. Painter. Carpenter, etc. Total.

£	s. d.	£	s. d.	£	s. d.	£	s. d.				
1,240	0	0	159	10	0	4,822	7	0	16,905	3	3
1,780	0	0	159	10	0	3,725	0	0	19,342	5	0
—	—	—	—	—	—	—	—	—	16,686	0	0
1,874	0	0	159	0	0	3,800	0	0	15,440	0	0
1,740	0	0	162	0	0	4,288	0	0	16,312	0	0
1,750	0	0	159	0	0	3,763	0	0	15,408	0	0
1,750	0	0	210	0	0	4,303	1	5	15,562	17	0
1,630	0	0	170	0	0	3,769	16	4	15,650	1	7
—	—	—	—	—	—	—	—	—	16,821	14	8
—	—	—	—								



110

**TENDRING.**—For heating the workhouse and infirmary at Tendring, near Colchester, for the Guardians. Messrs. Pries & Belslam, architects, 52, Queen Victoria-street, E.C.4.—

W. J. Burroughs & Sons .....	£2,979 17	Stanford & Co. (1,568 15	
J. E. Tabor .....	2,200 0	J. & F. May .....	1,695 0
B. Parker, Ltd. ....	2,087 0	G. H. Robinson .....	1,690 0
J. Richmond & Co., Ltd. ....	1,925 0	R. Clarke .....	1,569 0
Dargue, Griffiths, & Co., Ltd. ....	1,766 0	E. Dawson & Co., Ltd. ....	1,549 0
Z. D. Berry & Sons .....	1,750 0	The Brightside Foundry & Engineering Co., Ltd. ....	1,530 0
Cookridge & Co., Ltd. ....	1,720 0	A. J. Harvey .....	1,228 0
M. Dufield & Sons, Ltd. ....	1,700 0	The Lancashire Heating Co. (1,483 0	
Strode Co. ....	1,697 0	Hefford & Slutsdewood, Ltd. ....	1,497 10
F. W. Lowell & Co. ....	1,625 0	Leicester* .....	1,497 10

\* Alternative tender.

**TIPTON.**—For alterations and provision of partitions at Tipton Green and Great Bridge Council Schools, for the Urban District Council Education Committee. Mr. A. Long, architect, 21, New-street, West Bromwich:—

T. Chapman, West Bromwich .....	£295 0*	£198 10*	
Oakley & Colson .....	451 5	223 0	
T. Hardy .....	295 0	235 0	
J. Slesman .....	335 0	260 0	
N. W. Moore .....	345 0	230 0	
J. F. Beach .....	349 0	—	
R. Mallin .....	405 0	265 0	
G. Jones .....	370 0	249 0	
A. Cashmore .....	372 10	240 0	
J. Brann .....	371 6	224 15	
E. & W. Bennett .....	380 0	270 0	

**TWICKENHAM.**—For cleaning, distemper, and painting the Town Hall, for the Urban District Council. Mr. H. W. Pearce, Surveyor, Town Hall, Twickenham:—

B. Compton .....	£198 7 3	J. C. Snel, Twickenham* £137 10 0	
F. Smith .....	188 0 0		
F. De Jong .....	144 0 0		

**TWICKENHAM.**—For heating and ventilation at the Town Hall, for the Urban District Council. Mr. F. W. Pearce, Surveyor, Town Hall, Twickenham:—

Rosser & Russell £243 0	Shrubbs & Sons .....	£162 0	
Jeffreys & Co. ....	108 0	J. Gray .....	162 10
G. & E. Bradley .....	181 0	Howard .....	160 10

**TWICKENHAM.**—For erecting Trafalgar schools, Third Cross-road, for the Urban District Council. Mr. H. A. Cheers, architect, 35, Walgrave-park, Twickenham. Quantities by Mr. W. Herring, 163, Strand, W.C.1.—

W. H. Hyde .....	£19,990	Cropley Bros., Ltd. £14,995	
Simson & Co. ....	16,700	Spencer, Sauts, & Co., Ltd. ....	14,940
J. Ferguson & Co. ....	16,460	D. W. Barker .....	14,897
Ennes Bros. ....	16,083	S. N. Scole & Son .....	14,857
J. W. Brooking .....	15,999	Wisdom Bros. ....	14,759
W. B. Williams .....	15,950	W. Moss & Son .....	14,742
Myall & Tison .....	15,874	C. Wall, Ltd. ....	14,666
J. Barker & Co., Ltd. ....	15,830	W. Lawrence & Son .....	14,484
E. Wall .....	15,750	A. Eudon .....	14,440
G. Parker .....	15,550	H. H. Lorden & Son .....	14,444
H. Wilcox & Co. ....	14,484	Smethley & Smith .....	14,228
J. Chessum & Sons .....	15,400	Oak Building Co., Ltd. ....	14,220
Smethley & Smith .....	15,315	W. Wallis .....	14,177
Ltd. ....	15,306	H. Flint .....	14,095
J. Appleby & Sons .....	15,300	G. H. Gibson .....	13,997
M. Walls & Co. ....	15,240	W. J. Dickson .....	13,993
B. K. Nightingale .....	15,181	Cowley & Drake .....	13,941
W. J. Fryer & Co. ....	15,044	J. & M. Patrick, Wandswoth* .....	13,399

**WATFORD.**—For erecting new school at Parkstead, for the Hertfordshire County Council Education Department. Mr. C. P. Ayres, architect, Watford:—

Clark Bros. £11,052 15 0	W. Lawrence & Son .....	£10,839 0 0	
Lorden & Son .....	10,951 0 0	G. & J. Water .....	10,839 0 0
Gordon & Sons .....	10,897 0 0	man .....	10,333 0 0
Coulson & Latta .....	10,813 0 0	Hockley & Co. ....	10,175 0 0
Miskin & Son .....	10,809 0 0	J. Murray & Son .....	10,089 0 0
W. King .....	10,800 0 0	CHORF & Gough .....	9,999 0 0
G. Wiggs .....	10,735 0 0	H. E. Wal .....	9,899 1 0 0
Parrell & Son .....	10,688 0 0	C. Bright .....	9,875 0 0
W. H. Hinkins .....	10,652 0 0	man .....	9,749 18 7
Webster & Cannon .....	10,600 0 0	Oak Build .....	
J. Darvill .....	10,640 0 0	ing Co., Cambridge* .....	
J. L. Tyler .....	10,498 0 0		
H. Martin .....	10,440 0 0		

[Architect's estimate, £10,468.]

**WEST HAM.**—For laying tar-paving to playgrounds of three schools, for the Education Committee. Mr. W. Jacques, architect, 2, Pen-court, E.C.5.—

Constable & Co., Franklin-street, Kentish Town, N.W.* .....	£549		
Constable & Co., Franklin-street, Kentish Town, N.W.* .....	£312		
Constable & Co., Franklin-street, Kentish Town, N.W.* .....	£449 10		

**WELLS.**—For the extension and alteration of the Council Chamber, new staircase, and other works at the Guildhall, for the City Council. Mr. C. Brown, City Surveyor:—

E. Love, Redland, Bristol\* ..... £695

**WEST HAM.**—For cleaning, repairing, and painting of schools, for the Education Committee. Mr. W. Jacques, architect, 2, Pen-court, E.C.5.—

Bridge-road School (Interior). H. C. Horswill, 182, Green-street, Forest Gate, E.* .....	£309 0 0		
Oredon-road School (Exterior). H. C. Horswill, 182, Green-street, Forest Gate, E.* .....	180 0 0		
South Halls School (Interior). H. C. Horswill, 182, Green-street, Forest Gate, E.* .....	330 0 0		
Whitehall-place School (Exterior). H. C. Horswill, 182, Green-street, Forest Gate, E.* .....	210 0 0		
Chancery School (Exterior). W. H. Swann, 40, Prestbury-road, Forest Gate* .....	108 0 0		
Halls School (Interior). J. E. Meador, 674, Barking-road, Plaistow* .....	170 17 0		
Three Mills School (Exterior). W. J. Clemens, 24, Bridge-road, Stratford* .....	184 12 3		
Water-lane School (Interior). Gregar & Son, Jupp-road, Stratford* .....	325 0 0		

**WORCESTER PARK (Surrey).**—For erecting a detached house, stabling and coach-house, etc. for Mr. Alfred Lawson Gurney. Messrs. W. G. Tutt & Goodchild, architects and surveyors, St. Olave's House, 18, Ironmonger-lane, E.C. Quantities by Mr. Frank D. Hickman, 18 and 19, Ironmonger-lane, E.C.1.—

A. W. Jagers .....	£7,294 3 6	Months.	
Hibbert Bros., Ltd. ....	7,100 0 0	9	
G. E. Wallis & Sons .....	7,080 0 0	12	
A. Leather .....	6,989 0 0	8	
J. Burges & Sons .....	6,865 0 0	12	
Benson & Bishop .....	6,858 0 0	9	
Braid, Baker, & Co., Ltd. ....	6,842 0 0	9	
J. & C. Bowyer .....	6,839 0 0	9	
J. Thomas .....	6,833 0 0	9	
J. & M. Patrick .....	6,787 0 0	10	
Aldin Bros. & Davies .....	6,780 0 0	9	
J. Barker & Co., Ltd. ....	6,735 0 0	8	
Leslie & Co., Ltd. ....	6,670 0 0	8	
Holliday & Greenwood .....	6,666 0 0	11	
Ennes Bros. ....	6,663 0 0	12	
W. H. Lorden & Son .....	6,575 0 0	7	
T. Parnell & Son .....	6,571 0 0	9	
H. C. Payne .....	6,556 0 0	12	
T. J. Hawkes & Co. ....	6,533 0 0	10	
Aldridge & Son .....	6,500 0 0	9	
Turtle & Appleton .....	6,475 0 0	9	
Higgs & Outhwaite .....	6,474 0 0	8	
Marten, Wells, & Co., Ltd. ....	6,400 0 0	9	
Gathercole Bros. ....	6,360 0 0	9	
P. J. Shephard .....	6,270 0 0	8	
Oak Building Co., Ltd. ....	6,199 0 0	8	
Cropley Bros., Ltd. ....	6,197 0 0	8	
H. Flint .....	5,977 0 0	10	
J. Christie .....	5,946 0 0	10	
C. Sims & Co. ....	5,908 15 0	9	

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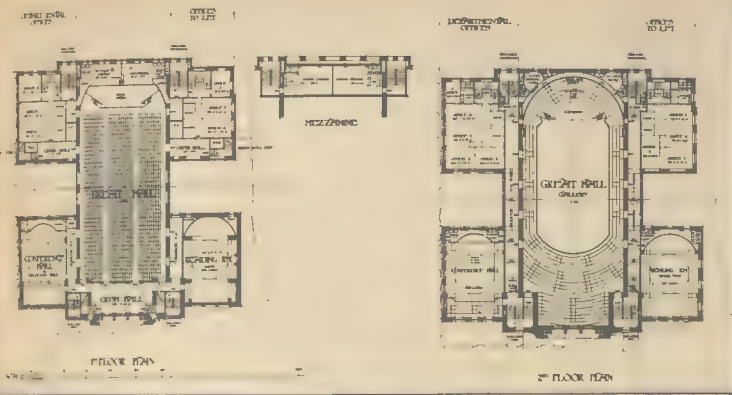
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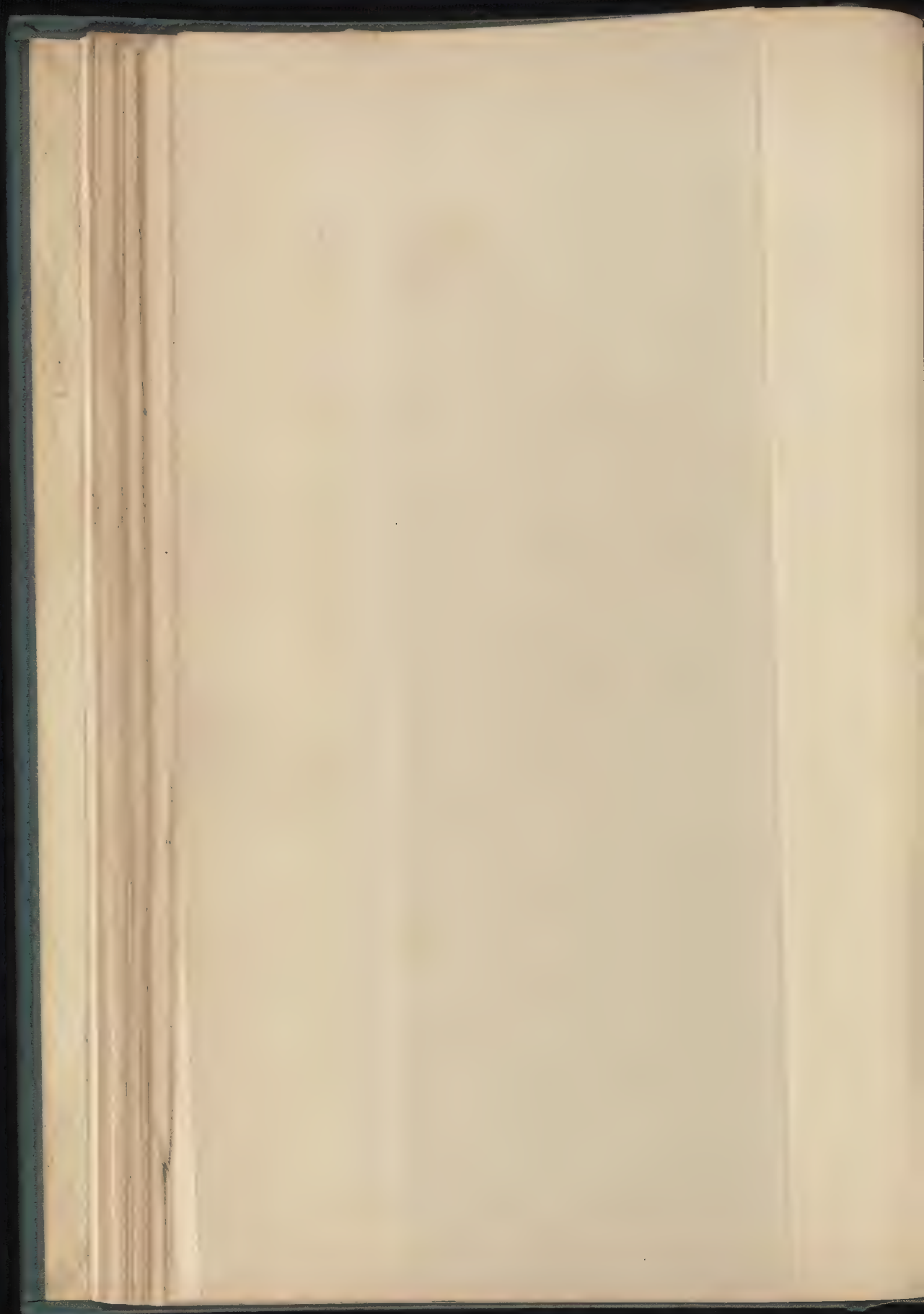
In Fibrous Plaster, Composita, Carton Pierre, and Wood.

**49, Rathbone Place, London, W.**

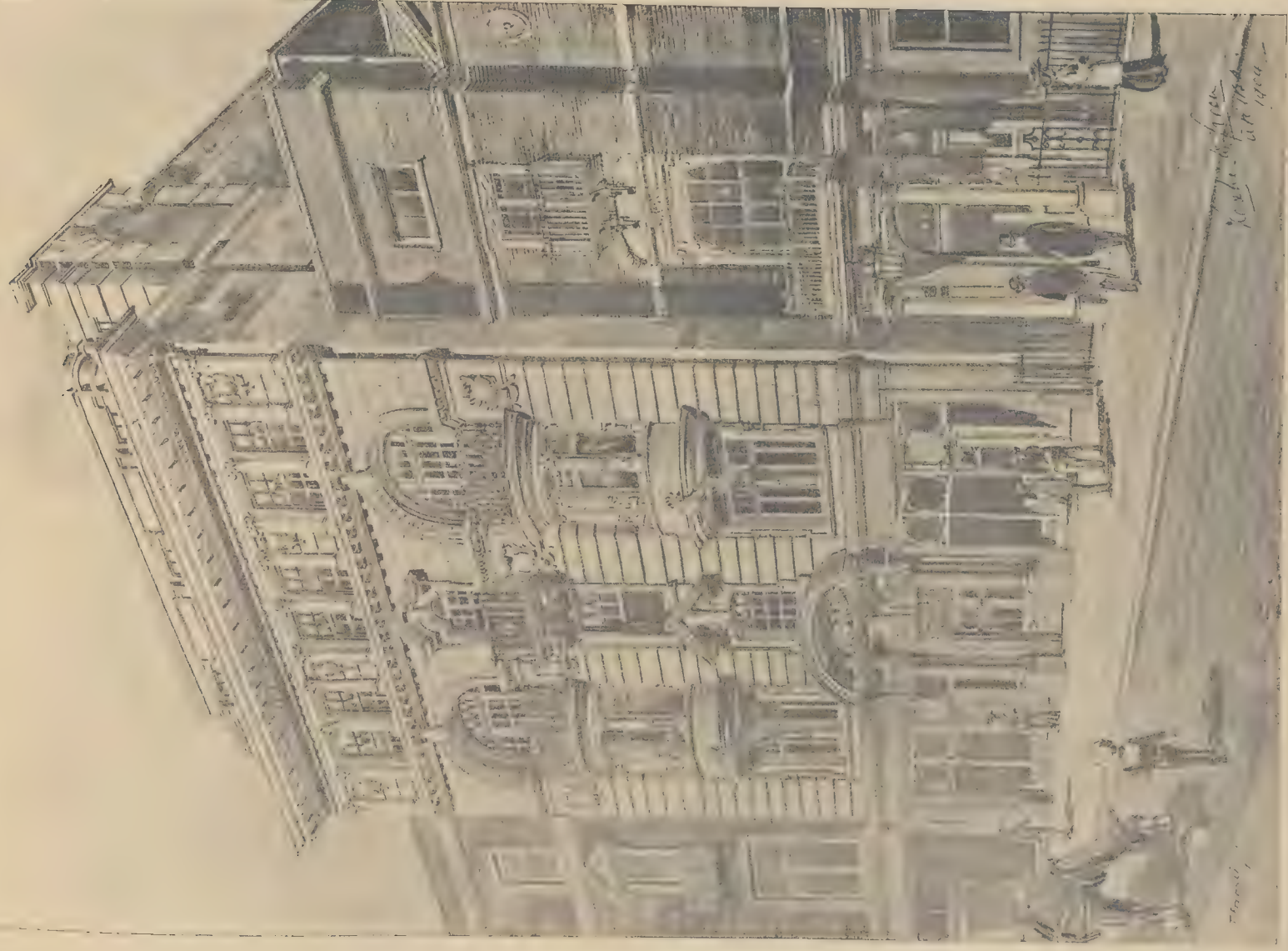


WESLEYAN HALL COMPETITION.—DESIGN BY MR. JAS. A. SWAN.

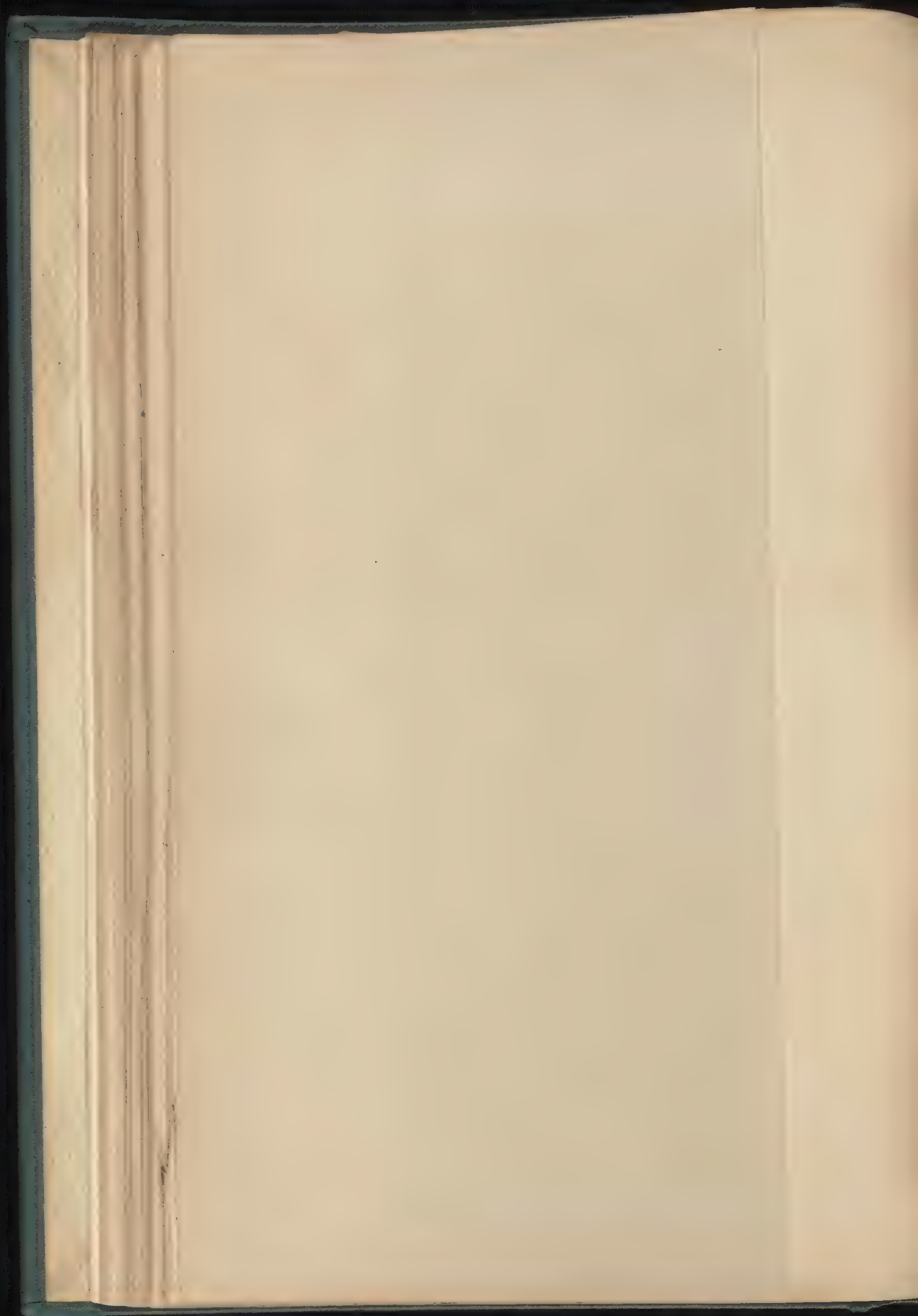




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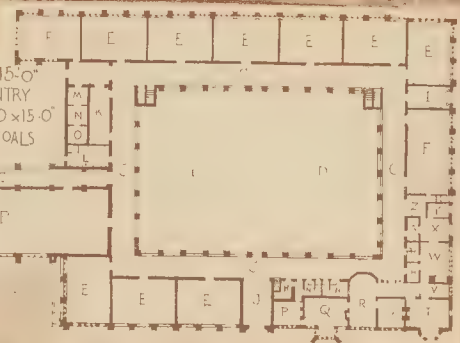




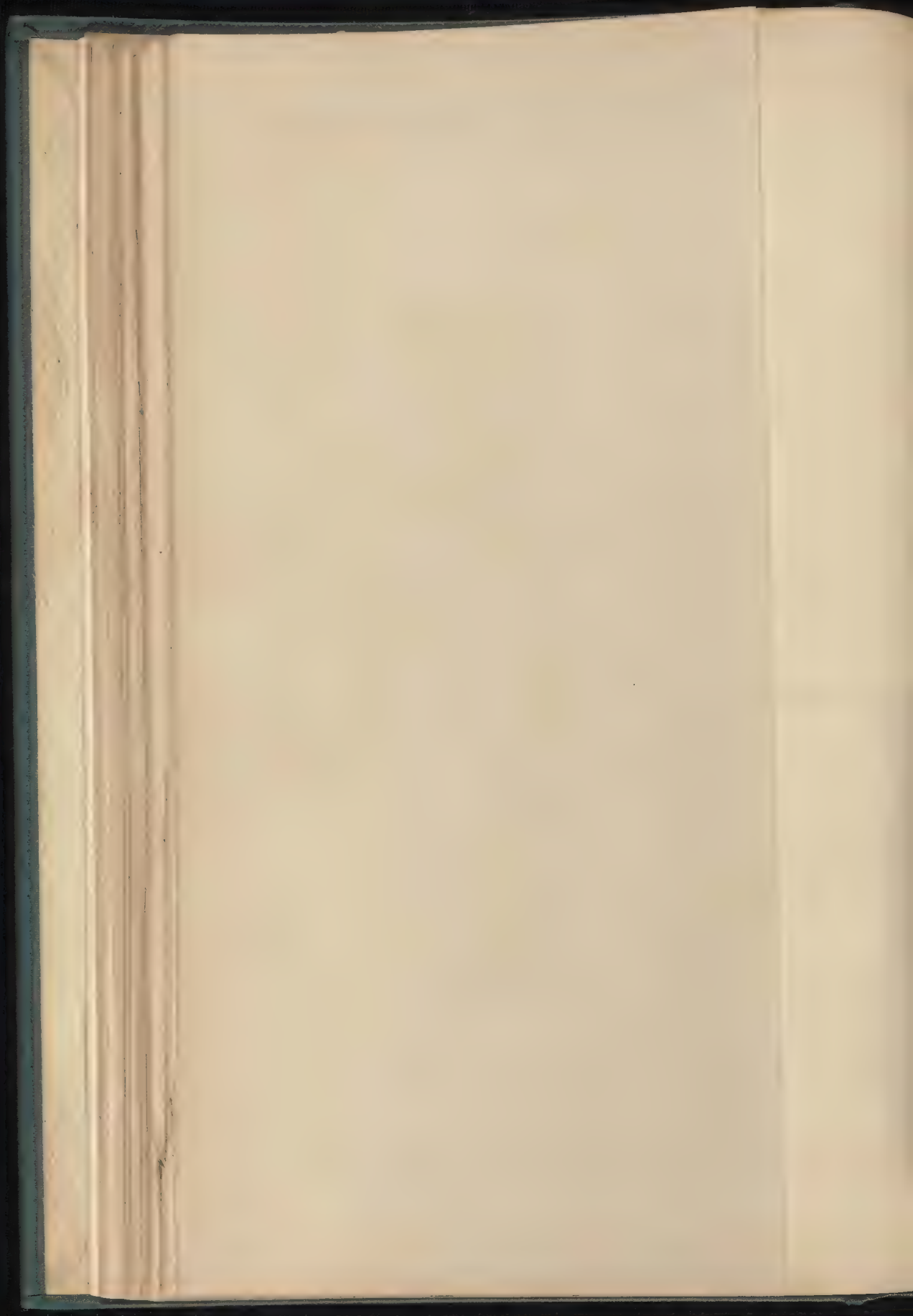
PROPOSED GRAMMAR SCHOOL.  
C. F. A. VOYSEY ARCHT.

REFERENCES TO PLAN

A. ANTEROOM	K. COATS & HATS	32'0" x 10'0"	T. DINING-RM	20' x 15'0"
B. HALL	L. URINALS & W.C.		V. PANTRY	Z. PANTRY
C. CLOISTERS	M. BOOTS	11'6" x 10'0"	W. KITCHEN	18'0" x 15'0"
D. QUAD	N. LAVATORY	10'0" x 10'0"	X. SCULLY	Y. COALS
E. TO CLASS ROOMS	O. DOVGES	10'0" x 9'0"		
F. DINING-HALL	P. MASTERS RM	13'6" x 13'6"		
G. CLASS ROOMS	Q. DRAWING RM	21'0" x 15'0"		
H. LAVATORY	R. HALL & STAIRS	24'0" x 13'0"		
I. MAIN ENTRANCE	S. STUDY	5'0" x 4'0"		









D



E







## ILLUSTRATIONS.

Sculpture: "La Seine et L'Escaut".....	M. Corneille H. Theunissen, Sculptor.
Competition Design for Wesleyan Hall, Westminster.....	By Messrs. Crouch, Butler, & Savidge.
"Britwell," Herts.....	Messrs. Hubbard & Moore, Architects.
House at Haslemere.....	Mr. E. J. May, Architect.

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### Report of the London Traffic Commission.—II.



HAVING in our last issue considered the suggestions of the Report in respect of street traffic, we have now to consider what is said in regard to railway transport, and some special proposals for bridges and other means of getting over crowded points, and also the proposal made for a more general administrative control of the whole traffic problem.

As the Report assumes, in one of its earlier pages, the housing problem is very largely bound up with and influenced by the question of railway communication between the centre of London and the suburbs. The evidence before the Commission (which, of course, we have not yet got) is taken to have established five propositions—(1) That the overcrowding in the metropolitan area is greatest in the central area, and tends to diminish towards the circumference. (2) That the average weekly rents for workmen's dwellings are highest in the central and more crowded districts of London, and tend to diminish towards the suburbs. (3) That the price of land in the central districts of London makes it impossible to re-house the working classes within those districts at rents which they can afford to pay, without a heavy loss to those who undertake the re-housing. Also that the price of land a few miles out

is still sufficiently low to admit of re-housing, without loss, at rents which the tenants can afford to pay. After some statistics of special cases, it is added as a corollary that whenever the London County Council have tried to provide workmen's dwellings in the central district there has been a heavy loss, and that "in effect the rents are largely paid out of the rates." (4) That a large proportion of workers in the over-crowded parts of London do not need to live near their work. (5) That where facilities for locomotion have been afforded, the population does, in fact, take advantage of them to live outside London. This is illustrated by the increase in the population of Edmonton, Walthamstow, and Leyton, since the Great Eastern Company commenced running workmen's trains to those places. The figures of increase are remarkable, but of course are not entirely due to the train service, though there is a marked increase about the time the train service was first started.

All this, it is urged, points to the necessity of securing ample and cheap train service out of London; but the Report admits difficulties in the way. Railway companies cannot be expected to open up new routes under the mere expectation or chance of creating a paying traffic; accordingly, many places suitable for building are not accessible by railway; and if there were facilities for going out of London in all directions, not only would the overcrowding of trains be less, but the demand for housing would be more dispersed and the rents payable

by the working classes would be kept within moderate limits. The result of all this seems to be, that more railways out of London are wanted, but that it is no one's direct interest at present to provide them. The Commission, on the basis of a remark by one of their witnesses, Mr. Perks (late chairman of the Metropolitan District Railway Company), suggest that railway companies might be allowed to purchase land in the vicinity of a new line while making it, in order to participate in its increased value. The Commission did not think it within their reference to pronounce an opinion on this point; they only observe that the provision of transit is a costly business; and that means must be provided for taking the population out of London, not in one or two directions, but in many directions, at rapid speed, short intervals, and cheap rates; and they leave it to be inferred that they are in favour of the above-suggested means of encouraging the enterprise of railway companies, though not called upon to pronounce on it. On page 71, however, we find reference again made to this subject, in a less reserved spirit, in a clause in which it is concluded that power to buy land should under such circumstances (i.e., making a railway into a thinly-populated district) be conferred on railway companies. It is also suggested (page 29) that authority to assist or construct underground railways should be given to the London County Council and to the City Corporation, "so that such power might be used to relieve congested areas, and to move



people out to more thinly populated districts."

That is all the suggestion that is made in regard to promoting the formation of what may be called a centrifugal railway system; and all that can be made, as far as we can see. We then come to the question of the use of railways within London, which has to be considered under two aspects—the routes to be adopted, and the kind of railway which is best. The "Inner Circle" railway, though it has been very useful, was first projected with the object of facilitating connexion with the termini on the north side of London and with the City. The northern stretch of it was first made with this object; it was to bring people into the City, and the southern limb of it was, in the first instance, a rival route, which used to be absurdly advertised on the stations as "daylight route to the City," there being a little more open air cutting than was to be found on the northern route. The combination of the two into a circle railway facilitated working, but it was one of those things done without any system; it carried people where it could, not where they most wanted to go, and left the centre of London unserved, leaving thus an opening for the Central London Railway to fill the gap. But we still have the north and south railway connexion unsupplied. It appears that Mr. Perks, in his evidence, stated that the Metropolitan District Railway were desirous of discontinuing the "Inner Circle" trains, and starting "shuttle services" between Edgware-road and South Kensington, treating the Metropolitan and Metropolitan District Railways as east and west routes only. This would involve changing carriages for the cross-route, but it would be a more reasonable way of making a service from north to south than by a circle train.

We may gather from the Report that at all events there is springing up a conviction that urban railways should be planned and laid out on some definite system to be worked up to and carried out by degrees, each new railway forming a link in a system planned beforehand and laid out as a whole. It is very late in the day to have come to such a conclusion—too late to undo some of the mistakes that have already been made, but a grasp of the whole problem may at any rate prevent further mistakes in the future.

The railway map appended to the Report shows in different colouring the existing and authorised railways, tubular and other, and seems to indicate that when all these are made, the cross or north and south connexion now so deficient will be pretty well provided for—that is to say, for those who like that method of transit. What we do not understand in the map is the dotting on it of a projected tubular railway close to the District Railway from Mansion House to Earl's Court, following all its windings and showing a duplicate line the whole way. Why this route, rather than any other, should be thus doubled, we fail to see.

Whether the tube railway is really the best way of providing for urban railway transport is, however, most decidedly a question to be asked, and it seems

rather inconsistent that, while the Report on one page expresses the opinion that London will be sufficiently served when all the tube railways on their map are carried out, on another page they raise grave questions (just too late, to all appearance) as to the advantage of deep-sunk railways of this kind. In the first place as to cost. Under Section 147 it is stated that the cost of tube railways, including that of the shafts and lifts, approximates to that of shallow railways not on the tube system, at least under the same conditions of location. "The cost of the more modern shallow stations has been due to the necessity of placing stations on private property, in order that they may be open to the air, on account of their being up to this date worked by steam locomotives. In the case of future shallow railways, which of course will be worked by electricity, there can be no objection to the stations being placed under the streets, and a very large reduction in cost both of property and works would result." It is also stated that it has been proved before the Commission that the cost of working the lifts is a very serious addition to the working expenses of each tube line. "It has been calculated, in the case of the Central London Railway, to add 8 per cent., or over 8,000*l.* each half year, to the working expenses." While on this subject, we may usefully quote at length paragraph 2 of Section 147 of the Report:—

"(2) With respect to non-interference with the traffic of the streets the advantages are distinctly on the side of 'tube' railways, though not to the extent which is generally believed. If the comparison were made between the construction of 'tubes,' and the construction of the original Metropolitan Railway by open cutting in Euston-road, the case would be overwhelming against 'shallow' railways; but such is not the present mode of making an underground 'shallow' line in large towns. The 'Inner Circle' completion was constructed through the heart of the City along the most crowded streets, such as Cannon-street, Eastcheap, and the Minories, under temporary wooden platforms, laid down at night, without any stoppage of the traffic, but involving a slight inconvenience, for a few months, from the wooden platform not being so good a carriage-way as a well-paved road. The same mode of construction was adopted through the most crowded streets of Glasgow, and a very large station was constructed without any serious interference with either the ordinary street traffic or a constant service of trams. Many other instances could be given, but another well-known example was the construction of the Bank Station in London, which was carried out without any serious interference with the street traffic of perhaps the busiest place in the world. The Metropolitan Railway in Paris is another instance of the adoption of a similar method of building a 'shallow' railway under public streets, in full use, with but slight public inconvenience."

It is thus evident that although the construction of 'tubes,' owing to their great depth in the clay, scarcely affects the traffic of the streets at all, yet the satisfactory construction of a 'shallow' railway is really only a matter of the adoption of proper precautionary measures."

To this we may add some further considerations which do not seem to have occurred to the Commissioners; which at all events are not referred to. When the London Central Railway was first opened, the clean and bright look of the stations and the rapidity of the transit took by surprise many of those (ourselves included) who had previously regarded the project of journeying in a tube so far below the surface as anything but promising or agreeable. After the first two or three days there was rather a rush for it, and the company could hardly provide for the traffic

offered them. The enthusiasm has somewhat subsided now (though the trains are still very crowded at some parts of the day); and the first surprise at finding it so much less objectionable than was expected leaves room for some reconsideration. People who have no interest involved in the success of this form of railway must, we think, come to a conclusion that, for a permanent system, it has very serious drawbacks both in regard to health and safety. In regard to the former, it is true that no thorough and scientific system of ventilation has yet been applied to the tube railways. It is all nonsense to urge, as some engineers do, that the very movement of the train through a tunnel not much larger in section than the carriages necessarily produces ventilation. It produces a draught, and a very strong one, which is something of a relief; but it is only the same air which is moved; no fresh air is systematically introduced, and any method of doing this efficiently would be a further addition to the working cost. As it is, we know that some people of rather susceptible organisation cannot stand the "tube" at all; it makes them ill at once. These are probably a minority; but even those less susceptible people who use the tube railway pretty often as a convenience probably find that in taking the whole route, from the Bank to Shepherd's Bush, they have about enough of it, and are not sorry to get out to the air again. And if this is felt even in occasional use, how will it be with those who have to use a tube railway twice every day to get from their homes to the City and back? In our opinion, very few people can do that without injuring their health and shortening their lives. And it must be added that while a tube railway is one of the safest of railways as long as everything goes right, it has dangers peculiar to itself in case anything goes wrong. However unlikely it may be, the possibility is always there of a breakdown in the middle of one of the tunnels, either from a mechanical accident or from a failure of current; in which case the passengers may be imprisoned for an indefinite time, without ventilation and with no possibility, as there would be in an ordinary railway, of walking out of the tunnel. Admit that such an incident is exceedingly improbable, it is not maintained that it is impossible; and the more the tube railway system is extended, the more the field of such possibilities is extended. In spite of the terrible catastrophe a year or two ago on the Paris Metropolitan Railway (which was due to mismanagement and recklessness rather than to construction), that railway, with its wide tunnels and roadway, and its easy access by stairs from the street, is a far more safe and satisfactory one than the London tube railways; and it is much to be regretted that these considerations were not taken into account before so many concessions for tube railways in London were made. The conclusions of the Commission as to the superior advantages of shallow railways, like almost everything else in connexion with the subject of London transport, come apparently too late to be of much practical use.



In Section 81 of the Report some special recommendations of the Advisory Engineers are referred to, which are intended to get over the difficulties of congestion at certain points. We cannot say that we are very much impressed with the practical character of these suggestions, or of two of them at all events. The first is, to commence a viaduct at the centre arch of Blackfriars Bridge and carry it north to the centre of New Bridge-street and Farringdon-street to terminate in Farringdon-street. This would involve the widening of Blackfriars Bridge and of Farringdon-street, and would be a very costly proceeding, attended, as it appears to us, with practical inconveniences in any case. Perhaps when we get the Advisory Engineers' Report we may find with it drawings showing how such a scheme is proposed to be carried out. For the present, we find it difficult to understand how such a viaduct, commencing in the centre of Blackfriars Bridge, is to get a sufficient headway over the junction of the Embankment-road and Queen Victoria-street, except by the employment of an inconveniently steep gradient. The second and somewhat analogous scheme is the construction of a viaduct from the north end of Waterloo Bridge to the hill of Wellington-street, across the Strand. Here also there appears to be very short space for getting a viaduct from the end of the bridge to give a sufficient headway across the Strand; and such a scheme would absolutely necessitate the widening of Waterloo Bridge, which we should prefer to leave untouched. Without widening it, however, too great a traffic would be discharged on to it; and we have no doubt the occasion would be seized on as an excuse for destroying and rebuilding Waterloo Bridge, thus robbing London of one of its grandest and most famous structures for a mere question of street way. That is obviously not included at present in the proposed scheme, as the cost of it is estimated at only 325,000*l.*; but that, we fear, would be the upshot of it. And, in a general way, all such schemes for a rising viaduct in the middle of a street must involve awkwardness and inconvenience at one point or another. However the headway may be arranged where the main traffic at right angles is crossed, there must always be a considerable portion of the rising viaduct which is too high to cross and too low to go under, so that for that portion of it one side of the street in which it rises is cut off from direct communication with the other side, which is a serious inconvenience. Schemes of this kind look much better on paper, as a rule, than they would work out in practice. The third suggestion is a sunken road from Berkeley-street under Piccadilly, to relieve the constant congestion in Piccadilly at the top of St. James's-street. Without seeing a plan and section of the proposed street it would be impossible to express any opinion upon a scheme so vaguely described. The Report merely says that it would involve the purchase of valuable private property, though no estimate of the cost is given. There is no doubt, however, that the block of traffic there is the most serious one in the western

portion of London, and, in the afternoon at all events, much more serious than that in the Strand at Wellington-street; and that some decisive even if costly effort is called for to mitigate it, as the evil is likely to increase rather than diminish.

In regard to the general question of subways and subway railways two remarks are made in the Report, which are certainly borne out by our observation. One is, that subterranean railways, in spite of the large numbers of people who, at some parts of the day, travel by them, do not seem to have reduced the numbers of vehicles and foot-passengers to any appreciable extent. Certainly the omnibus traffic seems little if at all reduced since the underground and tube railways were made; the receipts of the omnibus companies may possibly tell a different tale, but the result is not apparent to the casual observer. The fact we take to be this—that the more means of transit are multiplied, the more people move about. Statistics have shown this to be the case in New York, and we expect that statistics would show the same in London. There is a constant tendency in these days to increased locomotion, and the increase seems to have a tendency to keep ahead of the means of transport. In regard to the provision of subways for foot-passengers, the Report remarks that however theoretically a convenience, they do not in fact seem to be much used when provided; and they instance the case of the system of subterranean footways under the crowded space opposite the Mansion House. Our own observation confirms this. There is always a crowd on the street footways at this point, and a crowd of persons endeavouring to cross the street in the midst of the vehicles; but we have never found any crowd in the subways, well arranged and convenient as they are. Apparently, when it is only a question of walking, the mere fact of having to go down a stair keeps nineteen people out of twenty on the surface. To walk straight on seems a more obvious thing to do than to go down a flight of steps.

We come lastly to the subject of administration. It is noted in Section 152 of the Report that the Select Committee of the House of Lords appointed in 1863, to consider the question of "Metropolitan Railway Communication," recommended that every system of internal railway communication for the metropolis should be under one management for working purposes—a recommendation out of which nothing came. But the present Commission express the conviction that "this opinion carries not less force in the present day than it did at the time it was made." We should say it carried even more force at the present day, when we are threatened with a network of lines each under its own independent management. The Report adds, in the same Section, "all large systems of mechanical traction can be worked most economically, and with the greatest advantage to the public, when they are under one and the same management."

It is evidently on the basis of this suggestion that the Commission have drawn up, as part of their Report, the

recommendation of the creation of a "Traffic Board." We may quote the following statement of their argument, from Section 200 of the Report:—

"It would have been possible, at any particular date, to draw up a general scheme for street improvements, and the provision of facilities for locomotion and transport, and the financial difficulties in the way of carrying it out could have been overcome by legislation providing for assistance from municipal funds; but, even if any such general scheme had been devised, it would probably have been out of date before it was completed, and no permanent body existed which could modify it from time to time, in accordance with the ever-changing conditions of the problem. If such a scheme had been prepared in 1846, the provision for future urban and suburban traffic must, with the information then available, have proved insufficient. A scheme prepared at a later date would have become obsolete as soon as surface tramways and "tube" railways, worked by electricity, became practicable. There is no guarantee that a scheme prepared in the present day would be final; it is practically certain that it would require modification in a very few years. While, therefore, it is necessary that the provision of means of locomotion and transport should be carried out in accordance with a comprehensive plan, it is equally necessary that that plan should be modified from time to time to meet the changing requirements of the population, and make use of the latest scientific inventions. Under these circumstances, the only effective remedy appears to us to be the creation of a permanent authority, possessed of special knowledge and experience, and giving continuous attention to all questions affecting locomotion and transport in London. The present system under which an ineffective control is attempted to be exercised by opposing particular private Bills in Parliament, and, under which temporary Royal Commissions or Select Committees of Parliament are appointed, from time to time, to deal with special questions of an urgent nature, has failed."

It is proposed that this Board should draw up a yearly Report to Parliament on locomotion, transport, and traffic in "greater London," dealing with the whole subject of the control of traffic; the breaking up of streets; the removal of special obstructions to traffic, the provision of new lines of railway or tramway, etc. It is also proposed that it should deal with questions of street widening and the construction of new streets; but there would be a difficulty in this, as it would be trenching on the special province of the London County Council.

The Board would, further, be required to examine and report upon all Bills proposed to be presented to Parliament for schemes connected with locomotion. If required to do so by the Government, the Board might also prepare schemes for or in connexion with the provision of means of locomotion or transport, as well as report specially on any question affecting London traffic which might be referred to it by the Government. The idea of the amalgamation of London railway systems and tramway systems each under one management, already referred to, it would be one object of the Traffic Board to bring into actual practice, or to do all it could to facilitate that end.

As to the constitution of the Board, it is suggested that it should consist of a Chairman and not more than four or less than two other members, appointed by Government, and paid such salaries as would be sufficient to secure thoroughly competent men. It is not suggested that they should be experts in engineering or any other special profession, as the Board could consult specialists when necessary. All the other recommendations—as, that a member of the Board should not be a member of any local authority in London or have any



occupation which would limit the time he could devote to the work of the Board—are in favour of securing efficiency; but we do not agree with the Commission when they recommend the minimum of three members rather than the maximum of five. Three heads are hardly enough to manage such an immense aggregation of operations, affecting so many interests.

As we have seen, many of the recommendations of the Report are, for practical purposes, made too late; but it contains valuable hints for the future, and the formation of the Traffic Board, if carried out, would be a great and important step towards bringing order out of the present chaos of London traffic.

## NOTES.

**The Enrolment of Architects.** **THE Journal of the Institute of Architects** contains the draft of a Bill for promoting what is now called "The Enrolment of Architects" (we presume the word "Registration" has acquired rather undesirable associations), of which the first object is stated to be

"(a) To enable persons requiring professional aid in the design and construction of buildings to distinguish qualified from unqualified practitioners, and to prevent untrained and incompetent persons, styling themselves architects, from imposing on the community to its material loss, danger, and detriment."

We have not space and do not think it worth while (at present at all events) to consider the proposed measure in detail. It is to our minds little less than a catastrophe for the Institute of Architects to have been dragged into this at the bidding of the rank and file of the profession. As to the statement of "objects" which we have quoted, it would certainly be an appropriate question to ask why it is that the engineers, who are concerned exclusively with practical works of much greater scale and importance than usually fall to the lot of architects, do not find it necessary to have an Act of Parliament for preventing the selection of unqualified persons to act as engineers "to the material loss, danger, and detriment of the community"? If the sincere truth were told by many of those who support this Bill, we think it would read "to the material loss and detriment of our pockets"; to elude which they are ready to drag down a great art into a trade. However, the Bill is not carried yet, and we hope there will be a strenuous opposition to it.

**Rural Water Supplies.**

**IN** the paper read before the meeting of the Royal Sanitary Institute at Cambridge, Professor Sims Woodhead naturally devoted himself a good deal to the needs of the Cambridgeshire rural districts. His remarks are, however, generally applicable to most other counties. We quite agree that the problem of water supply in rural districts is even more pressing than that of the supply to large manufacturing towns. One very important consideration is that agricultural districts with contaminated water supplies may very easily become centres of infection to cities and towns receiving milk from such areas. That this is no idle fear is proved by the fact that many rural water supplies contain

quite as large a proportion of micro-organisms as dilute sewage. Apart from the question of cost, the difficulties encountered by rural authorities in obtaining pure water supplies are very great, and there is much to be said in favour of a national water board with county committees, as suggested by Professor Sims Woodhead. This, of course, is no new idea, and it deserves support for various reasons, in addition to those mentioned by the author of the paper.

**The Embankment Tramway.**

**IN** rejecting the Tramways Bill of the London County Council the majority of the House of Lords appear to have been actuated by some mistaken notion as to the value of establishing connexion between Westminster and Blackfriars bridges. The immediate object of the over-bridge lines is not to enable people to ride along the Embankment, but to do away with the intolerable crowding which takes place at the tramway termini, and to diminish the serious interference with ordinary traffic at those points. At the same time, it is the fact that large numbers of people do want to travel between Blackfriars, Charing Cross, and Westminster every day. For these the tramway would be far more pleasant than the District railway and more expeditious than the omnibus. By utilising a by no means crowded thoroughfare, the congestion of traffic in Fleet-street and the Strand would be much reduced. The ultimate effect of the over-bridge lines would be to provide a link, *via* Kingsway, connecting the northern and southern tramway systems. The great difficulty in extending the tramway system in London is (as pointed out in our leading article last week) that so many of our streets are too narrow for it. The Embankment road is one of the widest, and therefore one of those to which this difficulty least applies.

**Motorists and the Public.**

**THE** Motor Union of Great Britain and Ireland and the Highways Protection League both held meetings last week. It is somewhat instructive to notice that whilst at the meeting of the latter society evidence was given by influential persons of the wild and reckless driving of motorists all over the country, at the meeting of the former society the only matters debated according to the report available were matters connected with the sport the Union favours; that is to say, opposition to adverse legislation, and the better and more economic defence of those members charged with offences, and the dust problem. This meeting was presided over by Mr. A. Stanley, M.P., and having regard to the zealous expressions made in Parliament by the motor representatives to protect the public from the reckless motorists' excesses, it is somewhat surprising that this subject was not referred to at the meeting except in reference to public prejudice. We can only trust that the report in the daily press was not a full account of the proceedings. To anyone who studies the police reports it is idle to speak of the exaggeration of prejudice; the public can hardly have dust of that description cast in its eyes as well as the natural article raised by the cars.

**The Ventilation of Schools.**

**AT** a meeting of the Institute of Public Health last week a useful paper was read by Mr. J. H. Blizard, which should be noted, on the ventilation of schools and public buildings. The importance of good ventilation for buildings in which children live or work cannot be overrated. The adult is stronger and can recover from the effect of bad ventilation more quickly than the child. Good ventilation in youth, though large numbers of the public do not know it, is of as much importance as good food. Free breakfasts for school children are advocated by people who would keep them enclosed in close buildings for hours. A point of some interest in the paper referred to was the suggestion that classes in schools should in fine weather be held in the open air. This is certainly a matter which might well engage the attention of the Board of Education. It is also desirable that the subject of the paper should be well considered by those who are responsible for the building of our secondary schools.

**Public Conveniences.**

**THE** case of the London and North-Western Railway Company v. the Mayor, etc., of the City of Westminster, commented upon by us in our issue of March 19, 1904, has been carried to the House of Lords, and the decision of the Court of Appeal has been reversed, Lord James of Hereford alone dissenting. The facts of the case are simple. The Corporation of Westminster, acting as the sanitary authority and under the powers conferred upon them by Section 44 of the Public Health (London) Act, 1891, constructed certain lavatories in the middle of the roadway in the newly-widened thoroughfare at the lower end of Parliament-street. The mode of egress and ingress to these lavatories was by an entrance at each side of the roadway and a flight of stairs leading to a subway which goes through the lavatories. In the first instance these entrances encroached upon the footway, and since the footway is expressly excepted by Sub-section (2) of the above section, Mr. Justice Joyce ordered this part of the works to be removed. The railway company owns certain buildings fronting on Parliament-street, with vaults under the pavement, and they complained that the Corporation, under the Act, had no power to make a subway, and that they had committed a trespass and also obstructed the roadway. The Court of Appeal came to the conclusion that the object of the Corporation had been to construct a subway to facilitate the traffic, and held that this was outside the powers conferred upon them by the statute. The majority in the House of Lords have reversed this finding, holding that this form of access to the lavatory was reasonable and within the discretion of the Corporation to provide, and that it was erected not with the intention of providing a subway for traffic, but simply as a suitable means of access to the lavatories. This decision of the House of Lords is of considerable importance to owners of house property in London; it cannot be questioned, and has to be accepted, but it is obvious that it makes a very considerable



difference to owners having houses fronting the street whether access is made to lavatories in the centre of the road by one shaft above them in the roadway, or by entrances to subways close to the footway opposite their premises.

The Testing of Electric Lighting Mains. The decision of the Court of Appeal in dismissing with costs the appeal of the Manchester Corporation in the case of *A. H. Midwood & Co. v. Manchester Corporation* is thoroughly satisfactory. The plaintiffs had sustained damage by an explosion due primarily to a leakage of electricity from the electric mains, and a jury had found that the Corporation were liable for the damage done. The appeal from this decision was made on the ground that the electric lighting supply was being provided under stringent statutory obligations in the best possible manner, and that, as no negligence was proved, the Corporation was not liable. It seems that a leak had sprung between two neighbouring mains embedded in bitumen. Now bitumen, when heated, gives off a gas, and it was doubtless this gas that caused the explosion which damaged the plaintiffs' premises. In order to generate sufficient gas a large leak must have existed for some hours, and the evidence showed that the engineers knew that a leak existed somewhere. If a system had been adopted which enabled it to be localised rapidly the chances of an explosion would have been very remote. A paper read a few years ago by Mr. Wordingham gave the impression that the testing for faults practised by station engineers was of the most rough and ready description. "The best testing apparatus is 3,000 or 4,000 h.p., the best indicator a column of smoke, and the most useful instruments a pick and a shovel." This statement is not meant to be taken literally, but it roughly describes the practice of some supply stations. Great stress was laid by counsel on the difficulty of locating faults in a network of cables, and an attempt was made to prove that the complication of the system was due to the stringent rules of the Board of Trade. These rules insist that the pressure must not vary by more than 2 per cent. from the declared pressure. In other words, a total variation of the light given out by ordinary glow lamps of about 20 per cent. is permissible. It will be seen, therefore, that the rules are far from being stringent. Electric supply companies must arrange their networks so that faults can be detected at once. They must also, as some of them do, maintain a staff who are competent to make the requisite modifications, of the standard methods of locating faults, necessary in special cases.

Dimed Burial Grounds. LAST week some interesting evidence was given in the Consistory Court of London in connexion with the Church of St. Edmund the King and Martyr, in the City of London. A faculty was being applied for to enable the Commercial Bank of Sydney to extend their premises by throwing out a bay window, supported on steel girders, which would cover a space of about 20 ft. of the churchyard at a height of 18 in. from the ground. The

County Council opposed the application on the ground that this was a disused burial ground, closed by Order in Council, upon which the erection of any building was prohibited by the Disused Burial Grounds Act, 1884. It appeared that the original church was burnt down in the Fire of London and was rebuilt in 1689, but rebuilt in the nearly unique position facing north and south. Therefore the west end of the old church must have occupied the site which it was now proposed to cover with this projection. The Court, on the question of fact, came to the conclusion that this piece of ground had never been set apart for the purpose of interment, and held that the fact that it formed the site of an old church in which interments had taken place did not render it a disused burial ground within section 3 of the Act, following in this latter finding a decision of the Chancery Division given in 1895 in the case of *Ecclesiastical Commissioners and the New City of London Brewery Company*.

Barrington Court, Somerset.

THE National Trust are appealing for funds to purchase and preserve an exceptionally fine and interesting Elizabethan house, Barrington Court, in Somersetshire, dating it is supposed from about 1540. This is one of the IT-plan houses, and externally a very complete and beautiful example. Unhappily, the interior is not in the same state of preservation, one half of it only being now habitable, and much woodwork having been removed. But there is remaining the complete exterior of a typical Elizabethan house, which is now about to pass into the hands of an owner who is willing to sell it, with 220 acres of land, to the National Trust for 10,500*l.*, and about 1,000*l.* more would be required to put it into good repair and ensure its structural stability. Ten thousand pounds has been offered by one person, on terms which the Trust has agreed to comply with, and the general public are therefore only asked to subscribe the balance, 1,500*l.* We hope this will be forthcoming; but it would have been better, and more likely to gain subscriptions, if the Trust had stated what use they intended to put the house to when bought and repaired. Some persons, we think, will be likely to ask that question before subscribing, and it would have been well to give the information in advance.

The Late M. Henner.

By the death of M. Henner we have lost a very remarkable figure in the world of art. It is true that of late years he had become rather a mannerist, and that the exaggeration of some of the characteristics which had at first charmed his admirers had been carried so far as to considerably lessen the value of his works. The habit of losing or evading outline in his figures, which originally gave them such a poetic detachment from realism, had been carried so far in his later works that his figures gave one the idea of having been treated by some solvent acid which was dissolving them away. But in his earlier pictures, in which nude figures were combined with an ideal landscape setting, he may be said to have been one of the modern

painters who had best achieved the aim of treating the figure as an expressive poem, and not as a mere nude study; his pictures of this class, though they have been imitated since, stood at first rather alone in their peculiar idyllic conception; and these earlier works will, we think, always retain their value as examples of poetic expression in painting. A few facts as to his life and works will be found in our Obituary column.

#### CONGRESS OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT READING.

FAVoured with beautiful weather, which continued throughout the week, the sixty-second annual Congress of the Association was opened at Reading on Monday, July 17. At 2.30 p.m. a large party of members and visitors assembled at the Town Hall, where they were received by the Mayor, Mr. Martin John Sutton, J.P., wearing his gold chain and robes of office, attended by the town clerk and mace-bearer in full regalia. The opening proceedings were very brief, the address being deferred until the evening. The Mayor, having welcomed the Association to Reading in the name of the town with much cordiality, invited the members attending the Congress to a conversation to be given in their honour in the evening. Mr. R. E. Leader, B.A., in a few appropriate words, thanked the Mayor on behalf of the members of the Association for the kind and hearty manner in which he had received them, and the formal opening proceedings then terminated. Leaving the Town Hall, the party wended their way to the Public Museum, closely adjacent, where they were received by Mr. Alderman Blandy, the Chairman of the Museum and Library Committee of the Corporation, and the curators of the various departments. The museum at Reading is, as Mr. Blandy remarked, in its contents miscellaneous in character, and, like all local museums, necessarily so. The various collections, however, are all rich in valuable specimens, and well displayed and described. The feature of the museum which most appealed to the Congress was, of course, the wonderful collection of objects found during the excavations at Silchester, and known, far and wide now, as "The Silchester Collection." This, said Mr. Blandy, "was not at all miscellaneous, but was, indeed, a very perfect collection of the many objects of interest found at that Roman town."

Mr. Mill Stephenson then very graphically described the work of excavation which was being carried on year after year at Silchester, and indicated the various sites of buildings discovered upon the large scale ordnance map of the town suspended on the walls of the museum, preparatory to the visit of the Congress to Silchester on the following day. He then led the party through several galleries devoted to the housing of the collection, and gave an interesting account of their contents. The collection is one of exceptional interest, he said, inasmuch as they had a great mass of objects all gathered from one site, and of all sorts, though principally of a domestic character.

In the prehistoric department of the museum Mr. Shrubsole, the curator, pointed out some of the principal features of the Paleolithic and Neolithic ages preserved in the numerous cases, which had been found in caves in various parts of the country, and in Belgium, and the South of France. There are no natural caves in the Reading district, but the general type of the relics found is the same for all countries. The Rev. Alan Charles, the curator of the historical section, also gave interesting information upon the exhibits in his department. Leaving the museum, the party followed the Rev. P. H. Ditchfield, the local honorary secretary of the Congress, and hon. sec. of the Berkshire Archaeological Society, to the ruins of the once famous Abbey of Reading, where Dr. Jameson B. Hurry met them, and conducted them round the remains of the buildings. In the south transept of the abbey church Dr. Hurry gave a very lucid, but necessarily brief, history of the abbey, from its foundation



in 1121 by King Henry I. to its dissolution in 1539 by King Henry VIII., and its subsequent spoliation and destruction. To relate the history of Reading Abbey is to relate a large part of the history of England, for numerous Parliaments have assembled here, kings and princes have resided within its walls, and acts and treaties have been dated from and signed at Reading Abbey. Stately have been the pageants which have been witnessed here—John of Gaunt was married here in 1359 to Blanche, of Lancaster, and upon many occasions have the great Barons of England assembled to meet their sovereign within the precincts of Reading Abbey. This great Benedictine Abbey of Reading was founded by King Henry I. in 1121, and received from the king its first charter in 1125. This foundation charter, according to the Rev. P. H. Ditchfield, is unique, as the king had resolved that the building should be carried out on a scale hitherto unprecedented, and it is "the first religious house established on so broad and liberal a basis, and is the forerunner of the extended power given to other monasteries." The abbey was founded for 200 monks, although, probably, so many were never at one time in residence, and the abbey church was only some 50 ft. less in length than St. Paul's Cathedral in London. Its Abbot was mitred, and was third in precedence after Glaston and St. Albans.

There was a great religious revival movement in the time of Henry I., and it is thought that the king was influenced to a considerable extent in the foundation of the abbey, by his remembrance of Bishop Anselm, whom he respected as a scholar and a saint, as also by the loss of his only son, Prince William, in 1120. He, with the great officers of state, attended the consecration of the abbey, which was solemnised by Thomas à Becket. The charter granted to the abbey conferred very great powers upon the Abbot. He was allowed the privilege of minting money, and was granted the power of elevating to the Order of Knighthood, and he exercised great power over the townfolk, sometimes not over-wisely, as is evidenced by the serious quarrels which from time to time broke out between them. Even the right of electing the mayor and burgesses of the town rested with the Abbot, and it was not until the reign of Henry VII., according to Mr. Ditchfield, that the latter were allowed to elect three persons, one of whom the Abbot appointed to the office of mayor. The monastery was dissolved by attainder in 1539, and its last Abbot with two of his monks suffered death by being hanged outside the abbey gate.

Vast piles of flint rubble walling alone remain to testify to the existence of this once magnificent abbey. The ruins have been stripped in past years of almost every portion of facing stone, but now they are carefully protected by the Corporation, and the remains of the various buildings are indicated by labels attached to the walls, so that by their aid, and a study of the carefully-prepared plan of the complete buildings, together with the chart and lists of the Abbots, which have been framed and glazed and placed within the ruins by the generosity of Dr. Hurry, the visitor may reconstruct, in imagination, for himself the appearance presented by this glorious abbey in the days of its splendour. The revenues of the abbey at the dissolution were assessed at the large amount of 1,938*l.* 13*s.* 3*d.* The monastery occupied an area of about 30 acres, enclosed on all sides but the south by a high wall, on the south the streams the Kennet and the Holy Brook formed the boundary.

After a hearty vote of thanks to Dr. Hurry for his most interesting description, the party proceeded to the abbey gateway, the principal entrance to the abbey in olden times, now the headquarters of the Berks Archaeological Society, where Mr. Ditchfield, Dr. Hurry, and Mr. Keyser explained many interesting features and objects preserved there. In the vicar's garden adjacent to the gateway the visitors were shown several architectural fragments from the ruins of the abbey. The church of St. Lawrence was next visited, and was described by Mr. C. E. Keyser, the President of the Berkshire Society. This is the municipal church, and stands partly within and partly without the abbey

precincts. It is a Perpendicular church, dating from 1434, the arcade between the nave and aisle having elaborate canopied niches between the arches. There are some monuments and some good benches in the chancel, and several brasses, one of which, to John Andrews, a priest, is dated 1428. In a framed hinged case on the north-west wall of the chancel arch is preserved the well-known palimpsest brass of Sir John Popham, 1465. Attention was directed to the curious incised mark upon the stone of the interior of the tower, resembling the ragged staff of the Warwick arms, and this marking is repeated seven times in the height of the tower. It had been thought by some to be a mason's mark, but Mr. C. Lynam here pointed out that mason's marks were always geometrical. A brief visit to the church of the Grey Friars brought the work of the afternoon to an end. The mendicant Grey Friars, to which order this church belonged, appear to have been established in Reading about 1233, and some years later they erected about 1233, and some years later they erected the Friary buildings upon this site, which had been granted to them by Henry VIII. After the confiscation by Henry VIII. the church was granted to the Corporation for use as a Guildhall in 1543, and in 1613 it was transformed into a Bride Hall, and as such continued to be used down to 1860, when the Archdeacon Phelps was mainly instrumental in rescuing it from further desecration, and restoring it to sacred use. The older part of the church is but a fragment of the ancient edifice, but is a very fine example of early decorated work.

At 8.30 p.m. the members and visitors were received by the Mayor and Mayoress at a conversation in the large town hall, where a large number of guests were gathered to meet them, over 1,000 invitations having been issued. In the course of the evening Mr. C. E. Keyser, Chairman of the local committee of the Congress, delivered the inaugural address, which dealt in a very full and very scholarly manner with the history of the town and the various places to be visited by the Congress during the week, and it was much appreciated by the large audience from the admirable way in which it was delivered. A very hearty vote of thanks was unanimously accorded to Mr. Keyser upon the motion of the Mayor.

#### TUESDAY, JULY 18.

Leaving the Great Western station this morning a few minutes before nine o'clock, the members of the Congress reached Mortimer station a little later, and took carriages for the drive to the old Roman city of Calleva Atrebatum, the modern Silchester. Here they were met by Mr. Mill Stephenson, who supplemented his remarks at the museum on the previous day by a very clear and full description of the ancient city as it must have been in the days of its prosperity. From the revelations disclosed by the pick and spade. A large number of plans and drawings illustrated his address, and pleasure by the assembled company. The amphitheatre was first visited, now simply a grass-grown mound of earth, but having its outlines still traceable. Some portions of the city walls were inspected, but, owing to the standing crops of oats and barley, it was impossible to traverse the entire area of the city, which occupied more than 100 acres within the walls. The walls in places were 9 ft. in thickness, and the highest part remaining was about 16 ft., but the total height would probably never be ascertained. The circuit of the wall was about one and three-quarter miles. The remains of the Forum, the shops, ambulatores, and Basilica were fully explained, together with the position of the Christian church at the south-east angle, and following Mr. Stephenson, the party was then conducted to that portion of the site where the excavations are at present in progress. These consist of the walls of a house of the corridor type, with the usual square, or oblong, apartments, and a tessellated pavement, but of an unimportant character, having been composed of inferior material, so that much of the tessera had become decomposed. In the middle of one of the square chambers a large oak tree is in full vigour. From the mounds of earth thrown out of the excavations the visitors had a capital view, and were well able to follow Mr. Stephenson's description of

the system pursued in carrying out the excavations. Some other portions of the wall just discovered in a ditch by the side of the approach road were noticed, but it was impossible to give, at present, any explanation about them. Speaking of the destruction of the city, he said there was a legend that Calleva was destroyed by fire, but there was not the slightest evidence of there having been a general conflagration. No human remains had been found. In the houses and very rarely discovered anything at all, and everything pointed to a gradual abandonment of the city. This was emphasised by the blocking of the gates. One gate was blocked up with material taken from the Basilica, which showed that the Basilica must have been in ruins at the time the gate was blocked. Speaking of the Basilica, Mr. Stephenson spoke strongly of the condition into which the ruins had been allowed to get, which, he declared, was a disgrace to the nation, and the meeting indorsed his remarks. A vote of thanks to Mr. Stephenson for his courtesy and of appreciation of the able manner in which he was conducting a national work in the scientific exploration of this most important and interesting memorial of the Roman occupation of Britain was passed by acclamation. The party then resumed their carriages and departed for Pamber Church, which was described by Mr. Keyser. This church was originally a Priory Church of Sherborne, an alien priory and the parts now remaining are the tower and eastern arm of what was a cruciform building of the XIIth and XIIIth century dates. Some portions of the walls of the nave remain, but the western arch of the tower has been filled up, and now forms the western end of the church, with a doorway in the middle. There are some interesting monuments, especially an effigy, in wood, of the son of the founder, Sir H. de Porte, at the end of the XIIIth or beginning of the XIVth centuries. There are also four coffins slabs within the sanctuary rails, two on either side of the altar, on one of which is an inscription, "What we are, this man was, and what he is, we shall be." A curious wooden almsbox, of large size, massive, and of early date, is attached to one of the beam ends on the south side. The drive was resumed to Aldermaston, where, at Aldermaston Court, the charming residence of Mr. Keyser the members and visitors were hospitably entertained at luncheon in a large manor house erected on the lawn. After luncheon had been done justice to, and the kind hospitality of Mr. and Mrs. Keyser acknowledged by a hearty vote of thanks, Mr. Keyser gave a fascinating and descriptive history of Aldermaston and the estate. Great historical interest attaches to the estate, which was a manor of considerable importance at the time of the Norman Conquest, as is shown by the Domesday Book. The name of the officer who was equivalent to the Lord-Lieutenant of the county at this day. It was one of the possessions of Earl Harold, and after his death at Hastings it was annexed by William the Conqueror. It is said that the unincorporated portion of the estate formed a portion of Windsor Forest, and there still exist some magnificent oak and other trees of great age and enormous girth, some of the oaks especially being 800 to 1000 years old. In a very interesting manner, Mr. Keyser related the descent of the estate from the time of Henry I., who granted the manor to one of his knights, Sir Robert Achard, with whose descendants it remained until about 1538, when it passed to the family of De la Mare by marriage of the daughter and heiress of the last of the Achards to Sir Thomas de la Mare. From this family the manor passed, again by marriage, to the Forsters, Sir George Forster being Sheriff of Berkshire and Oxfordshire in 1516. In 1711 this family became extinct, and the estate passed to the Coggeswells, and from them, in 1846, by sale to Mr. Higford Burr, the predecessor of Mr. Keyser. The present mansion is of modern date in the Elizabethan style, but preserves within it the grand and elaborately carved staircase saved from the old house, which was almost entirely destroyed by fire in 1843. After viewing the house and some of the artistic treasures preserved within it, and the lovely gardens and grounds, the party strolled over to the church, which is situated in the park, not far from the house. An unusual



feature in connection with the church is that it is neither a rectory nor a vicarage. It was originally included in the grant made by Henry I. to Robert Achard, but was given in the next reign by William Achard to the monks of West Sherborne, and this grant was confirmed by his son, and, in return, the prior and monks were bound to provide a chaplain. After the suppression of the monastery, the Chapel of Aldermaston, with the estates of the dissolved priory, were given by Edward VI. to Queen's College, Oxford, but in 1567 William Forster obtained from the college a lease of 500 years at a small quit rent, and so acquired the right of nominating the minister. William Congreve purchased from the college all their interest, and thus it remained until a few years since, when institution by the Bishop was arranged for. There is much of interest in the church to repay careful observation. Exceedingly uncommon features are the so-called low-side windows and two high-side windows. There is some ancient wall painting, particularly a painting of St. Christopher. To enable this to be seen from the outside, one of the low-side windows is said to have been formed. Early and late Norman features are to be seen in the west door. Some brasses of the XVth century to the Forster family are preserved in the church, but the chief monument is a magnificent altar tomb with recumbent effigies of Sir George Forster and lady (Elizabeth de la Mare) exquisitely worked in alabaster. The knight is in armour and wears the collar of S.S., while the lady has at her feet a little pet dog, which is biting the hem of her dress. On the sides of the tomb, under canopies, are represented twelve sons and eight daughters. The whole monument is but slightly damaged, and for so late a date, 1526, is a careful and beautiful piece of work. The church has been adorned with mural decoration in an artistic way by the taste and liberality of Mr. Keyser. Padworth Church was next visited. There is no special history attached to this church, but it is a charming little gem of a village church of late Norman date, with apsidal end to chancel and beautiful carved capitals to the chancel arch. There is a Norman piscina, and north and south doorways of good character. Some interesting and curious wall-paintings have lately been discovered in the chancel, and on the jamb of the chancel arch, of the XIIth century, St. Nicholas being one of the figures represented. There was originally a very good font, of which a sketch is preserved in the British Museum, and Mr. Keyser expressed the opinion that it was probably buried beneath, or near to, the present one, which was an old religious custom. In the churchyard Mr. Walter Money gave some particulars of an engagement which the Royals and Parliamentarians, in 1643, in connection with a stone in the porch, which commemorates the event and the nameless dead soldiers who fell in the encounter in Aldermaston Lane. Proceeding on their way, the party reached Ufton Court between 3.30 and four o'clock, where they were received by Miss Sharp, who has written and published a valuable history of this most interesting old manor house, from which she read extracts in giving the description of the house. The house was built in the latter half of the XVth century by Lady Elizabeth, widow of Sir John Marlyn, and is in the form of the letter E, with modifications, and is three stories in height. Some parts of the house are of older date, but the greater part is Elizabethan, and the fine ceiling of the great hall is of that period; the only original paneling is in the library. When Lady Marlyn purchased the property in 1568 it was in the possession of Richard Parkyns, whose ancestors had been lords of the manor of Ufton from about 1400; she married him, and died there in 1581. In the time of Queen Anne the north projection of the house was altered in the style of the period, with long windows and sashes, and the interior of the apartments on that side still contain the plaster ceilings and fittings of that date; but the exterior has been restored to correspond with the south or later date, such as the leaden water-spouts, which are dated 1664. The alteration in Queen Anne's time seems to have been made to suit the taste or meet the requirements of a celebrated lady with whom the house is intimately associated, the heroine of Pope's "Rape

of the Lock," Arabella Fermor, who married a Francis Parkyns in 1715. Ufton Court is one of the many mansions in the country which afforded refuge to the adherents of the ancient faith, and it is honeycombed with hiding-places, in which the recusants were concealed in periods of danger and trial. Some of these were open for the inspection of the party and were viewed with very great interest. The oratory, priest's chamber, chapel, and long gallery were also visited by the kindness of Miss Sharp, who herself conducted the members in parties of ten at a time, owing to the narrowness of the passages and the intricacies of the plan of the house. The spring locks of some of the hiding-places are very curious.

Leaving Ufton Court with some regret, its picturesque gables, brown woodwork, overhanging windows, and mellow-toned, rough-cast walls showing charmingly in the evening sunlight, Reading was reached somewhat after seven o'clock. At the meeting after dinner, in the large room of the hotel, Mr. Emanuel Green presided, and a capital paper on "Some of the Brasses of Berkshire," was given by Mr. Andrew Oliver, which was well illustrated by many excellent rubbings. In the course of his remarks, Mr. Oliver said that Berkshire, as a brass country, did not possess many of great interest or importance. There were in all about 200 examples, and the greatest number were of the XVth and XVIth centuries. There were very few of the XIVth century; the only one of that date of any importance was at Bray, which represented three figures supported on a bracket with a fox at the foot. Mr. Oliver divided his subject into several headings, and dealt with each most fully. A short discussion followed the paper, in which the Rev. P. H. Ditchfield, the Rev. C. H. Evelyn White, Mr. E. Green, and others took part.

#### WEDNESDAY, JULY 19.

Members had previously been informed, and the programme reminded them, that the excursion to-day was to King Alfred's Country and the Berkshire Downs, and that, owing to difficulties of transit, the members must be limited to sixty. Leaving Reading by the Great Western line at 8.50, the party reached Newbury at 9.31, and changed into a special train for the little town of Lambourn, where they arrived about 10.15. Carriages were at once taken, and the party proceeded to the church, where they were received by the vicar (the Rev. Reginald Bagnall), who gave a short account of the edifice. The church is one of the finest in Berks, of late Norman date, about 1170. There are two chantry chapels belonging to the Estbury family; that on the south of the chancel is dedicated to St. Mary, is in the decorated style, and contains the tomb of the founder, John Estbury, with his memorial brass and coat-of-arms enamelled. The other chapel is dedicated to the Holy Trinity, and contains another altar tomb to the son, also John Estbury, who founded a hospital near the church for ten poor men, and the bedesmen assemble here every morning round the tomb for Divine service in commemoration of the founder—a curious and interesting survival of pre-Reformation custom. There is a fine altar tomb in the north transept, with alabaster effigies of Sir Thomas Essex and his wife, dated 1558. Leaving the church, the party followed the vicar to view the site of the palace of Canute and the market cross. The next halting-place was at Ashdown House, by permission of Lady Wantage, where the visitors viewed the numerous Saxon stones scattered about on the turf, and then made their way onward to Wayland Smith's cave, which, Mr. Walter Money said, was simply a denuded, chambered, long barrow, with an encircling ditch, of the Paleolithic Age, having a kistvaen of stones to protect the place of interment. Mr. T. White said the tradition of the Wayland Smiths was known in Scandinavian countries and in Germany. They are traditionally reputed to have lived underground, and travellers, whose horses had lost shoes, had only to place some coins on a suitably-placed flat stone, retire to a safe distance and forbear to look on, and, after a while, they would find the horses shod and the money gone. Wayland Smith's cave, he said, was mentioned as a boundary in an Anglo-Saxon

charter of Eadred, in 955. Owing to the difficulties of transport, as before mentioned, luncheon had to be of a very slight nature, which members had to carry with them in the shape of sandwiches, etc. These having been dispatched while the party rested on the slope at the head of the "Giant's Stairs," near the "White Horse," Mr. Theodore White gave an account of Uffington Castle, an oval earthwork of great dimensions, the highest point of which is 893 ft. above sea level. A most extensive and beautiful view is obtained from this elevated and breezy point, reaching, it is said, into ten or twelve counties. Mr. White related the tradition of the "White Horse" which is believed to have been cut by order of Alfred the Great to commemorate the great battle of Ashdown or Ecesdune. Mention of the Uffington "horse" was found in very early documents, and he was of opinion that it had been there for 1,500 years, and was, therefore, much older than Alfred's time. The figure of the horse covers over an acre of ground, and is 374 ft. in length. Progress was now made to Sparsholt, stopping for a minute or two at the well-known "Blowing Stone," Sparsholt Church being described by Mr. Keyser. The vicar (the Rev. F. A. P. Shirreff) received the party. Mr. Keyser pointed out the curious wooden effigies, two of which are of females, veiled and wimpled; the others, also of oak, are of knights, one cross-legged. All are of the decorated period, and are thought to be of members of the Achard family, as is the tomb in the chancel, to Sir Robert Achard. The church is almost entirely of the decorated period, and possesses many features of much interest; but time passed, and the express train, which had been arranged for to stop at Wantage Road Station, was due there at 5.22, so departure had to be hurried, and Childrey Church, with its numerous brasses, some twelve in number, of the XVth and XVIth centuries, had to be passed unvisited. Reading was reached about six o'clock. At the evening meeting a paper was read by the Rev. J. C. Field on "The History of Wallingford," preparatory to the visit on the following day. A paper on "The Walls of Wallingford" was also read by Mr. J. C. Gould.

#### THURSDAY, JULY 20.

After the fatiguing excursion over the Berkshire Downs of yesterday, the programme to-day was restful and very enjoyable. Leaving Caversham Bridge about 9.30 on board the steam launch "River Queen," the party, of about seventy members, proceeded by river to Wallingford, where they were met by the Rev. J. E. Field and the Rev. A. W. Deacon and others. After luncheon, brief visits were paid to St. Leonard's Church, which was described by Mr. Field, to an interesting old monastic building of the time of Henry VII. known as St. Lucian's, to St. Mary's Tower, the earthworks and moat in the Kine Croft near the railway station, and then to the ruins of the Castle of Wallingford, where Mr. I. C. Gould gave a very interesting historical account of the fortress to which the Empress Maud, mother of Henry II., fled when she escaped in the snow from Oxford Castle. The Castle of Crowmarsh Gifford, which was built by Stephen on the other side of the river, was intended to be visited, but time, again, was too short, and it had to be omitted, as the launch had to leave punctually at 4 p.m. for Reading, which was not reached until past 7. At the evening meeting, at 8.45, a paper was read by the Rev. P. H. Ditchfield on "The History of Abingdon," the famous monastic town to be visited the next day. This paper, though filled with historical information, is written in such picturesque language that it is most entertaining.

#### FRIDAY, JULY 21.

The members of the Congress, to the number of eighty, left Reading by Great Western train at 9.51 for Culham, where, at 10.39, carriages were waiting to take them to Sutton Courtenay Grange, by permission of Captain Lindsay. The manor of Sutton Courtenay was early in the possession of Abingdon Abbey. The old manor house, now the residence of Captain Lindsay, was considered by Mr. C. Lynam and other authorities present to have originally been a Norman chapel attached to the manor



house. A passing visit was paid to the church, and the drive continued to Abingdon, which was reached half an hour in advance of scheduled time—an unusual occurrence. In the Council Chamber of the Guildhall, which adjoins the old abbey gateway, the party was received by the Mayor and Mayoress, some of the aldermen, and the town clerk, and then inspected the fine collection of valuable Corporation plate, which was described by Alderman Harrison. Amongst the rarer objects, are the maces of Charles I., Charles II., given at the Restoration, 1660—noticable from the fact that in the inscription the Commonwealth is entirely ignored—and James II. The most valuable of all the maces, however, is one of the time of Edward VI. or Elizabeth. There are two fine silver chalices of the XVIIth century, and the seal of the Corporation, dated 1605. There is also a "Whistling Cup," dated 1658. Upon another table were laid out the valuable charters, ten in all, the oldest granted in 1555 by Philip and Mary. They were described by Mr. Challoner (the Town Clerk). The first charter gave to the town two members of Parliament, who were to be maintained by the borough. Amongst other objects exhibited were some old minute books and books of ordinances and orders, and building by-laws, from which it appears the Corporation had power to establish an infectious hospital and to take disinfecting measures in the year of the Great Plague; laws for the prevention of fire, and ordering that furze and fern should be stored in safe premises, and that every burgher should keep a club for the preservation of the peace are amongst these old ordinances, showing that the town of Abingdon was a good place to live in and its Corporation a very enlightened body in the XVIIth century. Luncheon was partaken of in the great Council Chamber, the Mayor presiding. The walls of this fine apartment are adorned with portraits of King George III. and Queen Charlotte, by Gainsborough, a large St. Sebastian, considered to be by Van Dyck, and other life-size portraits of Charles II. and James II., etc. Under the guidance of the Rev. P. H. Ditchfield, the party, at 2.30, proceeded to inspect the remains of the abbey buildings, which were described to them by Mr. Redfern, the architect, who was entrusted with their preservation by the Corporation, whose property they now are. Mr. Redfern kindly came down from London on purpose to meet the Association and point out what was most interesting of the remains. Of the abbey, which Leland saw and described in the time of Henry VIII. as a magnificent pile, the grand Abbey Church has completely vanished. The remains of the conventual buildings are very few. The buildings, Mr. Redfern said, had been for very many years used as malt-houses and other purposes, and their original uses could not be made out. Recent exploration has, however, enabled their purpose to be stated with reasonable confidence. The chief remains consist in what he believed to have been the exchequer of the abbey, the infirmary, and, perhaps, some portion of the prior's lodging. In the first of these buildings, the ground story is vaulted in four compartments from a central column; the upper floor has the remains of a fine hooded fireplace, and outside is a chimney with three lancet-shaped openings. Adjoining this building is a long building, over 100 ft., of two stories, with galleries into which the several chambers opened. The upper floor appears to have been divided into two large rooms, with several dormitories. It has an open-timber roof, in good condition, and, apparently, of the first years of the XVth century. This famous abbey was dissolved in 1538, and its revenues were assessed at 1,876l. 10s. 9d. The church of St. Nicholas was next visited, and described by Mr. West, its own churchwarden. The church adjoins the abbey gateway, and, as at Reading, stands partly within and partly without the abbey precincts, which is the reason why, it is said, it has only one warden, the monks, to whom the choir belonged, not, of course, requiring a churchwarden. The tower is built partly on the west wall and partly on piers within the church, and dates from 1485. The west front has, on the lower stage, a late Norman arcade, the centre arch forming the doorway. On the inner face of the west wall, just inside the porch, is a stone niche for a lantern, some 7 ft. or 8 ft.

above the floor. At the church of St. Helen, next visited, the principal features were described by Mr. Keyser. This is a very large and fine building, consisting of a nave and four aisles of the Perpendicular Period, with a graceful spire, which is a well-known flying buttresses, which is a well-known river landmark. It is called the church of five aisles, as they are all about the same width. The numerous aisles have each a distinct dedication, viz., Jesus Aisle, St. Lady's Aisle, St. Helen's Aisle, St. Catherine's Aisle, and the Aisle of the Holy Cross. They owe their existence to the various guilds which existed in the town. From St. Helen's the party went to the adjacent Christ's Hospital—a long and picturesque building of wood and brick, with open-timber gallery, into which the several dwellings open. In the Council Chamber, used also as the chapel, were laid out for inspection the several old tomes, dating from 1553. These several old tomes were examined under the guidance of Mr. Baker and Mr. Morland (Trustees of the Charity), which supports more than forty inmates. This visit ended the day's proceedings, and the party returned to Reading by the 4.47 train, reaching their headquarters about 6.15. At the evening meeting a paper was read by Mr. Childs (Principal of University College, Reading) on "The Place of Reading in the National History," and another on "The Commercial Aspect of Reading in the Middle Ages," by Mr. C. J. Williams (the Hon. Secretary of the Congress).

#### SATURDAY, JULY 22.

This was the concluding day of the Congress, and the morning only was devoted to archaeology. A visit to Newbury, Shaw House, and Donnington Castle was arranged for under the capable guidance of Mr. Walter Money, F.S.A. At Donnington Castle the party were to be entertained at luncheon by Mrs. Spurling, and afterwards return to Reading for the special general meeting at the hotel for the election of members and the concluding business of the Congress, which has proved so agreeable and satisfactory. The Hon. Congress Secretary (Mr. C. J. Williams) is to be congratulated on the success which has attended upon his energy in the organisation of all the arrangements, which, however, without the hearty co-operation of Mr. Keyser, the chairman, and the Rev. P. H. Ditchfield, the Hon. Secretary of the local Committee, aided by the willing efforts of all who had assisted on that Committee, it would have been next to impossible to achieve.

#### CHEAP COTTAGES EXHIBITION.

An exhibition of cheap cottages has been arranged at Letchworth (Garden City), Hertfordshire, and on Tuesday it was officially opened by the Duke of Devonshire, in the presence of a large number of people. Earlier in the day Sir William Foster laid the foundation-stone of the city's first public building—i.e., the entertainment and lecture hall, in memory of the late Mrs. Ebenezer Howard. The edifice will be constructed at a cost of about 1,200l. As to the cottages, a large number have been erected, many of them of an interesting character, and next week we hope to devote an article to them.

At the opening ceremony, Mr. St. Loe Strachey, who presided, said that they were indebted to the Duke of Devonshire for his encouragement of the movement, to Mr. Neville, and to the First Garden City Company for all they had done for the exhibition, to Mr. Cooper, the secretary, and Mr. Adams, the manager of the First Garden City. In conclusion, he asked the Duke to accept the book of the Cheap Cottages Exhibition, offered by the committee, as a small memorial of the exhibition. They trusted that that catalogue, which gave plans and specifications and details of all the cottages exhibited, would prove useful to those who were not able to come and see the cottages for themselves, and that people from all parts of the United Kingdom might be able to get from it information as to the means and methods of cheap cottage construction.

The Duke of Devonshire said that the exhibition must be one of very greatest interest to everyone who was connected, directly or indirectly, with the land. It was

of interest to the largest class of those who were connected with the land—the class of agricultural labourers—for it was most important to them that they should live in decent and well-built houses provided for them at a moderate rent. It was important also to the tenant farmers, because one of their chief interests must be the obtaining of labour, and efficient labour, for the cultivation of their holdings; and that efficient labour could not be obtained unless simple and decent habitations were provided for the labourers. Lastly, the exhibition was of great interest to landlords with a view to the proper management and administration of their estates. He thought it was only fair to English landlords to say that he believed there were very few of them who looked upon their estates merely as a source of revenue. One of the great difficulties which confronted landlords who wished to do their duty by their neighbours, by the residents on their estates, had been of late years the provision of suitable houses. The old miserable agricultural villages had, to a great extent, been swept away, and however excellent their intentions might be, some landlords had found and were finding, a very great difficulty in providing from their now somewhat limited resources the necessary capital expenditure for building new houses. To them, therefore, also, it was most important that every possible means should be discovered by which the almost prohibitive cost of housing the labourers on their land might be, at all events, materially reduced. The exhibition had an interest, and ought to be of interest, he thought, to an even wider class. We heard a great deal in these days of the migration of the people from the country to the towns. The census returns showed that, whereas fifty years ago about half the population of our country lived in the country, at present 77 per cent. of them lived in urban districts. He was not one of those who considered that this migration, this change in the distribution of the population, had been an unmitigated evil. When we considered the miserable condition of a large part of the rural population fifty or sixty years ago, we must consider it rather pleasing that a large number of them should have transferred themselves, not necessarily to overcrowded towns and cities, but very largely to new towns and villages which had grown up, and to populous industrial districts. They had transferred themselves to localities where they were able to obtain better wages, and, in many cases, he doubted not, find better houses. So far this migration had not been altogether an evil; but so far as it had been a migration from healthy country districts to the overcrowded slums of the city, that, on the other hand, had been, he thought, an unmitigated evil. He was afraid there was too much evidence to show that this had been and was still going on, with a disastrous effect on the health and physique of a portion of our people. There were many causes which had tended to draw away the people from the land. The housing question was not the only one. But there was no doubt that the question with which they were concerned that day—the housing question—was one, at all events of the forces which had exercised a powerful influence in drawing labourers away from the land and crowding them together in our towns. The problem which the committee of that exhibition was attempting to solve was that of ascertaining whether it was possible to build decent and serviceable cottages and houses at somewhat less than the present cost. Most landlords had, he believed, found, as he had found, that it was very difficult to build a good cottage much under 300l., or, say, 500l. for a pair of cottages. That meant a rent of 10l. or 12l. a year if the capital expended was to have any adequate return; and that, he need not say, was a larger rent than most agricultural labourers were in a position to pay. It was alleged by men who, he believed, were practical men, that it was perfectly possible to build a house which should be fit for habitation, which should be decent, and not too expensively for a sum not exceeding 150l. If that was the case, and if it was found through that exhibition that it was possible that that should be done, they would have done a great deal, not perhaps altogether to solve, but to assist in the solution of the



housing question. He did not say, even if they could build cottages at 150*l.* apiece, or something like that sum, that it would be a very remunerative outlay of capital for the landlord; but he thought it was not the landlord's only desire to get a good return on his capital expended in that way, but that many landlords would attack the problem of the housing of their people if they could do it without a loss which made it prohibitive. He hoped, then, that that exhibition would receive a great deal of attention from practical men. They must know, however, that those cottages were not only all that was required in appearance, but also they must call in experts to say whether they would afford adequate protection against the heat and cold and damp of our climate, and what was, perhaps, still more important, whether they would be built under conditions of sufficient durability. The landlord had not only to build the cottage, but he had also to maintain it; and it was perfectly possible that the cheapest outlay of capital at the beginning might not prove to be the cheapest in the end. They must all join in the expression of thanks to the Garden City Company for the assistance that they had given in establishing that most interesting exhibition. It was not a collection of model cottages which were to be shown to-day and which would disappear to-morrow. It was a collection of cottages which would be put to a practical test; cottages which would be inhabited; real cottages which would be inhabited by real men and women and children. It would be competent for all whom he was addressing to come there next year or the year after, and he hoped for many years, and to see whether those cottages were satisfactorily fulfilling the promise with which they had been built. He could not help thinking that that experiment was one of a most interesting character; and he heartily congratulated the committee of the Garden City Company on the interest which, as evidenced by the numerous audience he had the honour to address, that experiment had aroused. He had much pleasure in declaring that exhibition open.

Mr. Neville K.C. moved a vote of thanks to the Duke of Devonshire, which was seconded by the Bishop of Hereford, and supported by Lord Crewe, and carried unanimously.

The Duke of Devonshire, in reply, said that he had forgotten to mention that that exhibition, in addition to its other recommendations, might be very useful in the discussion of a question which evidently excited a good deal of interest in the minds of a good many of those present—the question of the building by-laws. He did not mean to go into that question on that occasion. The intention of those by-laws was, no doubt, excellent, and he was sure that all of them would desire that the by-laws should provide for everything which should lead in a sanitary direction to preserving the health of the people. But the question, he took it, was whether the by-laws were not, in too many cases, adapted rather to the wants of the towns than of the country, and whether they did not, in too many cases, entail an unnecessary expense on the building of cottages in the country. If it was true that many of the cottages they had seen that day could not have been built in many districts owing to the by-laws, and if those cottages were found to answer all necessary, reasonable requirements, then he thought that some revision of those by-laws, excellent as their intention was, might become necessary.

A vote of thanks to Mr. St. Loé Strachey for presiding brought the proceedings to an end. A series of conferences, under the auspices of the National Housing Reform Council, will be held during September at the Cheap Cottages Exhibition, First Garden City, Letchworth. On September 16 there will be a National Conference of Urban Authorities, to consider: (a) The better planning of new housing areas; (b) the designing and erection of cheap and artistic cottages. On September 23 a Rural Housing Conference, under the auspices of the National Housing Reform Council and the Rural Housing and Sanitary Association, to consider—The reform of rural by-laws and the building of cottages in rural districts. On September 30 a National Conference of Workmen's Associations.

## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

### THE MIDSUMMER EXAMINATIONS.

#### Preliminary.

The Preliminary examination, qualifying for registration as Probationer R.I.B.A., was held in London and the undermentioned provincial centres on June 6 and 7. Of the 245 candidates admitted, claims for exemption from sitting for the examination were allowed to the number of fifty-three. The remaining 191 candidates were examined, with the following results:—

District.	Number Examined.	Passed.	Relegated.
London .....	78	48	50
Belfast .....	1	1	—
Birmingham .....	8	5	3
Bristol .....	15	11	4
Cardiff .....	7	2	5
Glasgow .....	6	4	2
Leeds .....	26	17	9
Manchester .....	31	14	17
Newcastle .....	19	10	4
	191	117	74

The passed candidates, with those exempted—numbering altogether 170—have been registered as Probationers. The following are their names and addresses:—

Adams, W. N., Liverpool	Godfrey, H. V., Shepherd's Bush, W.
Allan, J. A., Aberdeen	Gray, J. H., London
Allan, T. S., Glasgow	Green, W., jun., Aberdeen
Allen, P., Cheddard, Somerset	Griegs, S., Clapham Common
Archer, C. S., Johnstone, N.B.	Grieves, H., jun., South Shields
Arnott, C. D., Gorseston-on-Sea	Griffin, E. V., Ealing, W.
Arthur, G. T., Redfield, Bristol	Grissell, F., Notting Hill Gate, W.
Aysley, J. T. O., Sunderland	Ground, J. K., Wadsworth Common, S.W.
Ayre, D. W., Cork	Ap. Gruffydd, C. O., Wellingborough
Badcock, W. F. B., Thornfield, Bishop Auckland	Hadwen, N. W., London
Bain, V., Sunderland	Hagell, F. W., Whitehall Park, N.
Banks, W. A., Stafford	Hall, E. S., B.A., West Dulwich, S.E.
Banks-Smith, S. R., St. Leonards-on-Sea	Hall, H. B., Nottingham
Barrow, T. H., Camberwell, S.E.	Hallatt, C. A., Wath-on-Deane, near Rotherham
Batty, W. A., Wolsingham, co. Durham	Hatton, P. K., Islington, N.
Beal, J. K., Newcastle-on-Tyne	Harrison, W. H., Whalley, Blackburn
Beetham, E., Darlington	Hastings, K. W., Clifton, Bristol
Bell, W., Bradford	Hawkins, E. H., Southampton
Bennett, T., Gravesend	Heath, F. J., Wansop, near Mansfield
Binnie, W. B., Airdrie	Heels, J., Bolton, Lancs.
Blackmore, A. C., Cottesham, B. Yorks	Henson, F. E., Wellington
Bramwell, G., Gargrave-in-Craven, Yorks.	Hodgson, J., Nottingham
Brett, W. G., Clevedon	Hindmarsh, J. R., Newcastle-on-Tyne
Britten, H. W., Croydon	Hinton, J. G., Exeter
Brook, A. St. H., N. Chesham, Surrey	Hooper, L. O., Southampton
Brodie, J., Edinburgh	Howitt, T. C., Hucknall, Torkard
Broomhall, T. H., Raigh, near Barnsley	Hughes, A. E., Newark-on-Trent
Brown, W. G., Leighton Buzzard	Jackson, W. H., Balham
Bryett, A., Greenheys, Manchester	Jeffery, E., Ashford, Kent
Burgess, S. H., West Hartlepool	Jew, R. E., Reading
Buttle, P., Rothwell, Northants	Johnson, L. P., London
Calhoun, W. W., Ealing, W.	Kania, W., South Hampstead
Champion, R. D., Balham, S.W.	Knapman, H. L., Primrose Hill, N.W.
Chippindale, H. M., Scholes, near Leeds	Kohler, H. F., London
Christie, C., Falkirk	Legat, C. S., Sunderland
Coates, P., Sheffield	Lucas, J. D., Sand, Woking
Cole, A. V., Watford	McAleer, J. C. O'C., Workington
Colville, D., Aberdeen	Marshall, F. W., Solihull, near Birmingham
Cook, W. B., Huddersfield	Masters, F. N. D., Doncaster
Coombs, G. J., Boscombe, Bournemouth	Maxwell, J. F. McC., Bedford Park
Coyle, F., Blackhill, co. Durham	Mayhead, R., Reading
Craddock, R., Wolverhampton	Medley, C., Kelghley
Crook, R. H., Birkdale, Southport	Mennie, F. E., Mile End, E.
Davidson, J. A., Knock, co. Down, Ireland	Michalowsky, H., Dalston, N.E.
Dewhurst, R. H., Harrogate, Yorks	Mills, W. S., Leicester
Doggett, F. A. B., Cambridge	Monk, H., West Auckland, Durham
Durant, A. M., Hemel Hempstead	Morgan, D. H., Aberdare
Eskdale, T. C., Wolverhampton	Nairn, G. C., Inverness
Emery, R. J., Lowestoft	Needham, T. H., Acton
Emms, H. D., South-on-Sea	O'Reilly, H. W., Cheltenham
Fetherstone, R. W., Canterbury	Owen, O. L., Swansea
Fisher, W. S., Hatton Park, Wellingborough	Page, W. MCP., Earl's Court, S.W.
Fitzgerald, G. B., London	Perry, H. C., Bournemouth
Fletcher, E. G., Ulverston, Lancashire	Peto, A. N., Leeds
Fourdister, N. D., Brook Green, W.	Pocock, J. C., Chiddingfold, Surrey
Furnas, R. W., Loughborough	Pogies, E. J., Clifton, Bristol
Garg, R. T., Aberdeen, N.B.	Pollard, J., Holywood

Babbula, E. A. R., Clapton, N.E.	Toone, A. J. E., C-on-M. Manchester
Rattenhuber, F., Shepherd's Bush	Trepp, H., Warwick
Rees, W. D., Cardiff	Turner, K. W., Ipswich
Rhodes, W. C., Chelsea, S.W.	Vallance, G. A., Mansfield
Rigby, L., Manchester	Vincent, F. J. N., Plymouth
Riley, B. H., Lower Darwen	Walker, H., Hesse Common, Hull
Rollo, R. L., Glasgow	Walker, W. D., Halifax
Ross, S. W., Belgrave, S.W.	Warren, H. G., Exeter
St. Aubyn, F. J., Battersea	Watkinson, H. E., Goodmayes, Essex
Seale, E. J., Bolton	Watson, F. E., South Ealing, W.
Seiway, E. B. D., Stourbridge	Webb, R. W., Brislington, Bristol
Shanks, N. F., Old Trafford, Manchester	Webster, F. P., Totley
Shrauth, A. G., Eastbourne	Rise, Sheffield
Shelburne, E. P., Melton Mowbray	West, A. B., Abingdon, Berks
Smeed, C. A., Stratford	West, J. L., Abingdon, Berks
Smith, F. W., Newark-on-Trent, Notts	Whitby, C., Sandown, I.W.
Smith, J. B. B., Furze-cote, near Botley	Whitham, N. A., Barnsley, Yorks
Smith, L., Lockwood, Huddersfield	Wilde, E. S., Weston-super-Mare
Spruling, E. A., St. Leonards-on-Sea	Wilkinson, W. H., Halifax
Stanley, G., Trowbridge, Wilts	Winch, A., Roundhay, near Leeds
Stead, M. J., Halifax	Winfield, J. E., Regent's Park, N.W.
Stock, C. H., Carlisle	Wood, P. M., Manchester
Stubbs, B. W., Norwich	Woodhouse, B. W., Carlisle
Talbot, H. C., Ilford	Worram, G. G., Hampstead, N.W.
Thompson, G. C., Gateshead	Worth, L., Bournemouth
Thorpe, A. K., Wandsworth Common, S.W.	Wright, S., Macclesfield
Tilden, P. A., Northwood, B.S.O.	Young, H., Portsmouth

#### Intermediate.

The Intermediate Examination, qualifying for registration as Student R.I.B.A., was held in London and the undermentioned provincial centres on June 6, 7, 8 and 9. One hundred and fifty-seven candidates were examined, with the following results:—

District.	Number Examined.	Passed.	Relegated.
London .....	93	44	49
Bristol .....	10	5	4
Glasgow .....	5	5	0
Leeds .....	18	13	5
Manchester .....	24	15	9
Newcastle .....	7	5	2
	157	88	69

The passed candidates, who have been registered as Students, are as follows, the names being given in order of merit as placed by the Board of Examiners:—

Davy, C. E., Maldenhead	Whitehead, W., Leeds
Thomson, W. J. M., Bournemouth	Corfield, C. R., Falmouth
Harvey, W., Edgware-road, W.	Rushworth, T. S., Clapham-road, S.W.
Henderson, A. G., Shawlands, Glasgow	Nicholls, L. S., Handsworth, Birmingham
Jenkinson, J. M., Sharrow, Sheffield	Sastry, J. P., Reading
Binning, A., Blackheath, E.	Vaughan, J. H., Ilford
Moss, H., Whalley Range, Manchester	Hesley, H., Didsbury, Manchester
Morley, E., Bradford	Wignate, C. P., Beverley, Yorks
Jew, R. E., Reading	Clark, C. W., Howdismombe, Plymouth
Lidbetter, H., Carlisle	Harnal, W. H., Leicester
Kenyon, A. W., Upperthorpe, Sheffield	Bower, A. E., Blundell-sands, Liverpool
Bray, A. G., Bolton	Webster, W. R., Aberdeen
Wearing, S. J., Leicester	Rowlings, G. L., Chorlton-on-Medlock, Manchester
Constable, A. S., Stocksfield-on-Tyne	Young, J. G., Ashburn, Alton, N.B.
Corney, J. W., Leeds	Collingson, F. E., Nottingham
Woods, F., Maldenhead	Warlow, H. G., Sheffield
Adam, D. A., Heaton, Newcastle-on-Tyne	Mally, C. B., Southfields, Leicester
Donaldson, F., Bishop Auckland	Reinmann, O. L., St. Leonards-on-Sea
Dawson, N. J., F.xhall, near Ipswich	Wright, C. L., West Kensington
Edmonds, L. W., Balham, S.W.	Caminecky, F., Chesham, Manchester
Meakin, F., Myddleton-square, E.C.	Goldsmith, G. H., Manchester
Spart, W. R., Batley, Yorks	White, C. H., Montpellier, Bristol
May, P., Dulwich, S.E.	Fitzroy, A. H., Lincoln
Orme, R. W., Oldham	Colles, G., Cheddar, Hulse, Cheshire
Dunne, G. E., Worcester Park, Surrey	Cotterell, A. N., Bristol
Carey, J., London	Crowe, J. J., Lidgate, Green, Bradford
Brentnall, A. H., East Dulwich-grove, S.E.	Douglas, A. H., Maid Vale
Hill, T. H., Hale, Cheshire	Dunn, A., Gloucester
Hicks, H. L., Gosforth, Newcastle-on-Tyne	Ellison, W. H., North Barnsley, Yorks
Wills, G. B., London	Fulford, C. G., Salisbury
Ling, R. B., Lavender-hill, S.W.	Groves, C., Chester-le-Street, co. Durham
Alcock, J. T., Clapham, S.W.	Guthrie, W., Clapham, S.W.
Rusbridge, A., Reading	Idie, M. Clapham, S.W.
Young, R. C., Cotham, Bath	Keir, W. L., Molkham, Wilts
Helm, W. F., Scotsdown, Glasgow	Leonard, F. G., Chatham
Pritchard, W., jun., Lancaster	Margary, W. H., Y. Upper Tooting, S.W.
Hartnell, A. P., Redland, Bristol	
Birkett, S., West Didsbury, Manchester	
Simpson, C. H., Russell-square, W.C.	



Petch, E. S., Stoney Rise, Scarborough.  
 Peth, R. M., Brighton.  
 Phipp, R. A. H., Trowbridge.  
 Ponder, C. V., Hastings.  
 Reed, C. A., Clapham Common, S.W.  
 Ross, W., Roath, Cardiff.

#### Final.

The Final and Special Examinations, qualifying for candidature as Associate R.I.B.A., were held in London from June 23 to 30. Of the 74 candidates examined, 21 passed, and the remaining 53 were relegated to their studies. The successful candidates are as follows:—

\*Barrett, L. N., Harrow.  
 Carder, A. A., Clapham Common, S.W.  
 \*Doll, O. S., Lancing.  
 Elkington, G. L., London.  
 Ely, G. E., Liscard.  
 Fleming-Williams, C. L., Clapton, N.E.  
 \*Foursacre, J. L., Plymouth.  
 Grace, L. U., Bedford-row, W.C.  
 Le Maître, W. C., Haymarket, S.W.  
 Markham, J. H., West Hampstead, N.W.  
 Moore, L. T., Great Yarmouth.

Myer, V., Gray's Inn, W.C.  
 Naylor, J. J. S., Hanover-square, W.  
 Prince, R., Clifford's-Inn, E.C.  
 Quirk, W. D., Hove.  
 \*Reid, E., Sunderland.  
 \*Robinson, P., Leeds.  
 Searle, S., Harrow-on-the-Hill.  
 Thomas, N., Rochester-road, N.W.  
 Walker, J. W., Portleban, Aberdeen, N.B.  
 Watson, W. E., Whitehall-place, S.W.

The following table shows the number of failures in each subject of the Final Examination:—

I. Design .. .. .	40
II. Mouldings and ornaments ..	37
III. Building materials .. ..	19
IV. Principles of hygiene .. ..	16
V. Specifications .. .. .	22
VI. Construction, foundations, etc. ..	19
VII. Construction, iron and steel, etc.	27

The candidates to whose names an asterisk is prefixed entered for the Special Examination, which is for architects in practice not less than twenty-five years of age, and chief assistants over thirty. Such candidates are exempted, by special resolution of the Council, from the Preliminary and Intermediate Examinations, and from submitting "Testimonies of Study."

### THE ROYAL INSTITUTE OF PUBLIC HEALTH.

THE Congress of the Royal Institute of Public Health this year took place in London from Wednesday in last week till Tuesday last. The opening sitting was held at His Majesty's Theatre on Wednesday afternoon, when the Marquis of Londonderry, President of the Board of Education, delivered an address, with special reference to the physical condition of school children. The sectional meetings were held at King's College and the Polytechnic, Regent-street.

#### Engineering and Building-Construction Section.

The first sitting of this section was held on Thursday morning at the Polytechnic, under the chairmanship of Sir Alexander R. Binnie. Mr. A. J. Martin and Mr. W. Aldwinckle (for Mr. W. H. Maxwell) acted as Hon. Secretaries of the section.

The President, in his opening address, said he would attempt to describe the circumstances which had gradually led up to the present very healthy state of the Metropolis as a whole. From the earliest times, in London, refuse was passed into the old river courses which flowed down to the Thames. Walbrook and the Fleet Ditch gave evidence of that. Up to about 1832, when there occurred the disastrous outbreak of cholera, London was practically a cesspool town. With the great cholera outbreak something had to be done, and gradually the system of connecting houses with the old water courses came into vogue.

The result soon showed itself. The whole of the sewage of London was passed into the Thames along the old valley lines, and the river became frightfully offensive. He could remember, in the days of his youth, when the windows of the Committee-rooms of the House of Commons had to be kept permanently closed in consequence of the effluvia from the Thames. That condition of things existed until about 1855, when the Metropolitan Board of Works was established for the purpose of dealing with the sewage of the Metropolis, and, under his predecessor, Sir Joseph Bazalgette, a large system of intercepting sewers was introduced—three on each side of the Thames, and running parallel with the river. These

sewers prevented the sewage entering the Thames in London: those on the north terminated at Barking and those on the south at Crossness. The low-level sewer, on the north side, required two pumpings—one at Grosvenor-road and one at Abbey Wood. The other two flowed by gravitation the whole way down to Barking. On the south side, the large area from Deptford to Battersea, which was called the Old Marsh, and formed what was the chief sewer. This was the natural level of it was 6 ft. below high water mark, and so this necessitated pumping in the case of the chief sewer. This was done at Deptford, where the sewer was joined by the other two sewers, and the whole flow then passed on to Crossness. These works, so ably carried out by Sir Joseph Bazalgette, had been the means of rendering London one of the best-drained cities in the United Kingdom. At that time the sewer was allowed to accumulate in reservoirs at Crossness and Barking, and it was discharged on the fall of the tide. This greatly improved the upper portion of the river; but from 1886 to 1890 this state of affairs began to show its weakness. The crude, untreated sewage passed into the river deposited its solid matter, and that rapidly underwent a process of decomposition, and showed itself very obnoxiously by floating on the surface. The result was that the sewage was treated in precipitation tanks with lime and protosulphate of iron, and from the precipitation tanks it passed by what might be termed the intermittent system. These were the works which he, in 1890, had to take charge of, and it struck him at once that the intermittent system was somewhat defective. They did not get the amount of solid matter which they expected, and at last they decided to adopt the continuous system which, within a month, gave them double the quantity of sludge. The sludge was taken about twenty miles below the Nore, where about 2,000,000 tons of sludge was deposited per annum, of which 200,000 was absolutely dry solid matter. That was the system that was now being worked, except that there was a continuous flow of the effluent into the river. The margin, however, allowed by Sir J. Bazalgette had long been exceeded, and in 1891, Sir B. Baker and he (the speaker) reported upon the whole system, and they advised the London County Council to introduce larger and other intercepting sewers to meet growing demands. These works were commenced by himself five years ago, and were now being carried out by Mr. Fitzmaurice. Before ten years the London County Council will have spent between £2,000,000 and £3,000,000, and they might expect that London would go on as it had up to the present—a well-drained, healthy town. In sewage matters, due attention must be paid to the stream or river into which the effluent was poured, for, in the case of London, for instance, if they were to exact a very high degree of chemical purification, they would place a burden on the community which would be enormous. In London the sewage passed into a tidal river of great volume, and so long as that river was able to destroy the matter poured into it, he thought for many years it would be sufficient for the requirements of the case. When they passed to other towns in the interior of the country not so fortunately placed, a careful system of purification became of the utmost importance, because from the streams and the wells came the water supply.

On the motion of Mr. Baldwin Latham (London), seconded by Mr. G. Whyatt (Grimsby), a hearty vote of thanks was accorded Sir Alex. Binnie for his address.

#### Glasgow Main Drainage.

Mr. A. B. McDonald (City Engineer, Glasgow), in the course of a paper on this subject, said that he believed that great improvement had been effected in the Clyde, for he had had unsolicited testimony from the masters of river steamers that the results following on the completion of the sewage works on the north bank of the Clyde had been successful beyond all ordinary anticipation. Unfortunately, the district was undergoing the most protracted drought that had occurred for thirty-seven years, with the consequence that the harbour water of Glasgow was, at the present time, in a relatively foul condition. The drainage undertaking of Glas-

gow, next to London, was the largest in the world; the drainage area measured about forty square miles. Two purification stations had already been completed, and in about three years the Shieldhall Works on the south bank was expected to be able to deal with the remaining pollution derivable from Glasgow territory. The ultimate delivery of sewage that had to pass through the three works would be ninety-seven million gallons per day, conveyed by something like thirty miles of sewers, ranging in diameter from 2 ft. 6 in. to 10 ft. In conclusion, the speaker quoted a number of figures with regard to the percentage of purification achieved at the different stations, which, he said, appeared to him to exceed anything that any public health authority could possibly exact from an industrial community such as Glasgow.

#### Relative Areas of Sewage and Storm-Water Filters.

Mr. Sidney R. Lowcock, M.Inst.C.E., in dealing with the subject of "The Relative Areas of Sewage and Storm-Water Filters," first touched on the Local Government Board requirements for the filter area, and pointed out that one of the practical difficulties in having separate filters for storm water was that frequently for long periods there was no storm water to be dealt with, and the filters, if left idle, became sterile. Consequently, in order to keep them in bacterial cultivation, they must be regularly treated with sewage proper, and then they had the anomaly of two different filters dealing with the same sewage, one at least 4 ft. deep, the effluent from which must be applied to land, and the other only 3 ft. deep, the effluent from it going direct to the outfall. To get over the difficulty and bring the whole thing into line, the author suggested that the Local Government Board regulation as to the storm-water filters should be altered, rather expressed in another way—that is, in the same way as the regulation applied to the sewage filters, in gallons per square yard per foot in depth, and the storm-water filter should be allowed to be made of the same depth as the sewage filters. The regulations would then read that for sewage filters the mean rate of flow should not exceed 56 gals. per square yard per foot in depth per twenty-four hours, with a minimum depth of 4 ft., and for the storm-water filters, the mean rate of flow should not exceed 168 gals. per square yard per foot in depth per twenty-four hours. For a depth of 3 ft. of storm-water filter this rate is the same as that at present allowed. This, in his opinion, would simplify the working of the filters and tend to increase efficiency.

#### Chemical Treatment of Sewage.

Mr. Douglas Archibald described the process carried on at the Kingston-on-Thames Sewage Works, with the results obtained. The works were built by the Corporation, and opened in 1888, in order to carry out the system of sewage purification operated by the Nature Guano Company. They were designed by Major Macaulay, the Borough Surveyor, and have been working for seventeen years, and now serve a population of 55,107. The average daily flow of sewage was about 2,597,574 gals. The substance employed for purification are sulphate of alumina, clay, carbon, and a small quantity of blood. From various analyses, both of albuminoid ammonia and oxygen absorption of the tank effluent, the purification effected in the tanks is found to vary from 75 to 80 per cent. upon a crude sewage of normal strength, which often contains considerable quantities of gas and brewery refuse, and therefore sulphocyanides. Since 1885 the Thames Conservancy have revised their requirements to a point unattainable at all times by any tank process, and the Corporation, in consequence, are laying down 1½ acres of contact beds, which will effect a further purification of from 60 to 70 per cent. The total purification of the raw sewage thus attainable with one contact therefore ranges from 90 to 94 per cent., and even then the complete work will only have cost 13s. per head on the present population. The guano, after emerging from the drying cylinder, is stacked and sold. The author gave tables showing the cost, which showed that, in comparison with eleven other



districts of somewhat similar character, Kingston was the cheapest.

#### Present Position of the Sewage Problem.

Mr. W. D. Scott Moncrieff then read a paper, entitled "The Present Position of the Sewage Problem." After some preliminary remarks, he said that whatever the required standard of purity might be, it might be taken generally that the sewage problem in its modern sense began and ended with this question of river pollution, and the safeguard of land as a necessary part of all sewage treatment only represented the fears of the Local Government Board that other methods provide inadequate guarantees of efficiency. The recognition of such a simple standard as the destruction or preservation of fish made it easy for the Legislature to enact pains and penalties, but it soon became evident that science had failed to provide the means, even in the case of the most lawfully-inclined communities, to comply with the statutory requirements. This discrepancy between the law and the reasonable means provided by science of conforming to it had all along been one of the chief features of the problem, and this opened the question as to whether the subject had ever been approached from a scientific standpoint at all. The successful application of natural laws to the solution of any physical problem depended upon the laws being complied with, and before this could be done there must be an accurate knowledge, in terms of some standard or measurement, of the phenomena involved. The extraordinary thing was that in other problems where the State never pressed for a solution of any kind, science had run concurrently with the needs of the community. He referred to the obvious cases of the perfecting machinery for manufactures and locomotion, to the development of chemistry in its industrial forms, and to electricity for lighting and traction. In contrast to all this, the question of sewage disposal had been approached from the untenable position that all sewage was alike, and even then without any measurable or measured data, until it seemed as if no one cared whether the problem was dealt with scientifically or not. What would be the position of any other science if it was impossible to mention a single proposition with regard to it which was universally accepted? Yet this was absolutely true of the sewage problem. All that one could say was that there were a few generalisations which were admitted, at any rate, by a majority of the *ex-distant* experts, and it might be well to consider what these are.

"The first proposition I shall refer to is one that is not yet universally accepted, but is slowly gaining ground, namely, that in the biolysis of sewage, which is the breaking-down of organic matter into mineral forms by the life-processes of micro-organisms. Nature's methods should be followed implicitly, and that the process should first make use of those organisms which hydrolyse the organic matter in suspension with a rise of temperature and the evolution of hydrocarbon gases, and that the work should then be carried on in a second and separate stage by a different kind of organisms, which break down the organic nitrogen to nitrates, with the evolution of carbonic acid gas and a fall of temperature—a phenomenon which I have only recently discovered, and which, so far as I know, has not hitherto been suspected.

In the first stage there is the work of organisms that under different conditions can produce a temperature of combustion with the evolution of combustible gases; and in the second stage the work of those that absorb heat and produce gases that put out a candle. And yet there are experts who maintain that in these processes Nature's methods need not be followed, and that the two stages may be jumbled together, so long as a partial purification can be obtained sufficient to meet some particular case. On the one hand, we have such a community as Glasgow ignoring the first stage altogether, and spending great sums of money upon chemicals; on the other, Birmingham, where 5,000l. per annum was saved on lime alone by simply invoking the natural forces that lay to their hands. In the next place, it is generally agreed that the difficulties of dealing with the organic matters in solution are not connected with the organic carbon, but with the organic nitrogen; and, that being

so, the reasonable course would have been to follow up any clues that were likely to solve the difficulty of dealing with the organic nitrogen upon bacterial lines. Seeing that if the organic nitrogen is fully mineralised all the other chemical difficulties disappear, it was obviously worth while to concentrate every effort upon the discovery, in terms of some sort of measurement, of the actual conditions that yielded the highest mineralisation of the nitrogen. It made no great demand even on the intelligence of a layman to come to the conclusion that the apparatus which gives the highest ratio of oxidised to unoxidised nitrogen in any particular sewage, if the conditions can be accurately measured, must be a guide to the final solution of the problem, which then, in the very nature of the case, could only consist of reproducing the same results upon a large scale.

A third and most important proposition has, unfortunately, been retarded in its acceptance because immense sums of money have already been expended upon schemes that are in direct contradiction to it. I refer to the fact that, while a certain amount of purification can be obtained from mixed groups of organisms working under unfavourable conditions, high nitrification, which is the true test of efficiency, can only be obtained by allowing the organisms to work in naturally selected groups, each suited to live upon the nutriment provided by the different chemical transformations which occur during the mineralising process.

It was the application of this zonal action which made it possible to obtain a ratio of 98.6 per cent. of oxidised to unoxidised nitrogen and nine parts per 100,000 of nitric nitrogen from an ordinary domestic sewage. And yet, although all the factors that gave these results are fully in evidence, and can be measured with great accuracy, their existence as an obvious key to the solution of the problem has been persistently ignored.

All the factors that require to be known with regard to the mineralisation of a well-hydrolysed effluent are—

(a) The quantity of oxygen required for the life-processes of the oxidising organisms.

(b) The best quantity of liquid to be delivered at each discharge.

(c) The best interval of rest between the discharges.

(d) The depth of filter at which the necessary degree of purification is obtained.

A knowledge of these four factors, in terms of quantity and time, is required in every case in order to design the necessary works for any given sewage, and until this is recognised as being absolutely essential the sewage problem will remain in a muddle."

#### Discharge of Crude Sewage into the Sea.

Mr. C. B. Latham, in a contribution on this subject, referred to past objections against sea outfalls on the ground of waste, but said the practice had shown that the production of a good effluent, with no nuisance to the neighbourhood, was all that could be aimed at in sewage disposal. The advantages of a sea outfall over any other form of sewage disposal are that, as well as being financially the cheapest, the only attention the works require is by unskilled labour in the opening and closing of a valve at the proper times, and attention to the screen, if there is one. The volume dealt with, as far as the disposal alone is concerned, is immaterial, and so, as a rule, there is no need to exclude the surface water from the sewers. Further, trade refuse can be taken into the sewers, as it is satisfactorily disposed of without any special attention or addition to the works. In designing sewerage works with a sea outfall, it is necessary to ascertain the tidal curve in the locality, as it is the difference between the level of the sewage in the sewer and the level of water above the outfall, minus allowance for the difference between the specific gravity of sewage and sea water, that will give the available head on which to calculate the size of the outfall sewer required to discharge the sewage during the determined time of discharge and the flood water at all stages of the tide. Further, should a scheme wholly or in part gravitation be adopted, the highest low-water neap tides determine the lowest level at which the outfall sewer can be laid, as the sewers must empty every tide, and the highest high-water spring tides determine the lowest level that can be

drained in time of storm without pumping. The most favourable position for an outfall is at the end of a headland, which, projecting into the sea, allows the flood and ebb tidal currents out to sea. Where these conditions cannot be obtained the main consideration is that the outfall should be on the downstream side of the town on the ebb tide. Failing this, there should be a large volume of water, either tidal or fresh, discharging into the sea at the point of outfall, which will tend to carry the sewage more or less to sea. He was of opinion that no town on or near the sea is so situated that a proper sea outfall for crude sewage cannot be designed, and that the combination of several authorities to take their sewage by a trunk sewer several miles into the sea—as in the case of the Western Valleys (Mon.) Sewerage Board, formed by the Urban District Councils of Abercarn, Abertillery, Ebbw Vale, Nantyglo and Blaenau, and Risca, who, by a joint scheme, are taking their sewage into the Bristol Channel, and discharging it there during the first four hours of the ebb tide—would, in many other places, be found the best and proper method of sewage disposal, and that sanitary authorities should combine more often for this purpose.

#### Recent Sewage Work in America.

Dr. Kimmicute, in an interesting paper on "Sewage Work in America," confined himself to the one method of the purification of sewage by intermittent filtration through prepared sand beds, which method was the outcome of experimental work done in America by the Massachusetts States Board of Health, and was, he believed, the method, which, when natural conditions allowed it to be used, gave the greatest percentage of purification and at the least cost. The method consists in applying sewage intermittently to filter beds made of comparatively coarse sand, whose efficient size is between 0.25 and 0.30 millimetres. The first work of the Board of Health was the building of an intermittent filtration plant for the town of Framingham, which had a dry-weather flow of 650,000 gallons of sewage per day. The plant had been in operation since 1890, and the results have been excellent, the effluent averaging:—Free ammonia .217, albuminoid ammonia .0104, oxygen consumed .26, and nitrogen as nitrates .9854. This success led to other towns following, and, at the present time, there are in Massachusetts three cities and eleven important towns, besides several other towns and numerous public institutions treating their sewage by this method. The method of construction of intermittent sand-filtration beds is, in most cases, very simple. In Massachusetts comparatively large areas of fairly level sandy soil are of very common occurrence, and all that is necessary to do is to strip off the surface soil, level off the sand area, divide it into beds by embankments made of the strippings, remove from the sand beds so made any pockets of clay or quicksand, underdrain the beds, which was best done by digging trenches 4 ft. to 6 ft. deep, about 50 yds. apart, and replacing in these trenches Akron clay pipes, laid with open joints. These drains are connected with the main drains, placed in the embankments between the beds, and the sewage is brought to the plant by gravity or by pumping, and by various methods distributed upon the surface of the beds. In certain cases, however, the sand beds had to be made by excavating the soil to the depth of 4 ft. to 5 ft., and replacing the soil by sand taken from some neighbouring knoll. The cost of construction where excavation is not required is from 200l. to 300l. per acre, and where excavation is required it is from 800l. to 1,000l. per acre. The beds vary in size from 65 of an acre, superficial area, up to one acre. In some places the beds are perfectly level, and in other places ridged, the difference being due to the difference of opinion as to the best method of applying the sewage. The original method was to allow the sewage to run upon a bed at the rate of 50,000 to 70,000 gallons per acre in six hours, but at present one often finds a dosing tank from which, by means of automatic devices, the allotted amount of sewage can be run upon the bed in from fifteen to twenty minutes. The preliminary treatment of the sewage, as a rule, consists of either screening or screening and sedimentation, only one town



in Massachusetts using a septic tank. The author believed, however, that when properly used septic tanks would allow of a much larger amount of sewage being treated per acre per day, and would also reduce to a large extent the amount of scrapings from the beds. The working of these plants in summer is very simple, but in the long and cold winters, when the beds are covered with ice and snow from December to March so that the surface of the bed cannot be reached, the filters have to be operated with considerable care to obtain good results. Trouble was also caused in the winter owing to the clogging of the beds, and the amount of sewage which can be applied is considerably reduced, and unless there is a reserve area for winter use there is danger of a certain amount of sewage being allowed to escape untreated. With regard to capacity, the author believed that if crude sewage was run directly on to the beds one acre of filter surface should be provided for every 500 persons, but if the sewage has undergone preliminary treatment by sedimentation or septic tank treatment, the same area may receive the sewage of from 1,000 to 1,500 persons. The cost of maintenance varies, but where the sewage runs by gravity to the filter beds the total cost should not exceed 16s. per 1,000,000 gallons. If the sand which is removed by scraping is replaced, he saw no reason why a carefully constructed plant should deteriorate.

Mr. Baldwin Latham proposed, and Mr. Whitaker seconded, a vote of thanks to the readers of the papers, and this was carried.

Ballie Anderson, of Glasgow, in opening the discussion, said that, notwithstanding the deprecatory remarks which had fallen as to the value of the system of chemical precipitation, yet in Glasgow the method was satisfying their requirements. The question of purification was one which every locality must deal with for itself, and if Glasgow found this method met its requirements, then he could not be expected to agree with Dr. Kinnicute that it was a failure. It was all very well for scientists and engineers and chemists and advocates of the bacteriological system to say that this or that system was the best; but the representatives of the ratepayers had to consider what was best and cheapest. In Glasgow they delayed their works to learn something more of what London was being advised to do, but they found that this advice, if followed, would have cost them ten times more than the cost of chemical precipitation, and, as representing the ratepayers, they did not feel justified in going to such an expense. They were satisfied with their system, and were satisfied that they removed not only the suspended matter, but a great deal of matter in solution, and were producing a very good effluent indeed.

Mr. Baldwin Latham pointed out that it was very difficult to compare an effluent in a tidal river and in a fresh-water stream. There was one thing in a tidal river which was of enormous force in removing sewage, and that was the mixing action. That was much more potent than the tidal flow or the current of water. The mixing action depended on the capacity of the river at low water, and so they must have regard to the place where the sewage was disposed of. Contact beds had been in operation for twenty years, and it was twenty years ago that the Friern Barnet Works were laid down, and had been dealing with sewage ever since, and had produced the best effluent that ever had been produced in the country. They knew that the London County Council had been making experiments, and they all hoped the day would come when salmon would come up the Thames, but that would not be until they had something more perfect than a mere chemical process.

Mr. G. Whyatt (Grimsby) remarked that at his town they discharged the sewage untreated into the river, and there was absolutely no harm done, because the volume of water was so immense. So far as they were concerned, therefore, the problem did not exist. They had listened to contradictory opinions that day, for while Mr. Archibald told them that the chemical process was satisfactory and that the effluent would not undergo secondary decomposition, Dr. Kinnicute told them exactly the opposite. Mr. Scott Moncrieff told them that the problem had never been tackled scientifically, and it

appeared to him that those who had to face the problem would hardly know where they were.

Mr. Lambie (Lanarkshire) thought that the price at which land had to be bought was at the root of the whole matter. He did not see why sewage disposal should not be treated in counties instead of having a large number of small installations.

Mr. Alderman Gibbons (Wolverhampton) said he was surprised to hear what was said about Birmingham sewage. If they rode along the line from Birmingham to Derby they would never see anything more deplorable. There were thousands of acres water-logged between Saltley and Tanworth.

Mr. Dibden said that over seventeen years ago he described the process of chemical treatment proposing to deal partially with London sewage, and he was pleased to know that the Council had been successful in accomplishing that which it was intended to accomplish. That process was coined by Glasgow, and he was glad to hear that they were extremely pleased with the results. The treatment removed the grosser condition of the river, but the effluent would have to be further treated before they got fish to live in it. He looked forward to the time when, by the bacteriological treatment, fish would be enabled to live, and he trusted Glasgow would follow in time.

Dr. Kinnicute said he did not wish to condemn the chemical treatment. All he said was that he did not consider it a complete method of purification.

The section then adjourned.

#### SECOND DAY'S SITTING.

On Friday Section B and Section D combined together to hear papers on School Buildings. Mr. J. H. Yoxall presided.

#### Elementary Schools in Rural and Urban Districts.

Mr. A. A. Kemp (Whitstable), in the course of a paper on "The Planning and Extension of Elementary Schools in Rural and Urban Districts," referred more particularly to the effect of the Education Act of 1902 upon rural districts. He thought that many of the difficulties which are experienced in carrying out any proposed scheme by the education authorities could be obviated by the appointment of an inspector of building acting directly under the Board of Education. Coming to the general construction and planning of new buildings, the author said the most suitable sites are those which have either gravel, chalk, or sandy soil. Care should be taken that the altitude of the land should be well above the storm level of any stream in the neighbourhood, and, if possible, where a district is not sewered, it should be in a position so that one could carry an effluent pipe for treating the drainage to an open watercourse. The area of the site should be sufficient in all cases for the erection of a complete group of schools, even although at first only a small school was required. The best arrangement of the buildings, particularly for infant schools, is where the classrooms are grouped round a central hall, with cloak-rooms on each end with flat roofs, the central hall being lighted above the cloak-room roof with large gable lights. This is much better than a lantern light in the roof, both as regards light and ventilation. In large schools heated by hot water, the low-pressure system is the best that can be adopted for even temperature, cleanliness, and economy. The first cost is not much more than that of ventilating stoves, and the excess is soon saved by the reduction in the expenditure on fuel. He did not consider ventilation by windows only an efficient system. Vitrated air-plates should be fixed in the ceiling and connected with a tube to some efficient ridge ventilator in the roof, or another simple form of an extract ventilator can be formed by building in glass louvres in each gable. His view was that a building can be thoroughly ventilated without going in for any costly special appliances. The code set out by the Board of Education as to the construction of walls provides that they should be solid, and not less than 14 in. in thickness; where hollow walls are used, one portion must have the full thickness required for solid walls. This he considered wasteful, particularly when the building is only one story in height. In many instances

the wall does not exceed 14 ft. in height, and would be quite safe if erected with two casings, 9 in. inside and 4½ in. outside, tied together with galvanised iron ties. This particularly refers to buildings in exposed positions, as in every case where 14-in. solid walls are used there are portions of the wall which are always damp, thus causing an unhealthy building. The cost of the work would prohibit the walls being built with 14-in. inner casing and 4½-in. outer casing, as the code sets out. The inside of the walls should be faced with glazed bricks, or some other suitable material which can be easily washed down and kept clean and sanitary. The walls above dado level should be faced with Portland cement faced with Keen's, and afterwards painted with indestructible paint, which likewise should be washed down and kept sanitary. All internal and external angles to walls, floors, and ceilings should be formed with hollows and rounded at corners, thus preventing dust accumulating in the interior angles, also giving better facilities for sweeping the dust away from the intersections of floor and walls. Care should be taken that projecting ornamental mouldings, cornices, and architraves should not be introduced more than is necessary in the interior of school buildings as they only harbour dust and bacteria, which should be avoided as much as possible. Where a system for the treatment of the drainage can be arranged it is of the utmost importance that it should be, as cess-pools and other modes of drainage used in rural districts are very injurious to health, and should be avoided if possible.

#### Ventilation of Schools and Public Buildings.

Mr. J. H. Blizard then read a paper on "The Ventilation of Elementary Schools and Public Buildings." In the course of his remarks he said:—"Under the Building Rules issued by the Board of Education, the minimum requirements were, for infants, 8 sq. ft. of floor area, or 80 cubic ft. of air space, and for adult children, 10 sq. ft. of floor area, or 130 cubic ft. of air space. A few years ago the rule for infants was altered to 9 sq. ft. of area, which was certainly an advance in the right direction, small though it was. In all the codes ventilation has been mentioned, that is to say, 'actual interchange by the removal of the vitiated air and replacing it with fresh air.' It was only a few years ago that an area of outlet per child was mentioned—viz., ½-in. outlet area per child, and ¾-in. inlet area; that has gradually grown, until to-day it is 2 in. area per child for the outlet, and 2½-in. area per child for the inlet. This is better than nothing, but it is really very little good. The actual results should be obtained and published, and a further alteration would very soon be made. These figures show very slow progress of the Education Department on this all-important subject. The limit of cost per head for the buildings and site, after the passing of the Education Act of 1870, was 10l.; it is now 10l., but excluding site, central halls, and a few other matters, such as glazed brick facings, etc., respectively submit, with all deference to the medical profession, that the construction of schools, elementary or otherwise, should go hand-in-hand with the construction of sanatoria or isolation hospitals. . . . I submit that the cubic capacity laid down by the Board of Education for each child—viz., 80 ft. and 130 ft. respectively—is grossly insufficient, even if there be fairly good ventilation; but it is impossible to get good ventilation with so small a cubic capacity per child, and the most serious part of it is the absence of any attempt at ventilation—that is, actual interchange of air—in the large majority of schools throughout the country. I venture to say the majority are insufficiently ventilated, and in many cases not ventilated at all. This is a serious indictment, but it is nevertheless true."

I submit that schools, where children are compelled to go, should be treated in a sense as a hospital, and that it is no good having a school unless it is properly designed for school-work from a hygienic standpoint. Doubtless, you will say that under the present law the cost governs everything; so it does, and so long as the limit is adhered to as laid down by the Board of Education, so long we shall have unhygienic



schools. The average ratepayers' representative must have nothing to do with the cost of a school; it must be dealt with directly by the State, or the ratepayers must be assisted by the State. It is unreasonable to expect a poor district with a low rateable value to do the same as a rich district with a high rateable value—East Ham and Westminster, to wit. . . . Ten years ago I designed a central hall, 83 ft. long, 40 ft. wide, and 30 ft. high. There are hot-water coils there; the cloak-rooms are warmed for drying the children's clothes, but there is no hot water to the lavatory basins. I would go still further to-day if I were allowed to do so, and have a regulated hot-water supply to the lavatory basins, and a bath for the children, so that they could be properly washed if sent dirty to school, also a disinfecting apparatus to disinfect the clothes of some of the poor children who are so sadly neglected by their parents, and allowed to go to school in a verminous condition, to the danger and discomfort of the large majority of children sent with proper clothing, and with due regard to cleanliness. The teachers, be it said to their credit, extend deep and practical sympathy with neglected children, and if an apparatus were provided and worked by the caretaker under the direction of the head teachers, it would have a marvellous educational effect upon the minds of the children so treated, and would bear good fruit in the future. The cloak-rooms should also be arranged to give more hanging space for the clothes, in order to have better ventilation during the time the children are in school, than can be obtained under present conditions. I have inspected and reported upon about fifty voluntary elementary schools since the passing of the Education Act, 1902, and the results were astounding. . . . Not one school had a proper combined scheme of heating and ventilation, and the sanitary arrangements were in some cases appalling. This could not exist if proper sanitary experts inspected the schools. In my position as architect and surveyor to the School Board of Southampton, after my appointment thirteen years ago, the first thing I tried to bring about was the ventilation of the then schools. I reported upon them to my Board, and in two or three cases only were my reports adopted. Why? Simply because the members did not understand the question, and though my ideas took fanciful. The argument was always, "Ventilation by open windows is sufficient," and that is the usual argument with the average School Board or education authority. Many schools should be condemned to-day for that reason. Even with the new schools it is the same old story: Keep down the cost, ventilate by open windows, and have ordinary fireplaces for warming. Just imagine the open doors and windows in the winter, which I have so often seen, and doubtless you have, too, and the air outside at freezing-point. Bad as it is for the children, it is better than the slow poison of pre-breathed air, which is also more or less saturated with emanations from uncleanly bodies; in fact, I have been told by both masters and mistresses that they cannot carry on their work without resorting to the open windows. Most of this has been done under plans passed by the Education Department with the limited cost per head.

Now, what is the remedy? We must admit that 150 cubic ft. per head is insufficient for reasonable ventilation. Soldiers in their barracks are allowed 600 cubic ft.; a man in a common lodging-house 300 cubic ft.; in a workhouse dormitory 300 cubic ft.; and for a scholar in a Canadian school 240 cubic ft. In our elementary schools we should have 250 cubic ft. per head, whether it is for infant or adult scholars, and that the actual interchange be at least four times per hour, winter and summer. There should be no imagination about it. Let it be done and passed by experts appointed by the Board of Education, and a certificate granted to that effect. Such a scheme would give 1,000 cubic ft. to each child every hour, and would minimise the evils and liabilities of infection; it would enable the children and teachers to breathe reasonably pure air, reduce the sickness rate, make everyone lively and cheerful over the schoolwork, send up the average attendance, give better educational results, and, consequently, increase the school grants. All

schools should be under the Board of Education or some other responsible authority appointed by the Government. They should be examined and put into proper hygienic order, which should include drainage, ventilation, and flushing of drains, sewage disposal, water supply, combined heating and ventilation based on a fair cubic capacity per head, with a continuous interchange of air of at least four times per hour, with the temperature maintained at 55 deg. F. when at freezing-point outside. This should be as carefully tested and adhered to as a battleship is tested for speed. Care should also be taken that the supply of fresh air be brought from as high a level as possible, and not from a point near the ground, as with the average 'Tobin tube' or 'wall inlet,' and each school should be studied on its own merits or demerits. When the certificate is granted, the whole sanitary surroundings of the school should then be handed over to the Medical Officer of Health of the Sanitary Authority of the various districts in which the schools exist, who should make periodical visits to see that the sanitary and ventilating and heating arrangements are in working order, and so report in his usual annual medical report. The amount of ventilation, as suggested by me, is, in the minds of some heating engineers, very extravagant, having regard to the competitions into which they have to enter for schemes and estimates; but they would nevertheless welcome such a change, because the majority know that the so-called ventilation, as generally carried out, is only a farce. If they had a basis upon which to work—that is, cubic capacity, nature of the building materials, windows, amount of interchange, temperature to be maintained in winter, interchange mechanically in the summer by electric fans, gas-jets, sprays, or other means—they would be as glad to compete on such lines as a marine engineer is when competing for engines to maintain a given speed to a torpedo-boat. At the present time, unfortunately, it is usually the cheapest scheme which is adopted, efficiency not being considered. . . . The enormous amount of money required for the reconstruction of unsuitable schools must be found, but the question which again occurs to one's mind is 'State aid.' It must come; the children must be taught, and one of the principal subjects is hygiene; that being so, the places in which they are taught must be arranged and constructed on hygienic lines. If this is not put into practice, then the teaching will be thrown away, and very little good will result. . . . I hope the outcome of this paper, and the discussion upon it, will be that the Council of the Royal Institute of Public Health will memorialise the Board of Education to amend their building rules on hygienic lines, and so protect the health of the elementary school children, also to appoint inspectors who are known to have a good knowledge and experience of school hygiene. If this be followed up, and become an accomplished fact, then the future generations will be for ever grateful that such an institute existed.

I do not think I can go into the details for the ventilation of public buildings. The same principle which I have stated for elementary schools underlies every building where people congregate. The hygiene of public buildings should be determined by the Local Government Board, on somewhat the same lines that I have suggested for elementary schools, and whatever is settled by them should be adopted by sanitary authorities in the form of by-laws, and the medical officers of health should see them carried out and report annually, as suggested for schools. Churches, particularly, are, in my opinion, the best places for the dissemination of the germs of infectious disease, particularly consumption. What do you find in the average church? No ventilation at all, consequently an ideal place for infection. . . . Take also the average public hall, courts of law—yes, even our London Law Courts—military barracks, and general assembly-rooms; they are all alike—insufficiently ventilated. The only places ventilated, as I understand it—that is, air properly interchanged—are modern theatres. If public authorities would study the hygiene of the up-to-date theatre, and apply it to every public hall and church in their district, they would confer a great boon on

poor suffering humanity, and would also keep the cost down for the maintenance of infectious diseases hospitals and sanatoria for the consumptive."

#### Planning of Educational Buildings.

Mr. E. R. Robson, formerly adviser to the Board of Education, and Mr. P. A. Robson contributed a joint paper on "The Planning of Educational Buildings," in which they said that, remembering that the whole first conception of strategy of plan turns on the scheme of education proposed for any particular school, architects have naturally looked for light and leading from those in the position of educational authorities. Such help, as yet, they have never received. The hygiene of a school really commences with the site; therefore its surroundings should not provide foul smells or nuisances, should be free from stagnant water or undrained land, and should be free from obstruction to sunshine or to the free passage of air all round. Being large and airy, the site should by preference be fairly elevated, sheltered from north-east winds, open to the south, and sloping away from the school. The subsoil should be of a dry, porous character, and, in towns, provided with at least one frontage to a wide street. The best shape is square, and the water supply must be sure. Play-grounds should face south, should be thoroughly underdrained with agricultural pipes, and the surface laid with tar pavement or asphalt. The number of entrances will vary according to the size of the school. The flooring of the corridors should be of tiles or granolithic pavement. For cloak-rooms and lavatories glazed brick is best for the wall surface, and there should be an impervious but dry flooring. Asphalt should not be used, as the condensation of the moisture in the air on its surface is highly disagreeable and unhealthy. The staircases should be fire-resisting, in short flights—no flight to exceed twelve steps—and of an easy gradient. A central hall should have an area of from 1,200 ft. upwards, but too large a one is both extravagant and useless. All classrooms should be entered from the central hall, through glazed doors opening into the classrooms. From the experience of other countries, 14 ft. per child is as much as is necessary in either secondary or elementary schools, but the question of a cubic unit is a more far-reaching matter. It is established that, for reasons of health, no scientific reason exists for making classrooms of a greater height than 10 ft. In American schools an average of 164 cubic ft. is usual, so that, with 14 sq. ft. per child, and a room 12 ft. high, the cubic content per child is 168 cubic ft., or 4 ft. more than in America. The numbers to be contained in each classroom may vary from eighteen to thirty-six in secondary schools, and from eighteen to fifty in elementary schools; and elasticity of working is attained best by classes of forty and fifty in the latter, and eighteen to thirty in the former. Unscientific lighting and the improper shape of desks are largely to blame for the increase of weak sight in schools, and the authors laid down the following rules as being satisfactory if taken together:—(1) A room facing south (or thereabouts) should have not less than one-sixth of its floor area as clear window glass, and those facing north (or thereabouts) one-fourth actual glass area, not window space. (2) No room is properly lit without subsidiary light if the distance from the window-wall to the wall opposite is more than 25 ft. (3) All light should come to the left side of the scholars. (4) No windows should face the scholars or the teacher except for ventilation, or for subsidiary light behind the scholars in the corner of the wall away from the main light. (5) The rooms should not be less than 10 ft. high; 12 ft. is ample. (6) The height between the top of the glass and the ceiling should be never more than 2 ft., preferably less. (7) The height from the floor to the bottom of the glass, 4 ft. (8) The ceiling should be white, the walls very pale green (non-poisonous and washable), the ordinary woodwork white (enamel). (9) Heavy piers should be avoided, if possible between the windows, also thick mullions and transoms and very small panes. The best form of artificial lighting is by acetylene gas, generated by an apparatus in which the calcium carbide drops into



water, and then the gas should drop through a purifier. The greatest factors in ventilation under ordinary circumstances are properly designed windows. If following the rules hereinbefore expressly laid down, these further additional hints will be useful:—A sash window is the best form to use with a fan-light at the top. This gives ventilation at four points at a height of from 6 ft. to 8 ft., according to the height of the room. A vertical sill-board is useful to prevent draughts at the bottom, and, if the fan-light's fall is glazed, side-pieces or cheeks are desirable to obviate down-draught. The amount of window-space to be opened must vary in the different rooms, owing to the vacillation of our climate. But each child should receive 2,000 cubic ft. of new air per hour. In addition to this, further inlet ventilation is necessary by means of long Tobin tubes, the air entering at the floor level and discharging into the room up screwed shafts 6 ft. long through "shuttles." The outlet should be by means of ordinary fireplaces, by separate flues properly proportioned to the size of the room and of the inlets, and aided by electric fans, or by ceiling trunks aided in the same way, or by a coil of pipes; ventilating radiators are liable to send draughts along the floor, and, moreover, if hot water is used in the radiators there is danger in frosty weather.

In the discussion which followed, Dr. G. Lyon held that the system of window ventilation had proved an absolute failure, and Dr. Somerville deprecated the appointment of an inspector of building under the Board of Education, as they would run a danger of having too much official supervision.

Sir George Kekewich said that a condition precedent to any good coming from the teaching of hygiene was an improvement in the houses of the working classes. He advocated the appointment of a medical officer at the Board of Education, and medical officers should also be appointed by the local authorities to visit every school and report on the sanitary condition of the schools and the health of the children, and they should get rid of the bad schools and put up others.

#### The Housing Question.

Mr. T. W. Aldwinckle subsequently presided over the resumed sitting of Section D, when papers dealing with the housing question were read.

Mr. J. Munce (Assistant City Surveyor, Belfast), in a paper on "Workmen's Dwellings in Belfast," said the demand for workmen's dwellings in the city had always been met by private enterprise. To have a cheap rent it was necessary to have a cheap site and a cheap building, and the method adopted at Belfast was to utilise the main frontages and the corner plots of a site for business purposes. The usual method adopted was for a building-owner to take a lease of a number of fields from the head landlord at a rent per acre, lay out the area in streets (which were adopted by the Corporation, as a matter of course, when completed to the satisfaction of the surveyor, and maintained in good order for twelve months). The usual price with streets made is from 3s. per lineal foot upwards, according to the width of the street. The leases were seldom less than 999 years, and such leases as ninety years would not be entertained. The ordinary house built is what is known as a kitchen house. Every house is provided with a yard, water-closet, and covered ashpit. A constant supply of water at high pressure was laid on, and gas fittings and penny-in-the-slot meters provided by the Corporation. Kitchen houses, with three bedrooms, with 13 ft. frontage and 36 ft. depth, ground rent from 35s. to 40s., and costing 70l. to build, were let at from 3s. 6d. to 4s. 6d. a week. Parlour houses, with parlour, kitchen and scullery, and three bedrooms, 14 ft. frontage and 42 ft. depth, cost 100l. to build, and were rented at from 4s. 6d. to 5s. a week. Then they had parlour houses, with the addition of a bath, which cost about 150l. to build, and were let at 15l. a year; and a somewhat better class let at 17l. to 19l. a year. The houses are built of good bricks and mortar, the outer walls 9 in. thick, parting walls 4½ in. thick, with chimney breasts; joists 9 in. by 1½ in. spruce; 1-in. redwood flooring, spruce rafters 4½ in. by 1½ in.,

parlins. 7 in. by 3 in., covered with slates. The joinery is of yellow pine. The exterior is faced, as a rule, with red perforated bricks, but in a few cases cement on common bricks is used. Party walls are carried up to slates, but not through, except in cases of shops adjoining dwellings. The rents he referred to are inclusive of rates. At the present time, the rates of Belfast are 7s. 3d. in the pound, but owners were allowed a discount, which brought the rate down to 6s. 1d. in the pound. He thought a great reason why built houses should not be expensively changed, that the value of sites frequently changed, and it might be to advantage to replace such houses with commercial buildings.

The Chairman remarked that apparently they had very different by-laws in Belfast from those they worked under in London, and it would be interesting to have a comparison of what they were allowed and were not allowed to do in the two places.

Mr. T. B. Simmons (Surveyor to the Malden and Coombe Urban District Council) expressed the opinion that the greatest stumbling-block in the way of making progress in providing reasonable dwellings for the labouring classes is the present unworkable by-laws. He believed that the class of house required to accommodate the poorer classes of the community is not generally considered by the private speculator, and considered that the Housing of the Working Classes Act of 1890 ought to be extended so as to give an urban or a rural district council so as to supply the wants of its respective locality when such wants are not fully provided for by the private landlord. The local authority is in a more favourable position to deal with the question than is the private builder for the period of repayment of loan, for the loan is eighty years and for the building sixty years, while the private builder undoubtedly would require to clear off all liability for the property in from fifteen to twenty years, as well as to make a reasonable percentage on his initial outlay. In some of the rural districts the housing question is being felt very acutely, and landlords, no doubt, would be willing to pull down the dilapidated cottages and replace them by healthier and more sanitary dwellings, but hesitate on account of the cost that would be entailed to comply with the present by-laws. He considered that the time has now arrived when the Local Government Board ought to make such modifications in its rural building by-laws as will reasonably reduce the cost of building healthy and wholesome cottages for the farm labourers. He saw no difficulty in framing such by-laws so that they would embrace any unit of a rural district which may become more of an urban character. In his opinion, the main points in the by-laws are to enforce the requirements for sufficient air-space in and about buildings; to enforce proper requirements for sanitary accommodation, and to see the same is provided so as in no way to interfere with the health and comfort of the public; to enforce the provisions for a good, wholesome, and sufficient water supply; to see that the site is properly prepared for the building so as to prevent dampness, and to see that the structure is put together in a sound and satisfactory manner.

#### Garden Cities.

Mr. Ralph Neville, K.C. (Chairman of the First Garden City, Ltd.), contributed a paper on this subject, which, in his absence, was read by Mr. Northcott (the secretary of the company). The author described the scheme for the first garden city, near Hitchin, to be known as Letchworth. Of the 3,800 acres acquired, only 1,000 acres in the centre are to be devoted to building, and the remainder is to remain always as an agricultural belt consecrated to the goddess of hygiene.

#### Motor Omnibuses in Relation to Public Health.

Mr. E. Shrapnell Smith, in a paper on this subject, referred to the importance of rapid means of transit in dealing with the housing problem, and, touching on the question of motor omnibuses being an alternative for electric trams, expressed the opinion that, in urban districts having a population ranging between 30,000 and

100,000, the benefits of the motor omnibus to public health would be most marked. He saw no reason why the size of motor vehicles should not be increased.

Mr. G. Whyatt (Grimsby) proposed a vote of thanks to the authors of the papers, and expressed the opinion that the housing problem was best met by private enterprise. He felt that the garden city enterprise was a good one. He did not see why local authorities were in a better position to deal with the question than the private builder, and it was not his experience that a building wanted to clear off the liability in fifteen or twenty years. The local authority was obliged by the Local Government Board to put up a better class of house than the private builder, and, consequently, it cost them more. He did not see that the model by-laws could be much improved, because the speculative builder knew how to sail closely to them. He rather felt that tramways were doomed for small towns.

Mr. W. Towers (Building Surveyor, Leeds) seconded the motion, and asked Mr. Munce the width of the front streets; the minimum amount of open space to the houses; whether the site of the houses was concreted; if damp courses were provided, and if, in the 13-ft. frontage houses, the sculleries were built outside the main walls. He agreed that the by-laws ought to be modified, especially with regard to the width of streets. He did not mean in the width from house to house, but in the actual roadway, because the wider the roadway the greater was the cost of paving and flagging.

Mr. Young (Wallingford) remarked that, in his town, they had had the greatest difficulty in closing insanitary houses because there were no other houses for the people to go to.

The motion was heartily agreed to.

Mr. Munce said he thought the by-laws in Belfast were more stringent than those in England. With regard to the 4½-in. walls, Belfast was shrewd enough to go to Paris for that power. The width of their streets was within the discretion of the Corporation. It was true that a narrow roadway was less expensive, but the difficulty was that the man who moved constantly to keep near his work could not keep his front garden in order, and they were, consequently, a failure. The rule now was to concrete the spaces in front of the houses. Forty feet between the houses was the minimum. They could require concrete under every house if the surveyor thought it necessary. There was a damp course for every house, and in all recently-built houses the scullery was outside.

A vote of thanks to the chairman concluded the day's sitting.

[Our report will be concluded next week.]

#### NATIONAL COMPETITION OF SCHOOLS OF ART.

THE annual exhibition of the prize drawings and designs of the Board of Education Schools of Art is now being held in the galleries of the Indian Section at South Kensington. Compared with former occasions, the show marks a falling off in the quality of the students' work, a fact strongly emphasised in the official reports of the Board. The exhibits consist mainly of decorative objects; there is a fair amount of applied design, and but little architecture proper; and of this, measured drawings of old work claim the largest proportion.

The chapter-house doorway at Southwell Cathedral, drawn by Mr. R. Atkinson, of Nottingham, is certainly the best. The inch-scale elevations are most carefully and thoroughly rendered; the full-size mouldings and carvings well shown, and the general spirit of the drawing is excellent and worthy of the silver medal which is awarded. The Church of St. Benet, Paul's Wharf, E.C., is a subject worthy of better drawing, while the gateway of St. John's College, Oxford, exhibited by Mr. W. J. Freeman, is carefully but incompletely done.

In the architectural designs there is an absence of interest and enthusiasm. Mr. Atkinson receives another silver medal for a design for "the lounge and staircase in a large hotel," and so far as drawing and detail are concerned, nothing could be desired. But, in the matter of construction, the fundamental point of the whole scheme is destroyed by the



insufficient size of the four piers which receive the main arches carrying the dome and roof of the central space. "A Royal Palace," by Mr. H. Phipps, of Shrewsbury, is scarcely dignified, nor is any importance given to the conception in the perspective view. Classic ornament is very well drawn in the contributions from Sunderland, for which well-merited awards are made to Miss Foote and Miss Stokoe.

One of the most interesting, and, in some ways the largest, sections is the work in stained glass. Students from Dublin are particularly successful with some excellent glass painting, for which Miss Rhind and Mr. Barden obtain silver medals. Mr. B. Lamphugh receives a similar award for some charming designs in Biblical subjects, many of which are applicable to the quarries of an ordinary domestic window.

Mural decoration is more in the form of pictures than possessing any architectural character. The work of the Regent-street Polytechnic school students is, however, an exception, and thus secures most of the prizes. Metal-work and furniture are disappointing. Some good work, however, is to be seen in relief panels, in which some of the sculpture from the Leicester school—Mr. Emerson's modelling in particular—is very good.

Pottery is both interesting in design and in colour. A gold medal is awarded to Mr. C. Vysse, of Hanley, for a memorial tablet in green glazed ware, which consists of a good modelled group of figures set in a frame of a somewhat restless design. Some vigorous work is shown by Mr. V. Webster, of Burslem, which is a welcome departure from the character of glazed ware for façades to which we have become accustomed. Students in the English pottery districts submit actual executed works, whereas the schools, which have not the same facilities, send drawings of designs, and the difference in quality and true feeling is pronounced.

Jewellery, although not extensively represented, is a very strong section, and if the other work undertaken by authoritative art education were as thorough, the effect on art generally in this country would be far-reaching. Miss Biggs, of Leicester, is awarded a gold medal for some delightful work in necklets, ring, and jewelled comb, in which the various materials are understood and arranged to display true values. Miss Clarke, of the same school, sends some charming work, which has additional interest in some tasteful enameled.

The show of wall-paper designs is surprisingly weak, although wall tapestries are good. Woven-fabric designs, however, are most excellent.

#### THE ARCHITECTURAL ASSOCIATION: DAY SCHOOL AND EVENING CONTINUATION SCHOOL.

An exhibition of students' drawings was held at the Architectural Association's premises in Tufnell-street, Westminster, on Friday, the 21st inst., upon the occasion of the termination of the fourth year's work of the Day School and the first year of the Evening Continuation School.

A large attendance, which included the President, members of the Council, past and present students, and some well-known members of the profession, contributed to the success of the gathering.

The President, Mr. E. Guy Dawber, gave a short address upon the result of the past year's work, in which he drew attention to the remarkable progress made by most of the students. He considered the training to be thorough and practical, and predicted that, with continued prosperity, the schools would have a direct and important influence upon the future of the profession. In concluding his remarks, the President commented upon the work of the successful students, and announced the awards, which are referred to at the end of this review.

Sir Aston Webb expressed his pleasure in being present, and said he was much gratified by the interest and success of the exhibition. He hoped, in conjunction with Mr. Basil Champneys, to render practical assistance to the work as a visitor appointed by the Board of Architectural Education, and that the heavy ordeal of the three progressive examinations

required by the Royal Institute of British Architects might some day give place to the gradual and more permanent training which the Architectural Association Day School offered. Such recognition by the Institute would provide an additional incentive to the students for concentrated, serious work.

Mr. Maule, Master of the Day School, cordially thanked the President and Sir Aston Webb for their presence, and also for the great encouragement which their remarks gave to all who were interested in the work of the Association. He considered that the drawings demonstrated that the students had worked hard and well. He also welcomed the co-operation with the Board of Architectural Education, which was now assuming definite form. He then gave some personal impressions of the past year's work, and of the aims and objects of the Day School in general. He deplored the lamentable state of current public school education, which manifested itself in the majority of first year students. He complained that young men who were supposed to have received a fair education were invariably lacking in fundamental elementary knowledge. Students came to the Day School who had no power of expressing their thoughts in their own language, had not been trained in the all-important habit of observation, and had no faculty for hard work or application. Thus a great amount of the students' time was occupied in the first year's course in being grounded in the elements of an ordinary education.

The Master of the Evening Continuation School, Mr. T. F. Green, reviewed the work in the past year, and commented upon the progress of the various students.

The exhibition of drawings was in every respect interesting, and clearly showed that the scheme of education is a practical one.

In the first year's course of the Day School, drawing is mainly devoted to the copying of styles and of construction, arranged concurrently with lectures and visits upon the respective subjects. Measuring old work, drawing from the cast and sketching are also important parts of the tuition, while holiday work is undertaken at the direction of the master. When it is considered that these students come direct from school, and have little or no proficiency in drawing, the results are admirable, and demonstrate that the educational policy of the Architectural Association is proceeding on right lines.

When we turn to the work of the second year, this satisfactory condition is more marked, and, what is of great importance, the individuality of the student appears to be carefully considered. Elementary design is the principal work of the year, and with it lectures, bearing upon the subjects, are given in history and construction, and visits are made to museums, as well as to buildings in process of construction. All drawings made are of a practical working nature, such as would be required of a student were he in an architect's office. Such subjects as a stable, a village church, a farmhouse, and a coast-guard station are set, according to the convenience of the three working terms, and the actual results, in which much thought, individuality, and good drawing are to be seen, may be said to reflect great credit upon the methods of teaching. Again, comparing the relative progress of the two years, the instruction is thorough, and consequently of lasting use to the student.

The Evening Continuation School is taken advantage of by a number of ex-Day School students, who, having entered an office, desire to prosecute their studies in design of a higher nature, and it is satisfactory to observe that the progress of the earlier work is steadily maintained.

The following is a list of the awards:—

#### ARCHITECTURAL ASSOCIATION DAY SCHOOL.

##### First Year Awards.

Book prize for first place in history and construction tests—E. Stanley Hall, A.A. sketch book for first place in freehand drawing tests—V. C. Bataha Reis. Book prize for best work in studio during whole session—Maurice S. R. Adams. Master's prize for essay—W. J. Jones. Drawings selected for presentation to school portfolio—V. C. Bataha Reis, E. Stanley Hall, Maurice S. R. Adams.

##### Second Year Awards.

Travelling studentship of 15l. for studio work during session 1904-1905, holiday work during three vacations, and general progress—W. W. Scott Moncrieff. Extra studentship of 5l. for general excellence in studio and holiday work—F. T. W. Grant.

End of session test (special prize offered by Mr. H. P. G. Maule), subject, "A Village Hall," award made by Mr. E. Guy Dawber—design placed first, F. T. W. Grant; bracketed second, A. G. Blackford, H. I. Merriman, and W. W. Scott Moncrieff; third, A. N. Peckham. Prize for studio work and excellence in draughtsmanship—H. I. Merriman; hon. mention, R. C. Coulson. Drawings selected for presentation to school portfolio—W. W. Scott Moncrieff, F. T. W. Grant, H. I. Merriman, and R. C. Coulson.

#### ARCHITECTURAL ASSOCIATION EVENING CONTINUATION SCHOOL. Session 1904-5 Awards.

First prize, general excellence in studio work—A. Welford; second prize—J. K. Ground; third prize—C. Makin.

## Correspondence.

### GIBBON v. PEASE.

SIR,—As the defendant in this action, will you kindly allow me, through the medium of your journal, which has supported me throughout, to express my very grateful thanks to all those professional bodies and fellow architects and surveyors who so kindly and generously came forward to my help, both financially and as witnesses, etc.

It was a great disappointment to me to lose the case, which I took up entirely in good faith, believing it differed entirely from Ebdy v. McGowan, as I still hold it does. I felt I had every chance of success, and thereby reversing the decision in the latter case, which I considered had been misunderstood for many years, though perhaps it was rather too large an undertaking for a young man only commencing his career and with little capital. I can only thank those who have helped me for their kind support, which I regret has been of no avail. C. EDW. PEASE.

16, Clifford's-inn.

### CHELSEA PUBLIC BATHS.

SIR,—As one of the London builders who tendered for the above, we write to protest against the action of the Chelsea Borough Council in passing over three substantial and well-known London firms in favour of a Plymouth contractor, whose tender was over 1,000l. higher than the lowest amount.

We think the Council should be asked to give their reasons for this unusual proceeding. It seems a great waste of time and money to builders tendering, besides throwing away the ratepayers' money, if a large contract like this is to be settled in such a manner.

"UNSUCCESSFUL."

### COURT OF COMMON COUNCIL.

The usual fortnightly meeting of the Court was held at the Guildhall on Thursday last week.

On the recommendation of the Streets Committee, it was agreed that the following clause, setting forth the manner in which electrical apparatus and circuits in vaults and areas may be protected, be added to the regulations for vaults and areas:—

"ELECTRIC LIGHTING, ETC.—That in connection with any provision in vaults, areas or cellars for the use of electricity for lighting power or for any other purpose, the pressure between any pair of terminals or conductors shall not exceed 450 volts, and the whole of the conducting circuit shall be insulated in the best possible manner, and be encased in a continuous metallic sheathing, efficiently connected to earth, so as to ensure at all times an immediate and safe discharge of electrical energy."

London Building Acts (Amendment Bill).—A letter was received from the Lewisham Borough Council, dealing with this Bill, and urging that "as the London Building Act of 1894 is already complicated by the Amendments of the Act of 1898," a new Building Act for London should be formulated.

The letter was referred to the Special Committee of the Court.

### METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of the Managers was held at the offices on Saturday last week.

Among the correspondence received from the Local Government Board were orders sanctioning the provision of additional bathing, lavatory, and disinfecting accommodation at Joyce Green Hospital, at a cost of 1,000l., and certain alterations at the laundry at the Eastern Hospital, at a cost of 4,684l.

New Central Stores.—It was agreed to apply to the Local Government Board for an order authorising the Managers to incur an expenditure not exceeding the sum of 31,800l. on the erection of the New Central Stores, such expenditure to be defrayed by means of a loan repayable within a period not exceeding thirty years.



## Illustrations.

## SCULPTURE: "LA SEINE ET L'ESCAUT."

**T**HESE two figures on pedestals, which were prominent objects in the sculpture hall at the Salon this year, were commissioned by the French Government from M. C. H. Theunissen, to decorate the entry on to one end of the new bridge of the canal at Saint-Quentin. They represent the two rivers, the Seine and the Escaut, which are connected with the canal.

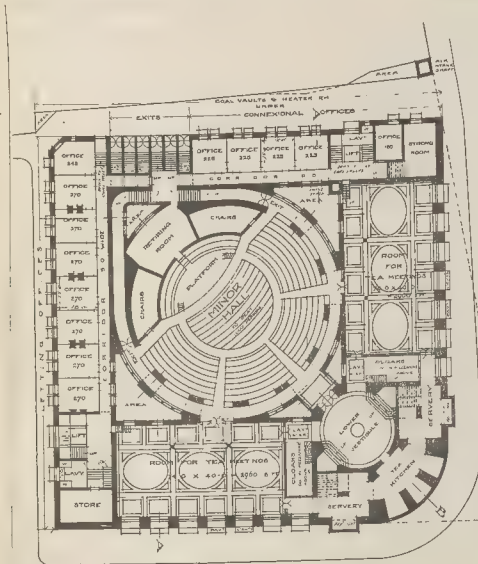
There will probably be two corresponding pedestals and figures erected at the other

extremity of the bridge, but as to these we have at present no information.

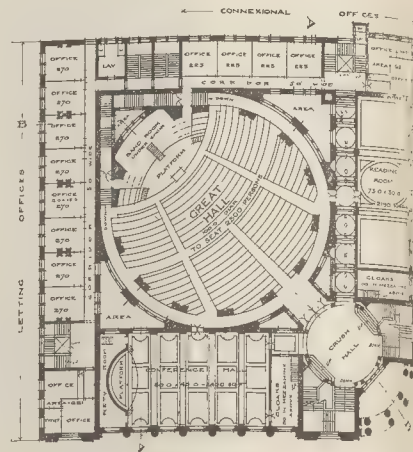
## DESIGN FOR WESLEYAN HALL, WESTMINSTER.

We illustrate this week the design submitted in the second competition for the Wesleyan Hall at Westminster by Messrs. Crouch, Butler, & Savidge, of Birmingham. We have in this case given the plans of four of the floors, because it would not have been possible with less to have explained fairly the peculiar feature of this plan, which is, to find the seat-room in the large hall, by extending it vertically rather than horizontally, the whole circular centre of the plan being devoted to the small and large halls,

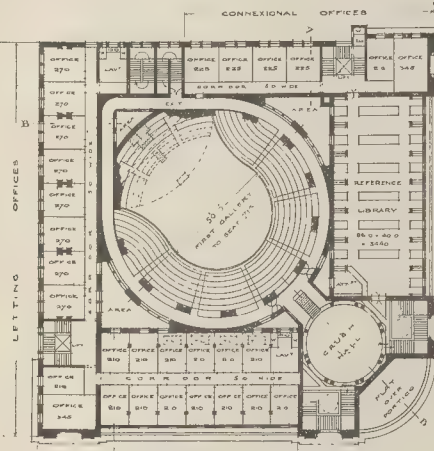
occupying the same area but differing much in height. We do not think this the best way of treating a large assembly hall, but in this case it has the merit of getting over the difficulty arising from restricted space on the plan, and the whole arrangement is not only very clever but displays a unity and symmetry of conception which is satisfactory in an architectural sense. As a general rule, an angle entrance is not the best for the plan of a large building; in this case, however, the employment of the circle for the principal and central interior apartment fits on very well with the angle entrance; and architecturally there was something to be said for this position in view of the fact that it is the most prominent point in the exterior street view.



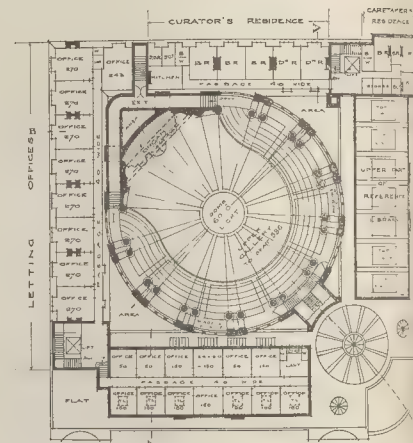
BASEMENT PLAN  
SCALE 60 FEET TO 1 INCH



FIRST FLOOR PLAN

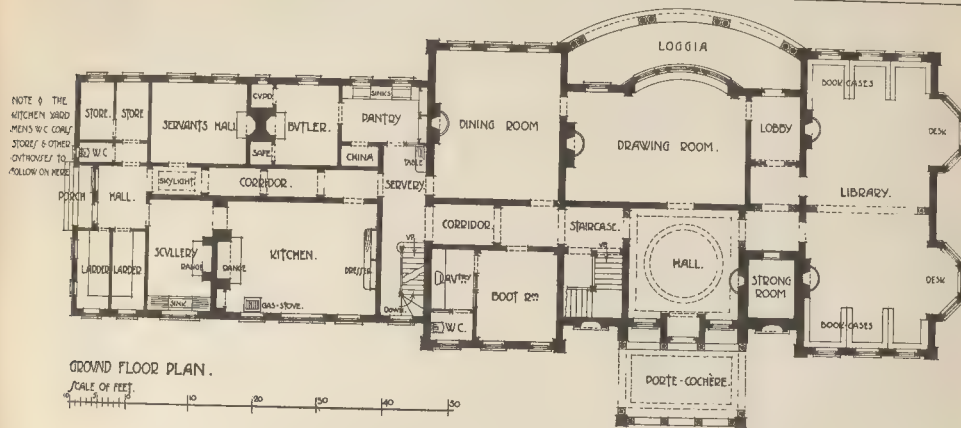


SECOND FLOOR PLAN  
SHOWING FIRST GALLERY  
AND 5TH FLOOR OF OFFICES



PLAN OF UPPER GALLERY  
SHOWING 4TH FLOOR OF OFFICES

Competition Design for Wesleyan Hall. Plans.



"Britwell," Herts.

We fear we could not have recommended for execution a building with the great hall planned on these lines; but nevertheless the design is a very able one and does great credit to its authors.

#### "BRITWELL," BERKHAMSTED.

The accompanying plan and description is of a proposed house for Sir John Evans, at Berkhamsted, Herts.

The chief point aimed at in the design was to provide a fairly comfortable and dignified house, having the usual reception-rooms, with a large library capable of being divided into two rooms well provided with bookcases, accommodation for two separate desks, and plenty of light, with the centre of the room left free for reception purposes or billiards.

The loggia protects the drawing-room from the full blaze of the southern sun, and the verandah over forms an adjunct to the best bedrooms which open on to it.

The culinary offices in the kitchen block face northward, and the servants' rooms face southward.

All the sanitary requirements, with the exception of the pantry sink, are in one block on the northern side of the house.

Messrs. Hubbard & Moore are the architects.

#### HOUSE AT HASLEMERE.

This house has recently been erected near Haslemere.

The walls are faced with many-tinted clump-burnt bricks, and the roof is tiled.

Messrs. Chapman & Lowry, of Grayshott and Haslemere, are the builders. Mr. E. J. May is the architect.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Camberwell Borough Council 1,256l. for street improvement, and 6,000l. for purchase of open space; Lewisham Borough Council 660l. for concreting bed of river Ravensbourne; North Surrey School District School Managers 700l. for works at Anerley schools; Poplar Borough Council 4,295l. for pipe sewers, and 10,818l. for electric lighting purposes; Hammersmith Guardians 5,640l. for poor law purposes; St. Marylebone Guardians 8,000l. for poor law purposes; Southwark Borough Council 7,400l. for erection of stables, etc., at depot; and Woolwich Borough Council 9,169l. for purchase of site for municipal buildings, etc.

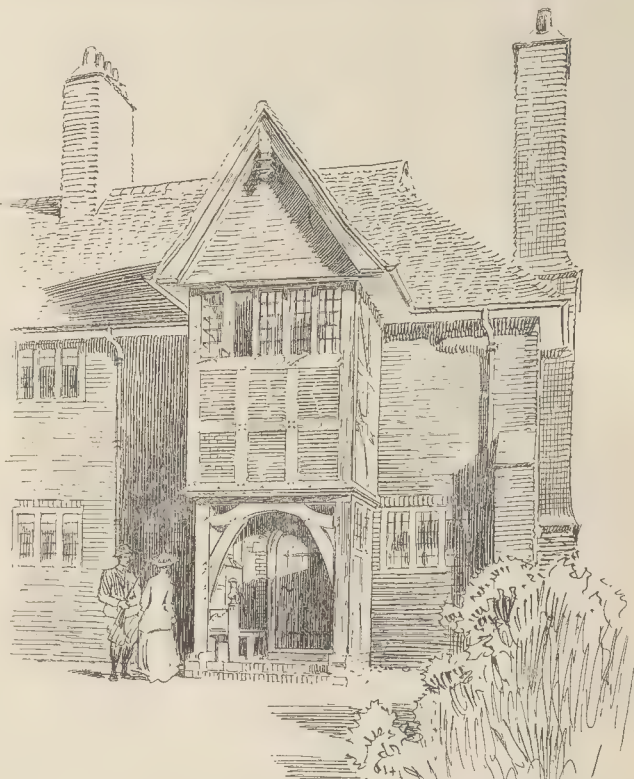
**Quantity Surveys.**—The General Purposes Committee brought up the following report:—

"We have had under consideration the question of the steps to be taken with regard to the quantity surveys employed by the Council to prepare bills of quantities for architectural works, and

those who were engaged by the late School Board for London to take out quantities for new schools, enlargements, etc. The firms with whom the Council entered into agreements, in accordance with its resolutions on April 3, 1900, and July 22, 1903, are seven in number. The late authority employed eight firms, the names of two of whom appear on the Council's list. The terms under which this work was done for the late authority differ from those laid down by the Council, and as we are of opinion that it is undesirable that there should be two sets of conditions dealing with the same kind of work, we have communicated, with one exception, with the firms employed by the late authority, and have ascertained that they are prepared to take out quantities for new schools, enlargements, etc., on

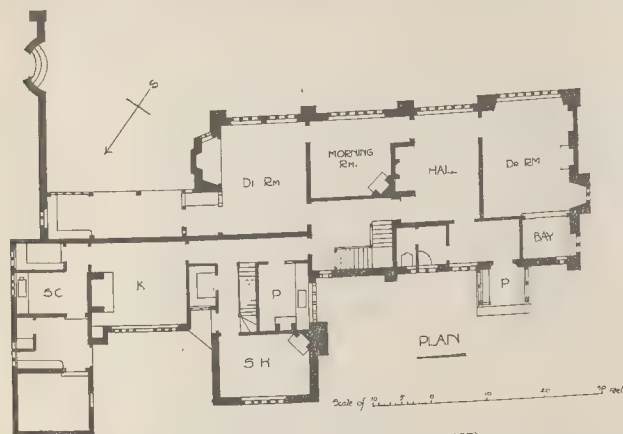
the conditions approved by the Council. The Education Committee consider it desirable, having regard to the anticipated large amount of work in connection with educational buildings, that the list of quantity surveyors engaged in this work should not be curtailed. We propose that the agreements entered into by the late authority with certain surveyors should be terminated, and that the number of quantity surveyors on the Council's list should be increased. We recommend—

(a) That notice be given to determine the agreements entered into by the late School Board for London with the undermentioned quantity surveyors: Mr. F. H. A. Hardcastle, 5, Old Queen-street, S.W.; Messrs. Arding, Bond, & Buzzard, 22, Surrey-street, W.C.; Mr. F. Downing, 12, King's



Porch at Haslemere  
by E. J. May.





House at Haslemere. Plan. (See page 127).

Bench-walk, E.C.; Mr. H. H. Robinson, 8, New-court, Carey-street, W.C.; Messrs. W. H. & P. B. Strudwick, 2, New-court, Carey-street, W.C.; Messrs. Young & Brown, 104, High Holborn, W.C.

(b) That the undermentioned names be added to the list of quantity surveyors to be employed for architectural works; that the solicitor do prepare and complete the necessary agreements in accordance with the Council's standing orders relating to quantity surveyors; and that the seal of the Council be affixed to the agreements when ready; Messrs. Arding, Bond, & Buzzard, 22, Surrey-street, W.C.; Mr. F. Downing, 12, King's Bench-walk, E.C.; Mr. H. H. Robinson, 8, New-court, Carey-street, W.C.; Messrs. W. H. & P. B. Strudwick, 2, New-court, Carey-street, W.C.; Messrs. Young & Brown, 104, High Holborn, W.C.

The recommendations were agreed to.

**Tramway Subway.**—On the recommendation of the Highways Committee, 50,000l. was voted in respect of the acquisition of lands and easements in connexion with the construction of the tramway subway from Southampton-row to the Victoria-embankment.

**Rotherhithe Tunnel.**—On the recommendation of the Bridges Committee, it was agreed that expenditure of 2,600l. on capital account be sanctioned for the widening of Brook-street, and the acquisition of Nos. 76, 78, and 86, Brook-street; that consent be given under section 72 of the Metropolitan Management Amendment Act, 1862, to a widening of Brook-street, Ratcliff, proposed to be undertaken by the Council of the Metropolitan Borough of Stepney.

**White Hart-lane Estate.**—The Housing of the Working Classes Committee recommended as follows, and it was agreed:—That the additional expenditure of 439l. 19s. 8d., incurred in the execution of extra work under the contract with Mr. H. Lovatt for the erection of 141 cottages on section A of the White Hart-lane estate, be sanctioned. It was also agreed that the price to be paid to Mr. G. E. Pulford for the twenty-four third-class cottages to be erected by him on section B of the White Hart-lane estate be 156l. 10s. per cottage, with an extra allowance of the 4l. 10s. for each corner cottage; and that the solicitor do take such steps as may be necessary to complete the matter accordingly.

**Tottenham-fields Estate: Erection of Cottages on Section B.**—The same Committee reported as follows, the recommendation being agreed to:—

"On July 12, 1904, the Council accepted the tender of Messrs. P. & H. P. Higgs for the erection of cottages on section B, of the Tottenham-fields estate, and considerable progress has since been made with the work. Nine blocks, comprising 174 third-class cottages, still remain to be commenced, and our attention has been drawn to the desirability of permitting some slight modifications in the specification, which would result in a reduction of the cost of erection, without unduly detracting from the character of the dwellings. The contractors have offered to erect three blocks, Nos. 46, 47, and 48, in accordance with the modified specification for a lump sum of 12,500l., including 522l. as provision money, and to complete the work under the same terms and conditions as that already commenced. The offer represents a saving of approximately 4 per cent. on the contract prices, and is one which would advise the Council to accept, not only for the three blocks in question, but

also for the remaining six blocks which are similarly planned. We recommend that the contract with Messrs. P. & H. P. Higgs for the erection of cottages on section B, of the Tottenham-fields estate be so varied as to allow of the erection of blocks 46 to 54, both inclusive, in accordance with the modified specification at a cost of 37,500l., inclusive of 1,566l. set apart as provision money for extra works."

**Wedmore-street Estate, Upper Holloway.**—The Committee reported that the third block of Wessex-buildings on the Wedmore-street site, Upper Holloway, is almost completed. The block will contain accommodation for 340 persons in forty tenements of two rooms, and thirty tenements of three rooms. The Wedmore-street site was acquired by the Council under the provisions of Part III. of the Housing of the Working Classes Act, 1890. The first and second blocks of dwellings erected on the site were opened for occupation in November, 1904, and contain accommodation for 710 persons, so that with the completion of the third block accommodation for 1,050 persons will have been provided on the estate in five tenements of one room, 140 tenements of two rooms, and eighty tenements of three rooms.

**Tramway Junction, St. George's-circus.**—The following recommendations of the Highways Committee were agreed to:—

(a) That the estimate of expenditure on capital account of 4,500l., submitted by the Finance Committee, be approved in respect of the construction for the underground conduit system of electrical traction of a junction line at St. George's-circus, between the tramways in Borough-road and Blackfriars-road.

(b) That expenditure, on capital account, not exceeding 4,500l., be sanctioned for the construction of a junction line at St. George's-circus, between the tramways in Borough-road and Blackfriars-road; and that the Highways Committee be authorised to arrange for the execution of the work.

Having transacted other business the Council adjourned.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

#### Lines of Frontage and Projections.

**Hackney, Central.**—An addition to No. 46, Kenninghall-road, Clapton, to abut upon Nightingale-road (Mr. C. Thomerson).—Consent.

**Fulham.**—A projecting clock, an iron and glass shelter, and a projecting stone, iron, and concrete balcony to the addition of the Town Hall, Harwood-road, Fulham (Mr. F. Wood for the Council of the Metropolitan Borough of Fulham).—Consent.

**Hamstead.**—Buildings upon the site of Nos. 168, 169, and 170, High-road, Kilburn (Mr. G. A. Sexton for Mr. B. B. Evans).—Consent.

**Hamstead.**—The retention of an addition to All Souls' church, Loudoun-road, Hampstead, abutting upon Alexandra-road (Messrs. Nicholson & Corlette).—Refused.

**Marylebone, East.**—A projection and balcony at No. 80, Portland-place, St. Marylebone

(Messrs. Boehmer & Gibbs for Messrs. Matthews, Rogers & Co.).—Refused.

**Paddington, North.**—One-story shops in front of Nos. 436, and 437, Edgware-road, Paddington (Messrs. Gardiner & Theobald for Messrs. Brewery Company, Limited).—Refused.

**Paddington, North.**—One-story shops in front of Nos. 439, to 461 (odd numbers only), Edgware-road, Paddington, to abut upon, upon Maresfield West (Messrs. Boehmer & Gibbs for Mr. Hirsch).—Refused.

#### Width of Way.

**Camberwell, North.**—A one-story building between Nos. 49, and 55, Crown-street, Camberwell, with external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. A. E. Mullins for the Davis Gas Store Company Limited).—Consent.

**Fulham.**—An addition at the rear of Nos. 29, and 31, Jordan-place, Waltham-green, with external walls at less than the prescribed distance from the centre of the roadway of Waltham-place (Mr. W. C. Poole for Mr. Jones).—Consent.

**Hackney, North.**—Retention of a wooden stage and enclosure at the rear of No. 34, Newington-green, Hackney (Mr. R. Manley for the Midway Radical Club).—Consent.

#### Width of Way and Frontage.

**Paddington, North.**—One-story shops in front of Nos. 431, and 433, Edgware-road, Paddington, with external walls at less than the prescribed distance from the centre of the roadway of Crompton-street (Messrs. Gardiner & Theobald for Messrs. Matthews & Sons, Limited).—Refused.

#### Line of Frontage and Construction.

**Hammersmith.**—That the application of Mr. I. Kiraly for an extension of the period within which the erection of a gangway in Woodhouse, Hammersmith, was required to be commenced, and of the period within which such gangway was allowed to be retained, be granted.—Agreed.

#### Width of Way and Space at Rear.

**St. Pancras, South.**—Buildings on the site of Nos. 183, and 185, King's-cross-road, and Nos. 31, and 32, Field-street, St. Pancras (Mr. E. J. Harrison for Mr. D. E. Cohen).—Refused.

#### Space at Rear.

**Southwark, West.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of the "Surrey Arms" public-house, No. 133, Blackfriars-road, Southwark, with an irregular open space at the rear (Mr. H. Smith for Messrs. West & Co.).—Consent.

**Southwark, West.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of buildings on the site of No. 31, Borough-road, and Nos. 67, and 69, Lancaster-street, Southwark (Mr. G. A. Lansdown for Messrs. P. Boswell & Sons).—Consent.

**Bethnal-green, South-west.**—Modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on lot No. 22, Turk's-street, Bethnal-green, with an irregular open space at the rear (Mr. C. R. Peters).—Consent.

#### Space at Rear and Construction.

**Strand.**—A projecting water-closet at the rear of Nos. 98, and 100, Regent-street (Mr. E. I. Kerr for the Aquasutum Company).—Consent.

#### Buildings for the Supply of Electricity.

**Hammersmith.**—A generating-station, and works on a site to the eastward of the generating station of the Central London Railway Company and approached from Wood-lane, Hammersmith (Mr. J. Slater for the United Kensington and Knightsbridge and Notting-hill Electric Light Company).—Consent.

#### Height of Buildings, etc.

**Fulham.**—Enclosures on the top of the projecting staircase from Block I, at the Manby & Co. Works, Brandenburg-road, Fulham (the Manby & Co. Works, Brandenburg-road, Fulham).—Consent.

#### Formation of Streets.

**Wandsworth.**—That an order be issued to Messrs. D. Young & Co., sanctioning the formation or laying out of new streets for carriage traffic out of the western side of Thurston-road, and northern side of Nimrod-road, Wandsworth (for Messrs. A. W. Goaden & H. F. Crumley).—Consent.

**Wandsworth.**—That an order be issued to Messrs. Milner, Son, & White refusing to sanction the formation or laying out of new streets for carriage traffic on the Furzedown Park, Wandsworth-road, Wandsworth (the Furzedown Park, Wandsworth-road, Wandsworth).—Refused.

The recommendations marked † are contrary to the views of the local authority.

THE INSTITUTE OF SANITARY ENGINEERS LIMITED.—The Institute of Sanitary Engineers have arranged to hold their Summer Outing at Southampton on Saturday, Sunday, and Monday, July 29, 30, and 31.



# THE ROYAL SANITARY INSTITUTE: Rural Water Supply.

The members of the Royal Sanitary Institute held a sessional meeting at the New Medical Schools, Downing-street, Cambridge, on Saturday last week, when the "Water Supply Problem in Rural Districts" was discussed. The discussion was opened by Professor G. Sims Woodhead, M.A., M.D., and Consulting Medical Officer of Health to the Cambridge County Council, who read a paper on the subject.

Professor Woodhead said that some years ago it fell to his lot to examine a considerable number of water supplies, especially those of large towns, and, in consequence, he had become acquainted with the tremendous difficulties encountered by many rural authorities in obtaining adequate and pure water supplies. He was bound to say that as regarded water supplies, communities, perhaps even more than individuals, were as absolutely selfish and inconsiderate as it was possible for men to be. The man who had a water supply, or a community in the same position, was the Greek who looked upon it as something that he had acquired a natural right to, to share which the outer barbarian in the next parish could have no sort of claim, at any rate in the same pure condition in which it came to him. He was careful to take out his own supply above his town or village, and, as a rule, he sent to the supply return his sewage in a more or less crude form. Were this confined to river and streams it would be bad enough, but when springs and wells of one district were contaminated by the sewage of another, the problem of supplying pure water became a very difficult one indeed. It had been maintained that large cities were at a great disadvantage as compared with rural districts, but most of those who had given any consideration to the matter had come to the conclusion that the problem of the water supply in rural districts was a much more pressing one than that of the supply to the more manufacturing towns, though there, undoubtedly, as the best catch-water areas were gradually acquired, something would have to be done ere long to keep the sewage from what at present were looked upon as the best catch-water areas. He was not outside the possibility of becoming water supplies. In illustration of his contentions, Professor Woodhead went on to refer in detail to the water supply of Maidstone. There was here an outbreak of typhoid fever, and he recounted the methods adopted by the authorities to improve the water. They cut off the sources from unsatisfactory wells and springs alongside the railway—these took only the water that came from the greensand. This was of good quality to begin with, but to improve it, they laid down a couple of excellent sand-filter beds, and constructed a covered-in clear-water tank, from which the water could be pumped directly up to a reservoir. It was examined regularly, chemically and bacteriologically, at intervals, and at first was not entirely satisfactory, but, after an old pump-hole had been cleared out, iron replacing wood everywhere, a very pure and stable water was delivered. The filters were allowed to run for a whole year before being "skimmed," and, he believed, was one of the most important factors in the purification of water. Warm weather the filter beds were literally teeming with algae growth, swarming with protozoans, but the water in the clear-water tanks was limpid, practically free from protozoans, and of excellent chemical composition. The collecting wells in connection with the Maidstone supply were all closed in and sealed down, but none of the surface drainage areas or the wells were fenced off or protected in any way. Under the scheme for making the supply to this county town absolutely pure, strong measures were carried round all the areas between the outcrop of the water and the outcrop and the well had been filled up, in chalk being first laid down, and then a fine white sand, with sufficient soil to afford nutriment to a close crop of grass. These means about as perfect a filtering material. They knew, as was especially stated by Dr. Vivian Poore, that a layer of good close vegetation, especially of grass,

was almost as good as the algaous growth that was seen on the surface of an ordinary sand filter, and, with the sand and the rammed chalk, it constituted a protective layer certainly equal to the best sand-filter made. As regarded the protection of the well-head, most efficient precautions had been taken to prevent anyone tampering with the seals. Small brick "cabins," with thick concrete roofs, concrete raised thresholds, and thick oak doors with strong locks had been built. One of them was placed at the highest point of each of the filter beds, so that contamination through the opening of the well was practically impossible. Anyone who had to deal with a water supply similar to that at Maidstone would, he was sure, learn something from a visit to those collecting grounds. Cambridge was exceptionally fortunate in having an abundant supply of water in a chalk well at Fulbourn, and in wells from the chalk and lower greensand at Cherry-hinton, though even in Cambridge, until the Fulbourn supply was obtained, there was considerable difficulty in meeting the various demands made. When, however, they came to the rural district, one was simply horrified at the shifts that had to be made to obtain water even of moderately-good quality. In some villages, the inhabitants depended entirely for their water supply upon surface wells, many of which were contaminated with sewage. In other instances, especially in the case of detached groups of houses, ponds, rivulets, and ditches, many of which were completely dried up in the summer, were practically the only water supplies to be obtained, and some years ago he was taken by the then Chairman of the Cambridge County Council to see a water supply that was in constant use, which, on bacteriological examination, gave a number of micro-organisms as great as one usually found in diluted sewage. Not far away was an isolation hospital, which was nearly half a mile as the crow flew, and a considerably greater distance by road from a roadside pump, which was the only supply for the hospital, whilst, in the same district, the workhouse, until comparatively recently, was entirely dependent upon what one might call a scratch supply. They had been told that it was impossible to do anything with those districts, and if they were to be left to themselves, and could be entirely isolated, it might be true enough; but he maintained that larger communities, even in their own interest, had laid upon them the duty of taking up this question of water supply to their poorer or more scattered brethren. He was gradually coming to the opinion that the question of water supply was one to be settled, not by individual communities, but by a National Water Board with County Committees. In Cambridge, they had water for the whole county and some to spare for neighbouring counties, but until they knew what was really required for the county, and until some perfectly independent Board could take up the matter, it was not safe for the Cambridge authorities to allow any tampering with their sources of supply. In the hilly districts, and even in certain of the low-lying districts, water was to be obtained from chalk or from the greensand, and the problem was a comparatively simple one. But what was to be done in areas of low rateable value, where it was necessary to bore deep wells at great expense if anything but surface water was to be supplied? If there could be some combination between a number of those areas, if the matter could be taken up by the County Council, something might be done; but until they had some central organisation, through which a readily available supply could be distributed as widely as possible, they would never have the best available system carried out. Even short of that, however, some centralisation was necessary, especially in advising and helping less wealthy communities. Some such method of filtration as that adopted at Maidstone might, with great advantage, be adopted for surface water in districts entirely dependent upon highly-contaminated surface wells. With grass and sand filters the rain water collected on the roofs of houses might be much more utilised than it was. Accepting the fact that surface water was the most dangerous water with which they had to deal, they might also accept Dr. Poore's statement that a layer of active vegetation would, in most cases, purify water

better than, or as well as, the best sand filter extant, and if the two were combined, as at Maidstone, he believed it possible to have tanks or wells of filtered water available at comparatively trifling cost, and therefore suitable for small communities. Placed at the bottom of hollows, and if the water from the roofs of houses or the surface water from land not too highly cultivated could be brought to them, those filter beds would produce an excellent supply—except, of course, in very dry weather. Even then the water from ponds might, after preliminary sedimentation, be placed on them. He suggested it only as a temporary measure, and where people were in great difficulties, as almost any kind of water could be purified in that way, especially after a preliminary rough filtration through sand to keep back such matter as would clog the soil on which vegetation was growing.

He thought it must be recognised, however, that we were gradually coming to a point at which the selfishness of communities must be counteracted by the constitution of some central organisation empowered to control water supplies and empowered also to prevent the contamination of any possible supply with sewage. He was aware that certain well-informed authorities maintained that rivers were the natural drains. With Lincoln before them they were apt, and he thought very justly so, to be very sceptical on the point. He ventured to think that most of them were of opinion that rivers were natural water supplies, and that they had only been converted into drains because people had not had sufficient foresight to see that in time we should not have sufficient water for our growing population without them. The rivers must be kept as clean as possible, so that when necessary their water could be thrown on to more or less perfect filters, and a fairly good potable water so obtained. As regarded rural districts, he was satisfied that co-operation and filtration were our passwords, and that, as regarded urban districts, we must also ask for co-operation; and with the aid of co-operation we must obtain purification. We had still plenty of water, even in dry years, if what we had could be properly purified and equitably distributed. Where a pure water supply was concerned, cost should scarcely be a factor to be considered, though with co-operation the cost of a good water supply should never be greater than even small communities could easily bear.

In concluding, Professor Woodhead said he wished to ask those interested whether or not some plan by which the Cambridge rural districts could be supplied with good water and plenty of it could be formulated. If it could be done for Cambridge, the problem would be solved for many other counties. Dr. Tresh had made a very good beginning with Essex—one of the counties which suffered very much as Cambridgeshire did.

Mr. J. E. Purvis followed, and placed before his audience by means of a blackboard various analyses of drinking water, including two from Cambridgeshire village pumps. Those waters had been condemned, both chemically and bacteriologically, he said, and were absolutely dangerous from a health point of view. But they were not isolated cases. There were thousands of such sources contaminated in the south of England, and also, but in less number, in the north. He did not say that those who drank that water would suffer from typhoid or any other of those particular diseases; but he did say that water which contained such large quantities of organic matter as those samples tended to lower the system and decrease the normal strength. His own part of the discussion was to illustrate the limitations in reading water analyses reports. In regard to the two particular reports, there was no doubt at all that they would be officially condemned. Still, such conclusions were not always so certain, and he thought some rules were necessary with regard to the instructions to be conveyed to the chemist, who, he held, should know the whole history of any water sent him for analysis. He should know the geological character of the source of supply, the method of storage and distribution, and the rainfall just before the analysis was taken. In fact, he should visit the place himself. Without such knowledge, they could depend upon it, the chemist would have some doubt in making up his judgment.



Finally, he did not hold that a purely chemical analysis was sufficient of itself. There ought to be a bacteriological examination also, and the final judgment should rest with the two in collaboration. For they could have water organically pure from a chemical point of view, and still it might contain the germs of disease. And, on the other hand, they might have water which was bacteriologically pure, and which, chemically, would be suspicious or even dangerous. Mr. Purvis also referred to the dangers arising from extremely hard and extremely soft waters, which were both liable to take up a certain amount of lead.

Professor Hughes endorsed the suggestion that some form of a superintendence board in respect of water should be instituted. A house could not be erected in Cambridge without the plan being laid before and sanction obtained from the Mayor and Corporation, but an ignorant peasant could dig a well in his back garden and get a supply of water without submitting to any supervision.

Mr. H. G. Fordham, speaking from an administrative point of view, said the limits laid down by Parliament were very narrow. To his mind, there would be some difficulty about areas, because the area of a county was not consistent with that covering the water supply. He hesitated somewhat in accepting for the County Council complete jurisdiction in such matters.

Mr. Martin said that in the Fen district the rivers were the chief source of supply, and the necessity of keeping them clean could not be too greatly emphasised.

Dr. Kinnicutt agreed that the water supply in the rural districts was not inferior to that of the towns, for the reason that the latter was better looked after. In the rural districts, the farmer usually sank his well where he pleased, and also a cesspool. Very often one supplied the other; but where the supply of drinking water was impure they had the power in the States to prohibit its use.

Dr. Armistead said that one of the main difficulties in regard to the adoption of a water scheme for a village was the cost. Some villages, which were formerly supplied by shallow-dug wells liable to pollution, were now supplied by wells bored to a depth of 100 ft. or more into the chalk and lined with iron tubes. Other villages on the gault had been supplied by wells bored through the gault into the lower greensand, and a good supply of soft water so obtained.

Dr. Luddington said there were many places where the supply must of necessity be obtained from the river, and not only that, but unless it was kept pure the health of the inhabitants who lived on its banks must suffer. The principle at stake was a matter of national importance. He thought the Government should appoint inspectors to visit the different rural district councils and give practical advice—inspectors who would not hesitate to pull up offending parties, such as the inhabitants of the village in which he resided suffered from.

Dr. Annington advocated the purifying of the wells rather than that they should be shut down summarily.

Mr. Moor said that, with regard to the fear of the prevalence of organic matter in water, it would necessitate then drinking about 1,000 gals. to get as much as was in a teaspoonful of soup.

Dr. Savage agreed with Mr. Purvis, and advocated that where the surface was found to give an impure supply it should be improved by boring deeper and covering with a proper pump. That, he maintained, was a solution in a great many cases. But there must be different standards of testing water.

Miss Cochrane thought that sufficient use was not made of rain-water, which, more often than not, was allowed to run waste in channels round the houses, making the property in that way damp. That was for rural districts. The larger question, she agreed, was national in character.

Mr. Purvis said it was continuous drinking of contaminated water that brought about the trouble.

The Chairman (Col. J. Lane Nott, M.A., M.D.) mentioned that the next meeting would be held at York on October 7.

The party then adjourned to King's College for lunch, and afterwards drove to the pumping works of the University and Town

Water Company and the Nine Wells, Stapleford.

[The above has been compiled from a report in the last issue of the *Cambridge Chronicle*.]

### ENGINEERING SOCIETIES.

JUNIOR INSTITUTION OF ENGINEERS.—Mr. Dugald Clerk, M.Inst.C.E., the well-known gas-engine expert, has been elected President of the Junior Institution of Engineers for the ensuing session.

### Books.

*Lives of the Engineers.* By SAMUEL SMILES. Popular edition. London: John Murray. 1904.

THE three volumes now before us of these reprints of Smiles's "Lives of the Engineers" to review in detail a reprint series of this kind, which is moreover rather of a popular than a scientific nature. But we are glad to see these biographies re-issued in a popular edition, and it may be said that it is owing to their popular and unscientific character that they really fill a place in the literature of engineering. Such engineering biographies as an engineer would write for engineers would not be understood or cared for by general readers; and it is desirable that the class of readers who know nothing of engineering scientifically should nevertheless have within their reach an intelligible and readable account of the great work of engineering during the last century and a half, and of the character of the men who were the most important factors in it.

The book on Watt and Boulton is perhaps the most interesting of the three volumes, as it goes back to the very beginnings of the use of steam in moving machinery; and moreover Watt is a very interesting character, in his mingling of shyness, low spirits (frequently) and weak health, with an indomitable energy and curiosity of intellect. It was in this curiosity—the desire to understand every problem that came before him, that the interest he took in everything, that a great part of the secret of his success lay. The old legend of his meditation over the boiling kettle as the origin of his success is indeed dismissed as apocryphal—and it is, in fact, just the sort of story that the friends or relations of a genius would be sure to recollect about him in his childhood; but on the other hand we have interesting traits of his early intelligence and intellectual restlessness, among others that of the relative, a Mrs. Campbell, with whom at the age of fourteen he was left for a week, and who ended by begging for a release—"I cannot stand the excitement he keeps me in, I am worn out for want of sleep"; for Watt would begin talking every evening and telling stories so exciting that the family could not get to rest. Watt evidently had in a strong degree the imaginative character which often belongs to a born inventor. Before settling down on the steam-engine, he had taken up and mastered many subsidiary subjects. And to this mental activity of his own he seems to have joined a nature most candid and simple, and a ready recognition of the merits of others.

It seems rather odd that Watt, having once realised the expansive power of steam to raise the piston in a condensing engine, should apparently have been so long in taking up the idea of using high-pressure steam to drive the piston both ways. He mentions it in one place, only as a possibility, long after he would have seemed to have been naturally led up to it by the very disposition of his working models. But the use of condensation for creating a vacuum had been so impressed on his mind by the systems of his predecessors, Papin and Newcomen, that it was probably difficult to emancipate the mind from it. He had actually made a model with a steam-pump from the boiler, or what might have been made such, at both ends of the cylinder, long

before he suggested using steam on the principle. It is curious, also, to come here to the first suggestions of great mechanical ideas destined never to be utilised till long afterwards. Somewhere about 1770 (the precise date is given) Boulton's partner, Small—this was before the Boulton and Watt partnership—wrote to him about an idea for driving the early boats by steam, in which they thought there was a prospect of success. Watt writes: "Have you ever considered a spiral screw that purpose?" Here was the direct suggestion of the screw propeller, just named, but was dropped again for more than half a century.

Watt's great opportunity came from the difficulty of keeping water out of mine shafts when it was once found out that an atmosphere could be had which could pump a mine out a great deal faster and more effectually than any hitherto known means, and after one or two mines had proved its success, there was almost a competition who could secure the first. His coming across Boulton had done a great deal to do with his ultimate success. Boulton having just the business qualities that Watt lacked. Apart from the main business of developing steam-power, perhaps the two most valuable and beautiful inventions of Watt were the "parallel motion" for connecting the arc movement of the over head beam with the mathematically precise vertical movement necessary for the piston rod, and the governor; the latter actually invented on stationary engines just as Watt was dying. Watt himself said—"Though I was not over anxious after fame, yet I am proud of the parallel motion than of any other mechanical invention I have ever made."

The life and character of George and Robert Stephenson are more familiar, and perhaps more interesting to the general public than that of Watt; they are newer to us, and are concerned mainly with a class of engineering work which has a practical importance for everyone who travels. The history of the immense change, too, brought over England first, and then over the world, by the introduction and development of railway travelling, has a dramatic interest almost like that of a romance.

The volume on Metcalf and Telford has an interesting history of the development of road-making in England. It is noticeable among other examples of anticipations and achievements of later days, that Metcalf, a wonderfully acute and observant blind road-maker, employed, in the middle of the XVIIIth century, on a smaller scale, just the same method of getting over a bog, in making the turnpike road from Knaresborough to Harrogate, which Stephenson was to employ eighty years later, in carrying the railway over Chat Moss. Metcalf "had a large quantity of furze and ling laid upon the bog over which he spread layers of gravel." His plan answered effectually, and when the materials had become consolidated, it was one of the best parts of the road.

The volumes are very well got up and indexed; it would have been an improvement if the pages had been headed with the date of the year which is being dealt with in each portion of the history; or, if that proved a difficulty, if dates had been more frequently introduced in the text. It is sometimes necessary to turn over a good many pages before one can find out, even approximately, what year we are at.

These are excellent books for presenting to boys, in which light we recommend them to the attention of parents and schoolmasters. They may serve to arouse in boys an interest in the great engineering history of their country, of which too many people are so deplorably ignorant; and they afford, by examples of high moral character and honourable energy on the part of those whose biographies are given, which cannot but be a healthy stimulus on the character of young readers.

*How to Build or Buy a Country Cottage. Fit It Up.* By "Home Counties" Ladies' W. Heinemann. 1905.

TATS is not a book that is of any general use to architects; it is a book of fancies, intermixed with some good and bad designs for cottages and bungalows. It is a part of the popular movement that has been got up lately on the subject of cottage building, and in connexion with it.



well-meaning landowners, who have each had a cottage of their own planning pulled down by the wicked local authorities, are held up as martyrs in the cause. We do not imagine there was need in either case for them to be actually pulled down, except as an assertion of "the arm of the law"; but we must say that the plans of the two condemned cottages, one by Mr. Wilfrid Blunt and another by Sir W. Grantham (the one is given here, and the other we have seen in another publication), are the most ridiculous specimens of naïveté in planning that we ever came across. The idea of both gentlemen, for a cheap cottage, seems to be to build a long parallelogram, divide it up by cross walls, and have an external door into each room, without screen of any kind! One wonders how either of the gentlemen would enjoy sleeping, on a windy night, in one of the bedrooms of their own planning. So far from these two cases furnishing examples of the unreasonableness of local authorities, we should say that the fact that two large landowners—men of rather exceptional educational acquirement in other respects—know no better than to plan cottages in this way, is in itself a proof of the necessity of having rural by-laws and authorities to enforce them, though the by-laws themselves no doubt need revision in some respects. We must do the writer the justice to say that in his chapter "How the Rural By-laws Work in Practice," as does not entirely run counter to the authorities; he even admits that the dangers of ferry-building may be greater in rural districts than in cities, since public opinion is lax or non-existent, and the persons most likely to suffer from scamped work cannot raise their voices. That is just what we ourselves remarked when what may be called "the Grantham cottage" was first got up.

Corrugated iron and wood, we are told, make the cheapest building; we see a page 2 devoted to corrugated iron, than which no more detestable material for a country district was ever invented. The American frame-house is infinitely preferable. Jement slab, which the author mentions with approval, is a material which has certainly claims for the cheap cottage builder. As remarked on another page, it can be rough, and the author has the perception to see that the flat roof that can be made in concrete as practical advantages, which seem for the most part to be ignored by the cottage building reformer.

There are some amusing things here and here, as where a section of Mr. Blunt's ingallow is marked "End Elevation"; and in the chapter "How to Deal with Architects" we read that "in cases where a cottage is to be built, and not ordered from one of the wood and iron, whole wood, or concrete block firms, it is desirable to employ an architect if a copy of someone else's tested plans and specifications cannot be got." The title is our own. And what are "tested plans"? It reminds one of "Carter's tested plans." "A forbidden cottage" is illustrated in front of the first chapter; "a cottage in ad and plaster, forbidden in many districts." It looks very nice in the picture. And the author ever sleep in it during a night hard frost?

*Principles of Planning: An Analytical Treatise for the Use of Architects and others.* By PERCY L. MARKS, Architect. Second edition, revised and enlarged. London: B. T. Batsford, 1905.

is more than four years since "The Principles of Planning" first appeared, and was reviewed in these columns; and Mr. Marks's made good use of the interval, as well as the criticisms he has received, in enlarging and improving his book to a very considerable extent. He has almost doubled its contents, while retaining the general arrangement of the first edition, has amplified it in every

for the sake of those unacquainted with the book it may be worth while to say that it is serving as a complete guide to the giving—so far as the plans are concerned—of every description of building that the most experienced architect could possibly expect to encounter. In it may be found, arranged in alphabetical order, businesslike instructions all the requirements of buildings for every imaginable purpose, ranging from the most domestic and utilitarian—see, for example, the designs "Cattery," "Piggery," or "Poultry

Run"—up to the most monumental and elaborate—as described under "Chapel, Church, and Synagogue," "Government Offices," "Palace, Royal," or "Parliament Houses." The book is liberally illustrated with plans, some of them imaginary designs of the author's own invention, but the greater part representing typical modern buildings of their respective classes. This carefully-chosen series of examples of the work of many of the most successful architects is in itself a valuable feature, while the ample "Table of Useful Memoranda Affecting the Planning of Buildings" should prove very useful, especially to the young practitioner.

It is impossible to look through such a varied collection of plans without the inclination to find fault with many points of detail; common fairness, however, to their authors causes us to remember the apology with which Mr. Marks concludes his Preface to the new edition:—"It is," he says, "a peculiarity belonging to architectural conceptions, that a plan but rarely admits of reproduction in its entirety, and many seemingly weak points are merely the outcome of local conditions and cliental requirements, which remove them from the plane of animadverted criticism." The words we have italicised ought constantly to be borne in mind; readiness to condemn an architect at first sight for his arrangement of a plan is so common. How much of what is questionable or bad about his work has been forced upon the unlucky architect by outside pressure is a thing that will probably never come to light; but, in the absence of full knowledge of all the "ins and outs" of the particular case, it would be better to give him usually the benefit of the doubt when the reasons for his dispositions are obscure.

#### BOOKS RECEIVED.

PICTURESQUE ESSEX. By Duncan Moul and R. H. Ernest Hill, A.R.I.B.A. (F. E. Robinson & Co. 6s.)

PERSPECTIVE TABLES FOR PRACTICAL ARCHITECTURAL DRAFTSMEN. By Robert F. Sherar. (Edinburgh: A. W. Sinclair. 3s. 6d.)

### The Student's Column.

#### STEAM BOILERS AND PIPES.—V.

##### FEED-WATER HEATING.

**A**SSUMING that we have a boiler designed in such a manner as to promote the perfect combustion of fuel and the transmission of heat through the plates into the water, and assuming also that the stoking and general management are in competent hands, something more may be done in the way of securing economy and efficiency by applying auxiliary apparatus calculated to increase the production of steam without additional expenditure of fuel.

This end may be attained by appliances of various types by which feed water is heated before delivery to the boiler.

It is a well-known fact that water contained in a vessel open to ordinary atmospheric pressure does not commence to give off steam until raised to the temperature of 212 deg. F. In a closed vessel such as a steam boiler the temperature of vaporisation varies with the pressure of the vapour upon the surface of the water.

Thus, if water be supplied to an open vessel at 32 deg. F., each pound must receive 180 heat units before evaporation can commence, while, on the other hand, if supplied with water at 212 deg. F., the only addition required per pound is 966 heat units—the latent heat necessary for vaporisation. In one case 1,146 heat units per pound of steam are required for vaporisation, and in the other only 966 heat units, a difference of 157 per cent.

Again, if water be supplied at 32 deg. F. to a boiler working at a pressure of 75 lb. per sq. in. absolute (about 60 lb. above atmospheric pressure), 1,175 heat units per pound of steam are necessary for vaporisation. But if the water be furnished at 212 deg. F., only 995 heat units are required, this quantity representing the latent heat of 897 units, plus the heat necessary for raising water at 212 deg. F. to the temperature corresponding with the pressure of 75 lb. per

sq. in. In this case there is a saving of 15.3 per cent.

By further heating the feed water until its temperature equals that of steam at 75 lb. pressure, still greater economy could be secured. Only 897 heat units per pound would then be necessary for evaporation, and the difference 1,175—897 would represent a heat saving of 23.6 per cent. From the foregoing examples we see that the hotter the feed water, the greater will be the production of steam per pound of coal consumed.

It must be obvious, however, that unless the feed water can be heated without expenditure the advantage gained must be seriously discounted. Fortunately, in the products of combustion passing from the boiler to the chimney we have an ample source of heat which, although it has cost money to produce, may be looked upon as a free supply, because, unless utilised, it will simply escape up the chimney shaft.

We have already seen that the temperature of the hot gases carried up the chimney is very high, even with the most economical boilers. Assuming the average temperature to be 650 deg. F., and the temperature necessary for ensuring adequate draught to be 350 deg. F., we have a large margin available for heating feed water to be supplied to the boiler.

The apparatus employed for utilising surplus heat in this manner is generally known as a fuel economiser, which is really a tubular feed-water heater of special construction placed in the main flue between the boiler and the foot of the chimney, so that the water contained in its tubes shall be heated by the surplus heat of the escaping gases.

An economiser ought really to be looked upon as forming an essential part of any boiler plant to which it can be applied, for it continues the process of heat abstraction commenced by the boiler, and which that apparatus is unable to carry to a truly economical point. The temperature of the water in a steam boiler is necessarily uniform, except so far as it is affected by the injection of cold, or comparatively cold, feed water.

On the other hand, the furnace gases are much hotter over the fire than at the tail end of a horizontal boiler. Consequently, the heating surface cannot reach a maximum value, and that at the tail end abstracts a comparatively small amount of heat, the proportion of which diminishes as the length of the boiler increases. For this reason it is more advantageous to include an economiser in a Cornish or Lancashire boiler plant than to employ a boiler of length greater than four times the diameter. The addition of an economiser permits the temperature of the waste gases to be reduced to less than that of the steam generated, an advantage that cannot possibly be secured in any boiler working alone.

In Table VII. we give some experimental results showing the heat efficiency of economisers applied to different types of steam boilers. It should be noted that the efficiency in each case represents the ratio of the heat percentage absorbed by water in the economiser to the total amount of heat evolved by the burning of fuel in the boiler furnace. The quantity of heat utilised by the economiser depends very much upon the heating surface of the tubes, as well as upon the temperatures of the gases leaving the boiler and of the water supplied to the economiser.

When worked upon the most favourable conditions, and applied to boilers that have previously been overworked, fuel economisers may effect savings up to more than 25 per cent. of the total fuel consumption. Among the causes that tend to reduce their efficiency are the use of hard water, resulting in the deposit of scale inside the tubes; neglect of the scraping apparatus, permitting soot to accumulate outside the tubes; and leakage of air through crevices and openings in the brickwork, reducing the difference of temperature between the water and the source of heat.

Given proper care and attention, the average saving to be effected by the employment of an economiser may be found from Table VIII. for different initial and final temperatures of the feed water.

It must be borne in mind, however, that,



Dimensions.	Heating Surfaces.	Efficiencies.	Temperatures.
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CHATHAM NEW NAVAL HOSPITAL—This tal has just been opened by the King. The buildings were started in June, 1899. The comprises 33½ acres of ground on the Chatham Hill, and the accommodation building is for 800 beds, staff and ninety. The whole is situated on the site, joined by connecting corridor to the main length east and west, nearly long, from which branch off the wards. A, B, C, D, E, F, from east to west. The has four towers with stone domes, and a centre a copper-covered dome. The main hall is vaulted in Doubling stone, and four arches and an arcade. The wards, cupola, and the piers are in gables, and from the central hall the corridor branch east and west to the inspectors.

sacrifices to get him for an artistic career. He studied at Strasbourg under Guerin and Drolling, and at Paris under Picot. He obtained the Grand Prix de Rome in 1858. His remarkable talents led him to the Salon of 1860, where he succeeded Cabanel in 1889. He was a Grand Officer of the Legion of Honour, and in 1878 obtained the Première Médaille at the Universal Exhibition. Since 1893 Henner was one of the glories of the Salon, and his work was always faithful. Among his most celebrated works may be mentioned the "Adam et Eve retrouvent le Corps d'Abel," the "Suzanne" (in the Luxembourg); "Biblis changée en Source" (in the Musée de Dijon); "Le Christ au Tombeau" (in the Luxembourg); and "L'Épilogue" (in the Petit Palais Museum). He gave long study to one subject, "Le Christ au Tombeau," which particularly interested him, and which he painted several times, and exhibited at different times. He has left also some admirable portraits. We may mention also "Le Lévitte" and "Ephraïm," which brought him the "médaille d'honneur" in the Salon of 1889. "Télémaque" was the last production of M. Chauchard. Henner, who retained throughout his life the homely personality that



office, surgeons' and medical staff, receiving, bath, and Röntgen-ray rooms, etc. On the west side are the board rooms, etc. This block is complete with sanitary and lavatory. The whole of these walls together with the medical side of wards are in Keen's cement and painted green. The surgical side of the wards is finished in a rose tint. Above the entrance hall and under the dome are the laboratory, pathological museum, library, and research rooms. These rooms are fitted with chemical benches, with opalite to the spaces between the sinks, and upboards and presses, etc., in polished teak. At the junction of the central hall with the main corridor is the clock tower, 90 ft. high, with a net weighing 1 ton. At the rear of this tower on the north side are the kitchen and domestic offices, sculleries, and stores. The kitchen has a white glazed brick dado, and is fitted with steam kary apparatus, sterilisers, tea infusers, and ovens by Messrs. Wenham & Waters, of Croydon. The services for cold water are by Messrs. Bevan & Co., of Gloucester and London, who have done the whole of the plumbing throughout the capital. Beyond this, going north, are the sundry buildings and boiler house, and at the north-west angle of the site is the infectious block, a hospital complete in itself, with its own ranges and staff, and enclosed within a neutral zone. The clock tower is in the centre of the connecting corridor, which runs through all the pavilion blocks and close to the lifts in the ell of the principal staircases. On the south side of this corridor on either side of the clock tower are the day and dining-rooms and reading-rooms. On the south end of pavilion C are the operating theatre, recovery, anaesthetic, and surgeons' rooms. There are solid iron gates opening to left and right of the main corridor. The majority of these wards in the pavilion buildings are for twenty-eight beds and are 10 ft. long, 28 ft. 6 in. wide, by 15 ft. in the clear. The floors are 1½ in. teak with patent secret joints and teak curved skirting at angles of floors and walls, the whole being polished with Benzolish. The heating is by two large pedestal stoves in the centre of wards, and the general temperature is regulated by steam radiators in the window backs on the low-pressure system. Fresh air is passed over these and admitted as it is removed by a series of fresh air inlets and to extract flues, which are connected with a series of iron ducts to a flèche in the centre of the roof. Each ward has a sister's duty-room, a ward kitchen and bathroom with fixed and movable baths fitted with hot water towel rails. The floors of all bathrooms and corridors are terrazzo, laid by Messrs. Wilkinson & Co. The walls of the sanitary annexes are in white glazed brickwork and the joints painted with enamel. The angle towers which flank the building are fitted with brush and sink rooms on one side, and on the other with lavatories and closets. The south half of pavilion B is fitted with separate rooms for officers and grant officers. There is a Portland stone staircase to each pavilion block, and in the wall of the block is fitted an electric passenger and ambulance lift. In the lunacy ward, which is on the south side of F block, the pedestal stoves are heated by strong iron columns and secured with padlocks, while all the windows have iron bars. In the boiler house there are five Lancashire boilers, 24 ft. long by 7 ft. diameter, worked at a pressure of 60 lb. per square inch, the steam being used for heating, and laundry, and for the hospital range, and by Messrs. Jones & Althott, of Nottingham and London. Above to the hospital round the carriage drives the residences of the principal medical officers, surgeons, fleet surgeons, sisters, storeroom, plain, and matron. Near the main entrance the sick-birth attendants' quarters, fitted with dining and recreation rooms, cubicles and sanitary seamen. These buildings are constructed with pitch pine floors. The whole of the wards are treated with distemper, and the heating apparatus is hot-water system. The heating apparatus has been carried out by Messrs. J. & Co., Regent's Park. The whole of the metal and iron, were manufactured by Mr. Gibbons (Wolverhampton). The current lighting is supplied by the Gillingham Corporation on contract, but it is understood that to near future the hospital will generate its own current. The new Gordon Museum and Pathology has just been opened, and has been erected from plans and drawings by Mr. J. H. T. Wood, architect to the service of the hospital. It forms part of an extensive scheme of medical school buildings for the purpose of study and instruction. The museum, some 12,000 in number, are arranged in four bays of the museum, each bay being lighted and having 1,000 sq. ft. of floor for models and exemplars, with two tiers

of galleries, gained by a central staircase, affording wall-space of more than 13,500 ft. superficial for specimens on shelves and in cases.

Tony H. Danvers, of the New Town Hall in New Cross-road, Deptford, was formally opened on Wednesday last week by the Mayor, Mr. J. Arthur Pyna. Mr. Lancashire, of Messrs. Lancashire & Rickards, architects for the building, presented the Mayor with a silver-gilt key, bearing the borough arms and a commemorative inscription. The new Town Hall has on the front a frieze representing a naval battle, and large figures of admirals. The total cost of the site, building, and fittings will be between 40,000l. and 50,000l.

**FREE LIBRARY, HAMMERSMITH.**—The Duke of Argyll visited Hammersmith on the 24th inst. for the purpose of opening the new library which has been erected in Brook Green-road at a total cost of 14,500l. Mr. Carnegie contributed to that amount a sum of 10,000l. on the condition that the cost of a site should not be a burden on the penny library rate. The architect was Mr. H. T. Hare.

#### APPOINTMENTS.

**CORPORATION OF WESTERN EGYPT.**—The directors have appointed as general manager in Egypt Mr. W. G. Beckett, who, in order to take up the post, has resigned his position as chief engineer of the Bengal-Nagpur Railway. They have also appointed as manager in the Oases, and geological expert, Mr. H. J. Beadnell, of the Geological Survey, Egyptian Government, and representative of the Egyptian Government in the Oases during several years past.

**ORDNANCE SURVEY.**—The War Office have appointed Colonel R. C. Hellard, R.E., as Director-General of the Ordnance Survey at Southampton in succession to Colonel D. A. Johnston, C.B., R.E., retired.

#### FOREIGN.

**FRANCE.**—The Académie des Beaux-Arts proceeded on Saturday last to the election of two members in place of the late MM. Paul Dubois and Alphonse de Rothschild. The result was that M. René de Saint-Marceaux, the sculptor, was elected in place of M. Dubois, by 19 out of 37 votes; and Dr. Paul Richer, in place of M. de Rothschild, by 22 votes out of 42. M. Saint-Marceaux, a former pupil of Geoffroy, was born in 1849. Among his principal works are "Le Jeunesse du Dante" (in the Luxembourg), "Le Forgeron Florentin," "Le Génie gardant le Sécrot de la Tombe," "Arlequin," the tomb of Alexander Dumas fils, and lastly the monument to be raised to the same writer in the Place Malesherbes. Dr. Richer is professor of anatomy at the Ecole des Beaux-Arts, and is also a talented sculptor and draughtsman. Last Sunday, at St. Malo, the statue of Jacques Cartier, the discoverer of Canada, was unveiled on the ramparts opposite the tomb of Chateaubriand. The statue is the work of M. Georges Barreau. A competition has been opened for designs by local district architects for a new hospital at Perpignan. The cost is estimated at 1,400,000 francs. The Société d'Horiculture du Rhône has opened a competition for the best floral decoration of windows and balconies in the city of Lyons. M. Fernoux, President of the Société Nationale des Architectes de France, has been created a Chevalier of the Legion of Honour. The Municipality of St. Germain-Laye will shortly open a competition for the rebuilding of the City Theatre. The jury of the competition opened by the town of Nîtry-le-François for a new savings bank, has awarded the first premium to M. Jossier, of Chalons-sur-Marne.

**SOUTH AFRICA.**—At a recent meeting of the East London Town Council eleven building plans were approved, the total approximate value of the proposed buildings being 10,560l. The same municipality also invite tenders for the erection of a Fire Brigade Station, the architects for which are Messrs. Cordeaux & Walker. The Pretoria Town Council have passed building plans to the value of 45,090l. These include shops and offices to be erected in Church-street for Mr. J. G. van Boeschoten, valued at 21,000l. In Johannesburg the building trade is still brisk, and it is reported that there is a good demand for steel ceilings, which are being placed in the old buildings when these are renovated. The local Town Council invite tenders for certain buildings to be erected in Smit-street, in connexion with the local water distribution, and also for the construction of a dam at Klipspruit. At Kroonstad, the Town Council met to consider the tenders sent in for the erection of a local town hall, and that of Mr. G. B. White, of Port Elizabeth, the lowest, for 9,540l. was accepted.

**EAST AFRICA.**—The new Cathedral at Mombasa was recently inaugurated with much ceremony. The first set of plans were by Messrs. Christian & Purday, architects, of London, but had to be set aside as involving too costly an edifice. According to the local *Africana Standard*, Mr. John H. Sinclair, Acting Consul-General in Zanzibar, "most kindly undertook to alter them." The cost of the Cathedral, when completed, will be about 66,000 rupees.

#### MISCELLANEOUS.

**NEW STANDARD WEIGHTS.**—In response to representations made to the Board of Trade by the Association of Chambers of Commerce, the Board have signified their consent, and they will take steps for the preparation of three new denominations of standard weights—20 lb., 10 lb., and 5 lb.—as aliquot parts of the "cental" and being multiples, respectively, of the imperial weight of 1 lb. ascertained by the Weights and Measures Act, 1878. The new weights will be legalised by an Order in Council in due course; the three standards will be fashioned in the octagonal shape, with a cross-bar, of the standard 60 lb. avoirdupois or "half-cental" weight of which we published an illustration on October 31, 1903, as then sanctioned and prescribed by Order in Council. The Associated Chambers have expressed their opinion that the adoption of the authorised "half-cental" has served to economise labour, time, and expense.

**SOUTH BENFLEET BRICKFIELDS.**—At the Mart, Tokenhouse-yard, on July 19, Messrs. Foster & Cranfield submitted for sale by auction the freehold property known as South Benfleet Brickfields, situate close to Benfleet Station on the London, Tilbury, and Southend Railway, and having direct water carriage to Benfleet Creek. According to the particulars, the area covers 34 a. 0 r. 26 p., divided in this way:—Pasture, 11 a. 0 r. 12 p.; pasture and ponds, 1 a. 1 r. 30 p.; and buildings, yard, pastures, etc. 34 a. 0 r. 26 p. It was stated that the entire property is at present let to and in the occupation of Mr. N. Stockwell under a five years' agreement from March 1898, subject to six months' notice to determine the tenancy, at a rental of 20l. per annum and a royalty of 2s. per 1,000 bricks made, less 10 per cent. for waste, and is, per yard for sand sold off the property. The ground was represented as well adapted for brick-making purposes, the contour of the land being such that the greater part of the deposit of brick earth stands well above the level of the land surrounding, so that an extensive business could be done without any detriment to the site. At present, with the exception of the portion now used for brick-making, the land was all grass. On the property were brick-built and tiled engine-house, square shaft, and office; corrugated iron-built pump-house; and, conveniently placed, a foreman's bungalow cottage; a piece of garden ground, a stable, and a coach-house. There was a good supply of sand, the brick earth was practically inexhaustible, and there was an ample water supply from two ponds. Bidding commenced at 1,500l. and went up to 1,800l., but, there being no further advance, the property was bought in at 3,000l., the auctioneers intimating that they would be ready to treat for a sale privately.

**MEMORIAL TO CHARLOTTE YONGE, WINCHESTER CATHEDRAL.**—The second part of the memorial to Miss Charlotte Yonge, the first part of which was unveiled in Otterbourne Church about a year ago, was recently dedicated by the Bishop of Guildford in Winchester Cathedral. It takes the form of a reredos, and has been placed in the Lady Chapel, its subject being the Annunciation. The reredos, which is of oak and mahogany, painted and gilded, was, like the screen in Otterbourne Church, designed by Mr. J. A. Kempe.

**ASPINALL'S ENAMEL.**—The patentees and makers of "Aspinall's Enamel" have just succeeded in an action taken against a Belgian firm who were selling goods labelled "Email Aspinall," "Peinture Aspinall," and "Vernis Aspinall." The court awarded the English firm substantial damages, and ordered that all the goods bearing the words "Aspinall" were to be withdrawn from the market.

**INCORPORATED CHURCH-BUILDING SOCIETY.**—The Society held its usual monthly meeting on Thursday, the 20th inst., at the Society's House, the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.—Building new churches at Bournbrook, S. Wulstan, near Birmingham, 250l.; Crofton-park, S. Hilda, Kent, 175l. for the first portion; Jarvis Brook, S. John, near Rotherfield, Sussex, 80l.; Southfields, S. Barnabas, Surrey, 250l.; and West Acton, S. Martin, Middlesex, 130l.; towards rebuilding the church of S. Andrew, Countesthorpe, near Leicester, 50l.; and towards enlarging or otherwise improving the accommodation in the churches at Chobham, All Saints, Surrey, 100l.; Enfield, S. Luke, Middlesex, 100l., making in all 3000l.; Llanelly, S. Elli, Carmarthen, 200l.; Llanfihangel Rhos-y-corn, S. Michael, Carmarthen, 20l.; Mortlake, S. Mary, Surrey, 150l.; Notting-hill, S. Clement, Middlesex, 20l.; Southend-on-Sea, S. John-the-Baptist, Essex, 50l., and Lynton, S. Mary, Devon, 45l. in lieu of a former grant of 50l. A grant was also made from the Special Mission Buildings Fund towards building a Mission Church at Hellfield, S. Aidan, near Long Preston, Yorks, 50l. The following grants were also paid for works completed:—Chepstow, S. Mary, Mon., 25l., making in all 75l.; Sutton Montis, Holy Trinity, Somerset, 15l.; Llandudnod, Wales, Holy Trinity, 150l.; Broughton Moor, S. Columbe,



Cumberland, 90l.; Hornsey, S. Peter, Middlesex, 50l., making in all 175l.; Barry Dock, S. Mary, Glam., 200l.; Chertston, S. Andrew, near Cambridge, 15l.; and Watford, S. Michael and All Angels, Herts, 40l. In addition to this the sum of 315l. was paid towards the repairs of the seventeen churches from Trust Funds held by the Society.

**LONDON BUILDING ACTS (AMENDMENT) BILL.**—At the meeting of Marylebone Borough Council, on the 20th inst., the report of the Joint Subcommittee of the General Purposes and the Works Committee appointed to consider the London County Council's proposed amendments of the London Building Acts was presented. The report formulated a great number of objections to various clauses in the Bill, which we have not space to give. It was adopted, and it was resolved to send it to the London County Council.

**WAYSIDE REST, NEAR BRANSCOMBE.**—At a spot situated about five miles from Colyton, and three from Branscombe, a massive semicircular seat of grey Dartmoor granite has been erected as a memorial to the late Dr. Gilbert-Smith. In the back of the seat has been introduced a medallion portrait, in bronze, of the doctor, whilst on each side are panels of the same material bearing inscriptions in raised letters. The work was designed by Mr. T. Phillips Figgis, of London, and the structure has been erected under the general official supervision of Mr. S. Ingram, C.E., the surveyor to the Devon County Council, by Messrs. Harry Hems & Sons, Exeter.

**UNIVERSITY DEGREE CONFERRED UPON SIR THOMAS DREW.**—In presenting Sir Thomas Drew to the Senate of Dublin University for the honorary degree of Doctor of Laws the Public Orator, Mr. Purser, began his address in the following terms:—*Maximi apud Romanos habitus sunt architecti, Viriuvigione fama cum libris doctissimi ad posterum per secula pervenit. Neque minus nos honorare architectos deest, et nunc Vitruvium nostrum Dublinensem ad vos duo Thomam Drew Equitem Auratum, qui Academiae Artium Regalis Hibernice Præses picturam, statuariam, architecturam insulas nostre summo iudicio gubernat, stimulat, promovet, Ecclesiasticas Cathedras Dublini, Armachæ, Belfasti vel reficiendi vel edificandi magna pars fuit. Nos quoque ipsi ingenio eius multa debemus; ædificium enim nuper Collegio donatum alumnorum nostrorum liberalitate, iam perfectum et exoptatum scientie eius monumentum existat perennum quam utile, quam spatiosæ, quam pulchræ sint aedes ab eo extractæ.*

**UNION OF BENEFICES, WESTMINSTER.**—The Commissioners appointed by the Bishop of London to inquire into the possible rearrangement of the nine Westminster parishes have just finished their labours. The Commissioners direct attention in their report to the great changes, with a concurrent diminution of the resident population, which have been caused by the demolition of houses and the erection of business and public buildings during recent years. They recommend that a union be effected of the benefices of the parishes of St. Mary and St. Stephen, together with the sale of St. Mary's Church (which was built in Tothill Fields in 1837) and of one of the two parsonage houses, and that St. Stephen's Church, the Naples Hall, and St. Mary's Schools be retained for the two united parishes. The population of St. Stephen's parish has dwindled to less than 2,000; it was nearly four times as much when Baroness Burdett-Couttes established and built the church in Rochester-row in 1846-7, after B. Ferrey's plans and designs.

**"THE HANDY NEWSPAPER LIST."**—Messrs. Charles & Edwin Layton, of Farringdon-street, have issued a useful and well-arranged little newspaper list at the low price of 6d. All the towns in the United Kingdom in which newspapers and periodicals are published are arranged in alphabetical order with the exception of London, which is placed first in the list. The names of the daily newspapers in each town are placed at the head of the list in larger type, to distinguish them from the other periodicals.

**THE SURVEYORS' INSTITUTION.**—The Council of the Surveyors' Institution have decided to offer annually the following scholarships, tenable for three years by students of the Institution, viz.: one of 80l. per annum at Cambridge University; one of 60l. at the University College of North Wales, Bangor; and one of 50l. at the Armstrong College, Newcastle-on-Tyne. Holders will be required to take the Natural Science Tripos, and the examinations for the diploma in Agriculture at Cambridge, or the equivalent for those examinations at the other universities. The first examinations will be held at Cambridge, Bangor, and Newcastle-on-Tyne respectively during the summer of 1906. For further particulars application can be made to the Secretary, Department of Agriculture, Cambridge University; the Secretary, University College of North Wales, Bangor; the Secretary, Armstrong College, Newcastle-on-Tyne; or the Secretary, the Surveyors' Institution, 12, Great George-street, London.

**GOODYEAR EXHIBITION, EDINBURGH.**—Owing to the lack of time, and the difficulty in getting

the exhibits to this country by a given date, the opening of the Goodyear Exhibition of Architectural Refinements at Edinburgh will not, as previously announced, take place in August, but has been postponed until September 5, 1905. The exhibition will be held in the National Portrait Gallery, Queen-street, Edinburgh. Those who are interested in the subject, and may wish to be present at the opening, are invited to send their names in to the Hon. Exhibition Secretary, Mr. J. Ingleby Wood, Edinburgh Architectural Association, 117, George-street.

**ROYAL SANITARY INSTITUTE.**—At an examination in Sanitary Science as applied to Buildings and Public Works, held in Cardiff on July 21 and 22, seven candidates presented themselves, and the following two candidates were granted certificates:—C. T. Russell, Clissold Park; D. T. Williams, Cardiff.

**KING'S COLLEGE, LONDON.**—The following is the list of prize-winners for 1904-5. Faculty of Arts.—Division of Architecture (day school): Studio; first year, J. Moodie, prize of books; second year, W. Hoyle, silver medal. Ornament: first division, H. N. Smith, certificate of distinction. Building Construction: first year, first division, J. Moodie, prize of books. Division of Architecture (evening): Architectural History: Architecture, first prize, L. F. Williams, second W. Harrington, first division; W. J. Burton, prize. Studio (first division): W. J. Burton, prize. Constructional Drawing (advanced): James Perkins, silver medal; H. A. C. in books; W. R. Hoek, 2l. in books; W. T. H. Woolcock, 1l. in books. F. C. Higgins, 2l. in books; Alfred J. Pyle, 1l. in books. Building Construction: A. G. Older, silver medal; W. T. H. Woolcock, bronze medal; Miss J. Lee, 3l. in books; T. W. S. Hall, 2l. in books. Sir W. P. F. Phillips' bronze medal for sanitary building construction; F. C. Higgins.

## Legal.

### BETHNAL GREEN ANCIENT LIGHT CASE.

The case of Price v. Davis came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Mathew, on the 20th inst., on the application of the defendant for judgment or new trial on appeal from a verdict and judgment at trial before Mr. Justice Walton and a common jury in the King's Bench Division, and Mr. Quicke appeared for the appellant, and Mr. Witt, K.C., and Mr. Woodfin for the respondent.

When the case was called on, Mr. Quicke said that the learned counsel who conducted the case in the Court below was engaged on a reference, and he asked that the appeal might in these circumstances be put at the bottom of that day's list.

Mr. Witt objected to this. He said that the case had been in the paper for two or three days, and he asked that it might be proceeded with.

The Master of the Rolls said that the appeal must go on, as it would be dismissed on the ground that no one was instructed to prosecute it.

Mr. Quicke replied that the brief had only that minute been placed in his hands to make the application for the appeal to stand over for a short time. He said he saw from the pleadings that the plaintiff was the tenant of a fully-licensed public-house known as the "Bricklayers' Arms," Bethnal Green, and he used the defendant, a builder, for damages caused by buildings he had recently erected in Somerford-street, which the plaintiff alleged had interfered with and diminished the light that he formerly enjoyed in the bar parlour. He submitted that on the decision of the House of Lords in the Colls' case there had been no such interference with the plaintiff's ancient lights as gave him a right to damages. He contended that the character of the trade usually carried on in a bar-parlour did not give the occupier of such premises any claim to a special amount of light, and so long as the new buildings did not reduce the light that reached the room below that amount ordinarily enjoyed in a town the plaintiff could not complain. Indeed, the defendant was so positive that no real damage was done to the licensed premises that he had asked that the jury should be allowed to view the premises, undertaking to bear the expense himself of their going down to see for themselves.

Lord Justice Mathew asked if it was not a question for the jury who had heard the evidence. He supposed that evidence had been called on both sides.

Mr. Quicke said that no doubt expert evidence had been called.

The Master of the Rolls read the judge's notes of the trial, from which it appeared that the "Bricklayers' Arms" stood at the junction of Somerford-street and Collingwood-street, and that the light to the bar parlour came in obliquely. The new buildings in Somerford-street were some 20 ft. higher than the buildings that had been pulled down. The evidence given by the plaintiff was that he had

now to use artificial light earlier in the day in the bar-parlour, and that the room, which was formerly bright and cheerful in the day-time, was now a dull room. Owing to this the trade had fallen off to the extent of about 50s. a day.

Lord Justice Romer said it was a clear case for the jury, and they had decided it.

Mr. Witt submitted that there was not sufficient evidence of diminution of light to justify that finding.

Lord Justice Romer—There is enough to give a verdict to the effect if the jury so found.

Mr. Quicke then submitted that the damages given were excessive.

Lord Justice Romer—50l., good gracious!

Mr. Quicke said that that was the appeal case.

The Master of the Rolls, without calling any Counsel for the respondent, said that Mr. Quicke had done the very best for his client in the circumstances and on the materials before him. It was obviously not a case in which the findings of the jury could be interfered with by the Court. The jury had returned a verdict, and on that verdict the learned judge was right in directing judgment to be entered for the plaintiff. The matter ended there.

The Lords Justices concurred, and the appeal was accordingly dismissed with costs.

Mr. Witt said that the damages had been paid in the Court as a condition to the appeal being brought. He asked that the money should be paid out to the plaintiff.

The Master of the Rolls—Yes, certainly. Order accordingly.

### POINT UNDER THE PUBLIC HEALTH (LONDON) ACT, 1891.

**APPEAL BY THE WESTMINSTER CORPORATION.**

In the House of Lords, consisting of the Lord Chancellor, Macnaghten, James of Hereford, and Lindley, on the 24th inst., judgment was delivered in the case of the Mayor, &c. of the City of Westminster v. the London and North-Western Railway Company on the appeal of the Corporation from an order of the Court of Appeal discharging a judgment of Mr. Justice Joyce in the Chancery Division.

The short facts of the case were as follows:

The appellants, as the sanitary authority of the City of Westminster, had constructed a sewer in the southern end of Parliament-street (where, in consequence of recent improvements, there was a distance of about 100 ft. between the opposite buildings) public lavatories and other conveniences, these conveniences being placed under the ground in the middle of the roadway as far removed as possible from the buildings on either side. On each side of the roadway there is an entrance 5 ft. 9 in. wide protected by railings and leading by a staircase of the same width to a passage or subway 10 ft. wide and 8 ft. high, which was the whole way across on a level with the underground conveniences. One of the ways there were openings where the lavatories and cloakrooms were provided on a large scale.

The London and North-Western Railway Company owned a large block of buildings on the east side of Parliament-street, having a frontage to Parliament-street and a frontage to Bridge-street, with vaults under the pavement of Parliament-street, and they claimed the soil beneath the roadway up to the mid line of the street. The railway company objected to the sanitary authority constructed by the Corporation, and sought to have them removed, alleging alternatively that the Corporation had committed a trespass or had been guilty of obstruction to the highway, causing special damage. The Corporation relied on their statutory powers under the Public Health (London) Act, 1891, which authorized them to construct such public conveniences and vaults in them for the purpose of the sewer of the road exclusive of the footway as the Lord Justice Joyce, before whom the case was argued, ordered the Corporation to remove such part of the staircase railings and other works as had been placed on the site of the old footway, was 2 ft. 6 in. from the kerb defining the present roadway. The Company, however, appealed, and the Court of Appeal ordered the Corporation to pull down and remove the whole of the staircase railings and other works upon the lands of the Company other than the conveniences in the pleadings mentioned and such further parts of the construction as the Court might think the order being suspended pending an appeal to the House of Lords, and the Corporation was ordered to pay the costs of the action and of the appeal. The Corporation acquiesced in the order of Mr. Justice Joyce, but they contended that the order of the Court of Appeal was wrong.

The Lord Chancellor, in giving judgment, said that it seemed to him that the powers of a local authority to erect certain public conveniences could not be disputed. The shape, size, and position of them were left to the discretion of the authority in question, and so far as the appellants themselves, which under their direction had been erected, he did not understand that the objection could be made. The objection, as they assumed the force of legal objection



referred to the access to them and to the supposed motives of the local authority in the selection of the site. Assuming the thing done to be within the discretion of the local authority, no Court had power to interfere with the mode in which it had exercised it. It seemed to him impossible to contend that these conveniences were not the things authorised by the Legislature. It seemed to him that the provision of the Statute itself contemplated that such conveniences should be made beneath public roads; and if beneath public roads some access beneath the road level must be provided; and if some access must be provided, it must be a measure simply of greater or less convenience, when the street was a wide one, whether an access should be provided at only one or at both sides of the street. Under these circumstances he thought it was a question of degree, and if there was the express provision, as he thought there was, to make a tunnel under the street for the purposes of these conveniences, then he thought the mention of its extent or cost was a matter with which neither a Court of law nor equity had any concern, since the thing contemplated by the statute had been done in the way the statute contemplated it might be done. He thought the judgment of Mr. Justice Joyce should be restored. Having regard to the fact that the local authority had made a blunder, and interfered with the footway, although that had now been put right, he thought neither side in the controversy should have any costs.

Lords Macnaghten and Lindley concurred in the motion of the Lord Chancellor that the appeal should be allowed.

Lord James of Hereford dissented, being of opinion that the works, so far as they constituted the subway, were constructed without legal authority. He thought, therefore, that the judgment of the Court of Appeal should be affirmed and the appeal dismissed.

By a majority, therefore, the appeal was accordingly allowed.

Mr. Haldane, K.C., Mr. Hughes, K.C., and Mr. Dighton Pollock, appeared for the appellants; and Mr. Montague Sherman, K.C., and Mr. Bustace Hills for the respondents.

#### ACTION BY BUILDERS' MERCHANTS.

Mr. JUSTICE KEEWICH, in the Chancery Division on the 25th inst., heard the case of Hooper & Ashby v. Willis, an action by the plaintiffs, a firm of builders' merchants, carrying on business at Southampton, with branch offices at Bournemouth, Poole, Portsmouth, and other places, for an injunction to restrain the defendant from carrying on such business at Broadstone in alleged breach of an agreement of service. The facts were these:—The defendant entered the service of the plaintiffs in September, 1896, when he was aged nineteen. The plaintiffs, by an agreement of service dated September 29, 1896, agreed to take the defendant into their employment, and in that agreement it was provided that defendant should not for the space of fourteen years after the termination of his employment be terminated by the plaintiffs or the defendant, at any place within a radius of thirty miles from the Town Hall at Bournemouth or the Market at Southampton, carry on directly or indirectly as principal clerk, agent, manager, or in any other capacity, the business of a builders' merchant or manufacturer of or a dealer in cement, lime, bricks, tiles, slates, roofing, and any other building materials which may use during his employment should be terminated by or dealt in or sold on commission by the plaintiffs. The agreement was countersigned by the defendant, but not by any member of the plaintiff firm. The defendant was employed first as a clerk and afterwards as a traveller at the plaintiffs' Bournemouth office, and discharged himself from their employment in August, 1903. The plaintiffs subsequently discovered that the defendant was carrying on business at Broadstone, which was within seven miles of Bournemouth, and accordingly brought the present action, claiming the before-mentioned relief.

In the result his lordship, after hearing evidence, came to the conclusion that the area covered by the agreement was larger than was reasonably required for the protection of the plaintiffs' trade, and dismissed the action with costs.

Mr. Stewart Smith, K.C., and Mr. Markham appeared for the plaintiffs, and Mr. P. Laurence, K.C., and Mr. Hohler for the defendant.

#### REMOVAL OF SHINGLE FROM A FORESHORE.

The case in which a workman in the employ of Shanklin Urban District Council, named Robert, has been summoned for a breach of the Prohibitive Order by the Board of Trade for the removal of shingle from the shore of the Isle of Wight, was again mentioned in the House of Commons, when Mr. John Marsh, on behalf of the Council, asked for a further adjournment of the case, saying it was the wish of the Board of

Trade that there should be another adjournment. Asked by the Chairman (Admiral Sir Algernon de Horsey) the object of the repeated adjournments, Mr. Marsh said, probably the Bench would hear no more of the matter. Under a section of the Act the rights of certain owners of the shore were preserved, and it was, he believed, contended on behalf of the Board of Trade that their order had the effect of overruling those rights. The Shanklin District Council were the lessees for Mrs. White-Popham, who was admittedly the owner of the foreshore and the shore down to low-water mark at Shanklin. Under their lease they had certain rights to take materials on the shore, which they had done for use in repairing the sea defence works, and application was made to the Board of Trade to allow them to continue their operations without any question as to the validity or force of the Order. During the time the matter was under consideration the proceedings in that case were commenced without reference to or knowledge of the Board of Trade. No material had since been removed. The effect of the works carried out by the Council in erecting a groyne was that there had never before been such a good beach as now. The Clerk informed the Bench that he thought it advisable to grant the application for the adjournment, as it would probably save a very serious law suit to test the validity of the Order of the Board of Trade. The application for a further adjournment was then granted.

#### AN ARCHITECT'S CLAIM.

At the Moot Hall, Newcastle, on the 26th inst., the case was resumed before the Official Referee (Mr. Edward Pollock) of Haswell v. Mulholland, which was a claim by Mr. F. R. N. Haswell, architect, of North Shields, for 274*l.* 3*s.* 5*d.* against Mr. John Mulholland, Station Hotel, Whitley Bay. The claim was made up of 270*l.* 13*s.* 5*d.* for work done, and 3*l.* 10*s.* expended by plaintiff as an architect. The defendant counterclaimed for 295*l.* for alleged inferior work passed by the architect, for 200*l.* for law costs incurred owing to right of light of a neighbour, and 35*l.* costs of defending an action brought by Mr. C. E. Lowenthal (instructed by Messrs. R. and R. F. Kidd), and the defendant by Mr. J. A. Compston (instructed by Mr. W. J. Ward).

The claim arose out of work in connexion with some premises owned by defendant at Whitley Bay, which in March, 1901, had an off wine and spirit licence, and for which defendant wanted a full licence. To get this, it was stated by plaintiff's counsel on the opening day, defendant consulted Mr. Haswell, who advised him to build something in the nature of an hotel. The project was proceeded with, and, after various sets of plans had been prepared by Mr. Haswell, defendant bought out Miss Canisick's (a neighbour) right of light, and erected a four-story building. The question of the right of light was a much debated part of the case, and plaintiff in his evidence averred that he knew nothing about the dates of Miss Canisick's building, nor of her right to light. As to his charges, he said that at the first interview with defendant he stated that the leading point was 5 per cent. upon the outlay of the contract; but it was not true to say that he agreed to do all the work dealt with for 5 per cent.

The suit came to an abrupt termination. Counsel discussed and settled various items in the particulars of claim, agreement on some matters in dispute having been come to. By this means the case was considerably shortened.

Thereupon the Official Referee gave judgment. He said that he saw no justification whatever for charging Mr. Haswell with any negligence either with regard to carrying out the building or Miss Canisick's right of light or anything else. He thought that if the matter was going to be settled in the way in which it had been by its withdrawal it was a charge that should not have been made. He could not see that there was any ground whatever for interfering with the ordinary course with regard to the costs on this occasion, and there must be judgment for the plaintiff in the sum of 244*l.* 6*s.* 4*d.*, with judgment for the plaintiff on the counterclaim, and with costs on the claim and counterclaim.—*Newcastle Daily Chronicle.*

#### PATENTS OF THE WEEK.

##### APPLICATIONS FOR PATENTS.

14,787 of 1904.—H. COULTHURST, J. COULTHURST, and A. COULTHURST: *Earthenware and like Pipes.*

According to the invention, an ordinary form of pipe press is employed, operated either by steam or screw power in the usual manner. The die for forming the exterior of the pipe is supported from guide arms as usual, and is made in two halves, so that it can be removed when the pipe is made, the two halves being held in position by means of clips during the pressing operation. The

\*All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

upper portion of the die is shaped internally to give the required formation to the spigot end of the pipe, the middle portion of the die is contracted to form the body or length of the pipe, and the lower portion thereof is shaped to give the required formation of the extension of the socket end of the pipe. The upper portion of the die is formed with an annular recess, in which is placed the loose ring, preferably made in halves and so shaped as to form a tongue on the spigot. When the pipe is made and the die is opened out, the loose ring remains on the pipe and is afterwards lifted off, the shape of the tongue being such that the die, if the ring were attached thereto, would not "draw away" from the pipe.

18,373 of 1904.—E. KUCKELHATS: *Detachable Connexions for Furniture Parts and Other Articles.*

A detachable connexion for furniture parts and other articles, comprising a keeper plate, a slot in said plate being bent outwards at the slotted portion, in combination with a locking plate with a laterally reduced part corresponding to the slot and consisting of a hook strip and a narrow adjacent strip with shoulders, said strip parts being bent inwards.

18,394 of 1904.—E. J. B. SCRATTON: *Holding Doors, Casements, or the like, Closed or Open or at any Desired Angle.*

In carrying into practice the improvements of this invention, a vertical tube of a suitable length is secured to the door, preferably near its opening edge, so that its lower end is situated a short distance above the floor. A rod, which may be round or square, is carried within the tube, and is fitted at its lower end with a catch or holder and at its upper end with a handle, preferably horizontal. The tube has a notch formed at one side of its top end to receive the handle when it is desired to hold the catch clear of the floor and another and deeper notch in which the handle is placed so as to allow the rod to descend and the catch to come into action.

18,576 of 1904.—R. SCHOLFIELD: *Machinery or Apparatus Employed in the Manufacture of Bricks, Tiles, and for like Forms.*

Means for automatically relieving the pressure of the material in the pug upon the intermittently rotating cylinder of the machine without dispensing with the continuous rotation of the screw-like blades of the pug. The combination of an intermittently rotating cylinder and pug, with a pug shaft having screwlike blades fixed thereon, and provided with an end adapted to fit a central hole in the rotating trunnion bearing, and means for causing the said shaft to travel forwards in one direction, and to be returned in an opposite direction by the material operated upon, said movements of the shaft being simultaneous with its continuous rotation.

19,267 of 1904.—A. J. FAULDING and S. WALKER: *Stoves for Heating Water and the like.*

This invention relates to the provision of portable apparatus, compact in construction and of light weight, adapted for quickly heating water or the like when a small quantity is required, without the use of coal or like fuel. In carrying out the invention, a stove is constructed of convenient height for the purpose, rectangular or of other suitable form in section, and of a size adapted for the reception of a fire lighter of the "Quicklit" type. The stove is by preference made of sheet metal, with openings cut through the metal plate walls at or near the base of stove, and above these openings are other perforations cut in such a way and of such form that, when the base of the stove, these pieces are bent towards the interior of stove, they form a grate for supporting the fire lighter, which may be ignited in any convenient manner. The last-mentioned perforations admit air to the sides of the burning fire lighter within, thus supplementing the current of air passing from beneath the grate and through the ventilated fire lighter, in the manner for effecting complete and rapid combustion. The flame from the burning fire lighter impinges direct upon the kettle or the like, and between the grate and top of stove, other perforations or openings are made for allowing the products of combustion and heated gases to escape, and thereby assist in the rapid heating of the water or the like.

22,907 of 1904.—J. J. MACKY: *Fastenings for Door Handles.*

A fastening for door handles consisting of a collar or thimble coarse screwed externally to drive directly into a tapped hole in the door stile and bored conically to take against a conical back nut on the shank of the handle.

3,423 of 1905.—J. SPARLA: *Machines for Stamping Pipes.*

A machine for stamping pipes, consisting of a stamper of the same annular shape as the mould and tapering towards the bottom, which is raised by means of a rope fastened to it and a rotating lever, which lever, after it has been turned a certain distance, lets the rope go, so that the stamper drops by its own weight, a feeding or filling device, consisting of a double-walled funnel, whose inside wall is lifted during the ascent of the



stamper and then caused to drop for the purpose of introducing the fresh material to be stamped, through the slit formed during this operation.

**4,600 of 1905.—H. COOLEY: Method of Key-and-Dovelling Wood-Block Floors and Pavements.**  
The invention consists of a double-pointed dovetail, made of suitable strength to be used for the purpose of fastening together floor or paving blocks. Between the points, preferably midway, of the parts forming the shanks is a disc, intended to form the key. On two edges, and as the extremities of the disc, are formed little projections or points. The edges of the portions forming the disc may vary in shape as desired, according to the grooves in the blocks to which they have to conform, while the shanks may be of any convenient cross section. The concrete for the floors is prepared in the usual way. The blocks to be used may then be placed in position on the concrete and the end of the dovetail-key inserted, another block similarly prepared is placed with the other end of the dovetail-key resting in the small hole for it. A smart tap is now given to the block, and this process is continued.

**7,761 of 1905.—C. W. KUHNENMEISTER and P. THOMANN: Brick-moulding Machines.**

This invention relates to brick-moulding machines, characterised in that on an endless chain transverse partitions are fixed and provided with notches, into which enter, when the chain is moving forward, longitudinal ledges, whereby, after the base plate has been inserted before the partitions and ledges catch each other, ready moulds are formed in which the material is then firmly rammed in, whereupon, after the ledges and partitions are again released from each other by the chain moving further forward, the base plates can be taken out together with the ready bricks placed thereon.

**8,024 of 1905.—E. LAINE: Manufacture of Composition for Building and Other Purposes.**

According to the invention, silk screens allow the material to pass in grains, which are too large and insufficiently permeable to be liquified, and are used for converting it into paste. In order to obtain such paste in a state of perfection, with eliminations of the iron, lime, or manganese impurities, it is necessary to prepare it by wet-hot process by precipitation—that is to say, in the so-called atomic state. Then it is well washed and contained in an open vessel, so as to deprive it completely of water and expel the last traces of carbonic acid. The material thus obtained is then mixed in suitable proportions with a liquid of the following composition, the proportions being by volume:—Three volumes of pure chloride of magnesium, one volume of alcohol denatured by acetone, which cellulose has been added, and containing subsequently in solution a variable proportion of gum, elemi gum sandarac, or the pure resin of pinus larix.

**8,398 of 1905.—F. SHEPPARD and F. D. KELLY: Manufacture of Paving Slabs, Stair Treads, Steps, and the like.**

This invention relates to paving slabs, steps, stair treads, and the like, manufactured from a combination of Kentish rag stone, dust, Bath stone, dust made into a slurry with a binding material, such as Portland cement, adding furnace slag in lumps of a small size, thoroughly amalgamating same together and moulding same to the desired shape, and drying naturally or artificially.

**9,689 of 1905.—O. S. LAMBERSON and P. R. MOSLEY: Mould for Cement Blocks.**

In a mould, the combination of sides and ends, catches carried by the sides and engaging the ends, a bottom provided with a plurality of openings, a plurality of core blocks having their lower ends received in the openings of the bottom, one of the sides being also provided with a plurality of openings; therein core blocks disposed against the inner faces of the sides aforesaid, and having projections received by the openings in said side, and core members integral with the other side of the mould, and of substantially the same form as the core blocks adjacent the first-mentioned side.

**12,295 of 1905.—J. M. PERRYJOHN: Moulds for Building Blocks.**

A mould adapted to be lifted clear of the object moulded, and placed at a distance therefrom in readiness for the next succeeding moulding operation, consisting in the combination of a box having separable sides and ends, a bottom from which the said sides and ends may be freely withdrawn, a core for the interior of the mould, and means whereby the core may be secured to the bottom of the mould frames surrounding the box at a distance from the sides and ends thereof, arms hinged to said frames and to the sides and ends of the box, and a hopper carried by the frames so as to surmount the box, the arrangement being such that whilst in normal position the frames will

resist pressure upon the sides and ends of the box from within the latter, and that by a continuous vertical movement of the frames the sides and ends of the box will first be withdrawn laterally from the bottom of the box and a moulded object standing thereon, and may thereafter be lifted clear of said object.

**14,616 of 1904.—B. E. TOPHUNTER: Sluices and Sluice Gates.**

This relates to sluice gates and the like, consisting in the use and arrangements of the movable side beams for separating the sluice gate from its joint beams, in combination with fixed guide weights, seating, in combination with a continuation of the movable which weights form a continuous weight for the anti-friction rollers of the sluice gate to work on during the opening and closing of the sluice.

**754 of 1905.—E. A. GREEN: Channel Junctions, Channel Couplings, and Channels for Use in or about the Inspection Chambers of Drains and Sewers.**

The construction of channel junctions with straight or curved main channels and single or double right or left side channels characterised by a gradual change of cross section of the main and side channels, both narrowing in place as well as deepening in vertical section to their junction, with one another, and being prior to their junction, separated by a tongue or diaphragm gradually diminishing in thickness.

**2,013 of 1905.—P. LAHYTE: Impregnation and Colouration of Timber.**

An apparatus for impregnating timber, consisting in the combination of a receiver provided with a bevelled rib adapted to be driven into the end surface of a log of timber, the external face of the rib being cylindrical or only slightly conical and the internal faces thereof more distinctly conical.

## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for publications, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

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We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

**July 10.—By FAREBROTHER, ELMES & Co. (at Tamworth).**

Clifton Campville, etc., Staffs.—"The Clifton Campville and Heanton Estate," 2,736 a.

f. (in numerous lots) ..... 261,964

**July 13.—By DILLEY, SON, & BEAD (at St. Neots).**

Easton Socon, Beds.—Freehold market garden land, 25 a. 2 r. 10 p., y.r. 60s. .... 1,125

Market garden land, 2 a. 3 r. 15 p. f. .... 210

Honeydon, Beds.—"Upper Honeydon Farm," 287 a. 0 r. 15 p. f., y.r. 100s. .... 2,650

**July 15.—By TROENBORROW & Co. (at Kewick).**

Rothwaite, Cumberland.—"The Seawall Hotel," 4 a. 3 r. 22 p. f., y.r. 150s. .... 2,700

Croftwaite, Cumberland.—"Burns Estate," 129 a. 1 r. 14 p. f. .... 2,300

Kewick, Cumberland.—"J. Blomfield's, f. .... 560

**July 17.—By BALES & BALES.**

Finchfield, etc., Essex.—"The Hole Farm," 180 a. 3 r. 25 p. f., y.r. 140s. .... 1,560

**By BUCKLAND & SONS.**

Farnham Royal, Bucks.—Main-rd., two building plots, f. .... 150

Main Road, corner building plot, f. .... 100

**By CHESTERMAN & SONS.**

Kensington.—15, Phillimore-gdns., u.t. 48s y.r., g.r. 15s, y.r. 250s. .... 3,550

Forest Hill.—31 and 33, Redbourne-rd., u.t. 41 y.r., g.r. 13s, f. .... 870

Stanstead-rd., "Oak Lodge," with timber yd., u.t. 51 y.r., g.r. 16s, y.r. 60s. .... 850

**By DRIVERS.**

Holloway.—45, Windsor-rd., u.t. 47 y.r., g.r. 5s, y.r. 80s. .... 300

**By E. J. GALE.**

Bradwell-on-Sea, Essex.—"Orplands Estate," 239 a. 3 r. 5 p. f. and l.p. .... 4,500

"Goodgrove" and Eight Barn Estate, f. .... 89 a. 1 r. 23 p. f. .... 3,650

By Wm. HOGGSON.

Tottenham.—19 to 25 (odd), Connaught-ter., u.t. 84s y.r., g.r. 14s, w.r. 92s. 12s. .... 570

Walthamstow.—61 to 67 (odd), Somers-rd., u.t. 77s y.r., g.r. 10s, w.r. 101s. 8s. .... 850

19, 21, 23, 25, Colchester-rd., f., w.r. 68s. 18s. .... 400

Chingford.—Hampton-rd., a block of building land, f. .... 400

Chingford, a freehold building land, f. .... 120

Ainslie Wood-rd., a block of building land, 2½ acres, f. .... 24

Ainslie Wood-rd., a block of building land, f. .... 24

**By KING & CRASWELL.**

Alford, Surrey.—"Alford House Farm," 182 a. 8 r. 2 p. f. .... 4,300

"Gibbitch Farmhouse" and 21 a. 3 r. 2 p. f. .... 85

"Roundies Copse," 12 a. 2 r. 12 p. f. .... 85

"Barbury Farmhouse" and 79 a. 0 r. 8 p. f. .... 1,450

"Sorghum New House" and 55 a. 2 r. 28 p. f. .... 1,450

Loxwood, Surrey.—"Willett's" and 14 a. 0 r. 5 p. f. .... 700

Enclosures in land, 18 a. 0 r. 32 p. f. .... 700

"Blackthorn House" and 24 a. 1 r. 24 p. f. .... 550

Enclosures in land, 11 a. 8 r. 7 p. f. .... 550

Rudgwick, Sussex.—"Saxons Plot Cottage" and 22 a. f. .... 250

**By MOORE & CLARK.**

Sutton, Surrey.—"Cheam-rd., Norfolk House," f., y.r. 110s. .... 1,400

Wallington.—Park-ls., f. g.r. rents 15s, reversion in 93 and 97 yrs. .... 15

**By A. SAYLE & SONS.**

Sutton Valence, Kent.—Main-rd., building land, 3 a. 1 r. 38 p. f. .... 1,450

Main-rd., building land, 24 a. 1 r. 33 p. f. .... 1,450

"Heaven Farm," 2 a. 2 r. 23 p. f. .... 1,450

Main-rd., building land, 4 a. 2 r. 30 p. f. .... 1,450

"Lower Farm," 122 a. 0 r. 27 p. f. .... 3,300

Witham, Essex.—"Bendon Hill Farm," 174 a. 2 r. 24 p. f. (in lots) .... 3,300

"Freebourne Farm," 202 a. 2 r. 17 p. f. .... 1,100

"Turn Table Field," 2 a. 3 r. 28 p. f. .... 1,100

"Ricks Farm," 88 a. 8 p. f. .... 1,100

**By T. B. WESBACOTT.**

Stoke Newington.—3 and 5, Brooke-rd., u.t. 78s y.r., g.r. 12s. 10s, y.r. 102s. .... 75

By JOHN KITFOW (at Lauceston).

Broadwood, Devon.—"Beckett Farm" (three), area 880 a. f. .... 2,250

**July 18.—By C. H. BROWN.**

Fulham.—20, Ryeport-st., u.t. 86s y.r., g.r. 6s, p. .... 0

**By HAY & PERKINS.**

Brixton.—10, Dalberg-rd., u.t. 64 y.r., g.r. 7s. 7s, c.r. 42s. .... 30

36, Rattray-rd., u.t. 69 y.r., g.r. 6s. 7s. 6d, c.r. 40s. .... 30

85, Beechdale-rd., u.t. 85 y.r., g.r. 7s. 6d, c.r. 45s. .... 30

**By MILLAR, SON, & CO.**

Binstead, Isle of Wight.—Three freehold cottages and gardens .... 1,500

A freehold house and three cottages and gardens, y.r. 22s. .... 1,500

Penge.—Linden-gt., f. g.r. rents 65s, reversion in 77 yrs. .... 1,500

Hornsey.—27, Ryegate-rd., f. g.r. rents 100s, reversion in 77 yrs. .... 30

**By STOCKINGS & POTTER.**

Hackney.—Morning-ls., "The Globe" pub., c.g.r. 45s, reversion in 43 yrs. .... 1,000

**By WALKER & LANE.**

Oxshott Heath, Surrey.—"Heatherwood" and 2 a., u.t. 99 y.r., g.r. 25s, p. .... 4,700

Churchstow, Devon.—"The Whitehall Estate," 98 a. 3 r. 13 p. f. .... 4,900

**By TROENBORROW & Co. (at Penarth).**

Watermillock, Cumberland.—Homestead and 55 a. 8 r. 22 p. f. and c. .... 2,500

Renwick, Cumberland.—"Queen's College Inn," f. .... 30

**By TOMKINS & CAPPER (at Aberystwyth).**

Abergavenny, Monmouth.—5, Frogmore-st. (Kings), c.g.r. rents 50s, u.t. 72s y.m. .... 2,000

Albany-rd., "Birchfield," u.t. 98s y.m., g.r. 4s. .... 60

**By H. J. CHEPPING (at Saffron Walden).**

Wimbold, Essex.—"New House Farm" and "Crony Wood," 281 a. 3 r. 33 p. f. .... 2,000

Radwinter, Essex.—"Godfrey's Farm," 41 a. 3 r. 0 p. f. .... 2,000

**By MOORE, GARRARD, & SON (at Ipswich).**

Eye, Suffolk.—"The Uplands Farm," 64 a. 8 r. 26 p. f. and c. .... 30

Huntingfield, Suffolk.—"The High House" and 78 a. 2 r. 20 p. f. .... 40

Cratfield, Suffolk.—"The Manor Farm," 94 a. 0 r. 27 p. f. .... 30

"Turkey Hall Farm," 72½ acres, f. and c. .... 30

**By HODGKINSON & SONS.**

Stoke Newington.—Lordslip-rd., l.g.r. 28s, u.t. 67 y.r., g.r. 4s. .... 75

**By HAROLD GREEN.**

Batcombe.—8 to 10 Church-lane, u.t. 79s y.m., g.r. 15s, f. .... 10

120, St. John's-hill, f., p. .... 10

**By HUMBERT & FINCH.**

Dinton, Bucks.—Ford Farm, 187 a. 1 r. 3 p. f. .... 1,000

Northwood.—Green, f. 5 freehold building sites, area 6 a. 1 r. 1 p. .... 1,000

**By F. JOLLY & JAMES.**

Victoria Park.—2, 4, and 6, White Post-ls., l. w.r. 70s. 6s. .... 30

Canden Town.—11, and 1 to 14, Beed-pl., u.t. 17 y.r., g.r. 37s, y.r. 468s. .... 30

Hamstead.—96, Adalade-rd., u.t. 41 y.m., g.r. 15s, p. .... 10

108, Adalade-rd., u.t. 48 y.m., g.r. 14s. 14s, y.r. 65s. .... 10

Regent's Park.—67 and 67A, Grosvenor-st., u.t. 50 y.m., g.r. 15s, and y.r. 40s. .... 10

Harrow.—Spencer-rd., "Sunnyside" and "Brookside," f., y.r. 60s. .... 10



9	Storrs—delivered on road wagons,		s.	d.
10	Paddington Depot .....	1	6	per ft. cube.
11	Dry, delivered on road wagons,			
12	Nine Elms Depot .....	1	8 $\frac{1}{2}$	" "
13	CENTRAL STONE (20 ft. average).....			
14	Brown Whitbed, delivered on road			
15	wagons, Paddington depot, Nine			
16	Elms depot, or Fimlico Wharf.....	2	1	" "
17	White Lasebel, delivered on road			
18	wagons, Paddington depot, Nine			
19	Elms depot, or Fimlico Wharf.....	2	2 $\frac{1}{2}$	" "
20	.....			
21	Castler in blocks ..... s.			
22	..... d.			
23	..... per ft. cube, del'd rly. depot.			
24	.....			
25	Greenhill ..... 1			
26	Barley by rail in blocks..... 2			
27	..... 10			
28	Ad Corsehill ..... 1			
29	Ouseburn Bed Freestones 2			
30	ad Mansfield ..... 0			
31	..... 4			
32	Roxs Stone—Robin Hood Quality,			
33	Appledd Roadstone blocks 2			
34	in sawn two sides			
35	randings to 4 ft., super. 2			
36	under 40 ft., super. 2			
37	n. rubbed two sides			
38	ditto, ditto..... 2			
39	..... 6			
40	n. sawn two			
41	sides (random sizes) 0			
42	to 2 $\frac{1}{2}$ in. sawn one			
43	side (randie slabs			
44	(size)..... 0			
45	72			



## OILS, &amp;c. (continued).

Genuine Ground English White Lead	per ton	19 15
Red Lead, Dry		19 5
Best Linseed Oil Putty	per cwt.	0 10
Stockholm Tar	per barrel	1 10

VARNISHES, &c.		Per gallon
Fine Pale Oak Varnish .....	.....	0 8
Pale Copal Oak .....	.....	0 8
Superfine Pale Elastic Oak .....	.....	0 8
Fine Extra Hard Churn Oak .....	.....	0 8
Superfine Hard-drying .....	..... for seats of Chaises	0 8
Fine Elastic Carriage .....	.....	0 8
Superfine Pale Elastic Carriage .....	.....	0 8
Fine Pale Mahogany .....	.....	0 8
Superfine Pale Durable .....	.....	0 8
Extra Pale French Oil .....	.....	0 8
Eggshell Flatting Varnish .....	.....	0 8
White Lead and Turpentine .....	.....	0 8
White Lead and Paper .....	.....	0 8
Best Japan Gold Size .....	.....	0 8
Best Black Japan .....	.....	0 8
Best Black Mangrove .....	.....	0 8
Brownish Black .....	.....	0 8
Berlin Black .....	.....	0 8
Knottin' .....	.....	0 8
French and British Polish .....	.....	0 8

### TERMS OF SUBSCRIPTION

**"THE BUILDER"** (Published Weekly) is applied for from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum (13 numbers) PREPAID. For parts of Europe, India, China, New Zealand, India, Ceylon, etc., 28s. per annum. Remittances payable to J. H. MORGAN should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

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## TENDERS.

Communications for insertion under this head should be addressed to "The Editor," and must be *not later than 10 a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional case and for special reasons.]

8. ....

**ABERSYCHAN.**—For alterations and additions to the classrooms for the trustees of the English Congregational Church. Mr. G. Daniel, architect, Newport. W. Branch ..... £433 | E. Meara .....

**ALTOFTS.**—For the construction of new footpaths for the Urban District Council. Mr. J. C. Coe, Surveyor, District Council Offices, Altofts. Quoted by Surveyor :—

*Section A.*

LEAD, &c

J. Brawham ..	£128 10 0	Swindel Smith, Southwark* £100
Section B.		
J. Brawham Altofts .....	£92 10 0	Swindel Smith £70

**BRIDLINGTON.**—For erecting and completing detached residence and premises, for Mrs. J. C. Boddy, Mr. J. Earnshaw, architect, Wellington-road, Bridlington:—

W. Hoggard ..	£787 13 6	R. E. Yeomans £752
A. Gariam ..	765. 5 0	T. Spink .....
Smallwood & Shaw .....	785 18 6	E. Wilson .....
Sampson & Sampson ..	724 17 0	F. Knecshaw, Bridlington* 600

ENGLISH SHEET GLASS IN CRATES  
24d. per ft. del.

BRIGHTON.—For repairs, painting, etc., to School, for the Education Committee, Messrs Simpson & Son, surveyors, 17, Ship-street, Brighton.	
Middle-street School, and No. 31, Middle-street, S. Worsley & Co. £52 10 0	Gates & Sons, 1, North-road, Brighton..... £21
G. R. Lockyer, 22 10 0	Brighton..... £21
G. R. Lockyer, 22 10 0	Brighton..... £21
Elm-grove School, and Nos. 36 and 37, Colman- street, Brighton.	
E. Gearing & Sons..... £108 0 0	Gates & Sons, 1, North-road, Brighton..... £25
J. Barnden..... 98 18 6	
G. R. Lockyer..... 96 0 0	
Richmond-street and G. R. Lockyer..... £2 18 6	Sussex-street School, Gates & Sons, 1, North-road, Brighton..... £21
J. Barnden..... 130 0 0	

## OILS, &amp;c.

		Municipal School of Science and Art, Brighton.		
		J. Barnden	.....	£38
		F. Geering & Sons.....		38
		G. & Lockyer.....		39
		Gates & Sons.....		40
		S. Worsley & Co.....		47
		Cirencester.		
		J. Barnden	£285	Gates & Sons, 1 North-road, Brighton.....
		F. Geering & Sons.....	285	
		R. G. Lockyer.....	109	
		Leaves-road School, Cirencester.....		
		G. & Lockyer.....	£99 10	F. Geering & Sons, 1 North-road, Brighton.....
		J. Barnden.....	88 10	
		Gates & Sons.....	0 0	
		No. 18, Dean-street, Brighton.		
		G. Lynn & Sons.....	£225 0 0	Gates & Sons, 1 North-road, Brighton.....
		F. Geering & Sons.....	19 18 8	
		S. Worsley & Co.....	19 0 0	
		York-place Higher Grade School.		
		Sattin & Evershed.....	£261	J. Barnden & Sons, 1 North-road, Brighton.....
		G. Lynn & Sons.....		
		York-place Higher Grade School (Limekiln).		
		H. HAYCOCK.....		
		Gates & Sons, 1, North-road, Brighton.....		
		[* Recommended for acceptance.]		

**PARKING.**—For erecting Baptist Tabernacle. Messrs. G. Baines & Son, architects, 5, Clement's-lane, Strand, London, W.C.2.—

Builders' Estimates.	Higgs & Hill.	Holliday & Greenwood.	C. North.	Batley, Sons, & Holness.	Sands & Burley.*
£	£ s.	£ s.	£ s.	£	£ s.
2,140	1,672 0	1,656 0	1,457	1,400 0	
28	16 0	24 10	15	13 5	
23	16 15	40 0	10	15 4	
244	270 0	271 0	217	241 0	
384	237 0	230 0	215	241 0	
148	133 0	142 0	132	139 0	
40	20 0	17 0	18	18 0	
32	26 0	40 0	34	23 7	
		30 0	29	30 8	
If one month were allowed	30	NIL.	50 0	NIL.	10 0

\* Accepted with modifications.

**DEVONPORT.**—For alterations, etc., at the Police Station, for the Station of the County Council. Mr. C. W. Best, County Surveyor, County Brecon. Quantities by Mr. R. B. Wilkins, 137, -street, Oxford.—  
 Estimate, £1,833 5 4 J. Jenkins.  
 Estimate, £1,770 0 0 Brynmawr.

**DEVONPORT.**—For erecting new Council school, for the Hampshire Education Committee. Messrs. Law & Co., architects, 1, Sheep-street, Northampton.—  
 Estimate, £2,825 F. G. Watson. £2,420  
 Estimate, £2,890 F. Archer. £2,879  
 Estimate, £2,861 G. W. Sower. £2,858  
 Estimate, £2,860 A. J. Chown. £2,850  
 Estimate, £2,895 R. E. Rutter. Co-operative  
 Estimate, £2,850 J. H. Builders. £2,335  
 Estimate, £2,434 G. Fisher. £2,287  
 Estimate, £2,429 T. Higgs, Northamp-  
 Estimate, £2,422 ton. £2,280

**RDIFF.**—For the erection of new mission hall vestries and classrooms at the Heath, for the Rev. R. D. D. Messrs. Vell & Sant, architects.—

Estimate, £4,711 F. W. Symonds.  
 Estimate, £4,170 0 0 E. R. Evans & Son.  
 Estimate, £3,800 0 0 Bros. £3,445 0 0  
 Estimate, £3,880 0 0 W. T. Morgan.  
 Estimate, £3,830 0 0 T. Bevan. £3,445 0 0  
 Estimate, £3,798 0 0 H. Knox & Wells. £3,443 0 0  
 [All of Cardiff, except T. Bevan, Penarth].

**DEVONPORT.**—For roadworks, lane between Evelyn Kathleen-streets, and rear of Victoria-road (Contract No. 79), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £185 5 0 Jefford & Sons. £186 0 7  
 Estimate, £183 5 0 Plymouth. £123 16 0

**DEVONPORT.**—For roadworks, Warleigh-avenue (Contract No. 83), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £432 11 0 F. J. Stantury. £344 10 2  
 Estimate, £377 11 0 E. L. F. Duke. £413 16 0  
 Estimate, £373 3 0 F. D. Doney. £283 8 4  
 Estimate, £354 17 2 Devonport.

**DEVONPORT.**—For roadworks, road from Victoria-avenue south end of Edith-street (Contract No. 84), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £235 10 0 Jefford & Sons. £213 4 7  
 Estimate, £27 7 0 Jefford & Sons. £207 14 9  
 Estimate, £220 2 0 F. D. Doney.  
 Estimate, £216 8 1 Devonport. £195 16 8

**DEVONPORT.**—For roadworks, lane between St. Andrew-avenue and section 2 of St. Aubyn-avenue (Contract No. 86), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £150 13 3 E. L. F. Duke. £125 14 8  
 Estimate, £134 3 0 Pethick Bros.  
 Estimate, £123 16 1 Plymouth. £121 0 6  
 Estimate, £125 18 6

**DEVONPORT.**—For roadworks, Kathleen-street, (Contract No. 74), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £188 8 11 F. D. Doney. £160 12 1  
 Estimate, £177 16 0 Jefford & Sons. £165 7 6  
 Estimate, £175 14 1 Pearce Bros.  
 Estimate, £171 13 4 Plymouth. £163 14 0

**DEVONPORT.**—For roadworks, lane rear of No. 1, 0, Lyshe-terrace, Victoria-road, and north of -street (Contract No. 77), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £59 0 11 J. F. Doney. £50 3 0  
 Estimate, £42 2 0 Pethick Bros.  
 Estimate, £42 5 0 Plymouth. £58 18 8  
 Estimate, £60 5 6

**DEVONPORT.**—For roadworks, Tamar-avenue, (Contract No. 88), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £477 13 0 Steer & Pearce. £392 17 0  
 Estimate, £411 7 10 Jefford & Sons.  
 Estimate, £406 7 5 F. D. Doney. £377 4 2  
 Estimate, £370 0 10 Devonport.

**DEVONPORT.**—For roadworks, Lynher-street (Contract No. 78), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport.—

Estimate, £180 17 1 Jefford & Sons. £128 6 10  
 Estimate, £134 3 0 Pearce Bros. £125 12 0  
 Estimate, £123 16 1 F. D. Doney.  
 Estimate, £129 10 8 Devonport. £123 4 4

**JARROW.**—For alterations and additions to the Bede Burn and Grange Council schools, for the Education Committee. Mr. Adam, clerk of works. Quantities by Mr. J. J. Savage, Newcastle.—

Estimate, £4,756 3 5 Bede Burn Council School, Jarrow.  
 Estimate, £4,756 3 5 Grange Council School, Jarrow.  
 Estimate, £3,585 10 0 W. Cowper, Back Railway-street, Jarrow.

**LEYTONSTONE.**—For alterations and additions to the board-room and office at the Workhouse, Union-lane, for the Guardians of the West Ham Union. Mr. J. Williams Dunford, architect, 1000, Queen Victoria-street, London, E.C.—

	Alternative Work.
Shurmer & Sons	£7,821
Novell & Lusty	7,400
J. & W. Inkpen	7,150
H. C. Moravill	6,967
Gregor & Son	6,833
Fuller & Son	5,833
W. Maddison	5,821
Sands & Burley	5,568
F. J. Coxhead	5,293
Patman & Petherborough	5,224
W. Manders, Leyton	4,961
[Architect's estimate, £5,250 and £5,000.]	

**LONDON.**—For wiring for electric light installation at workhouse and infirmary, Wormwood Scrubs, for the Metropolitan Board of Guardians. Messrs. J. & S. Burleigh, engineers, 48, Lincoln's Inn-fields, W.C.—

Estimate, £4,580 W. J. Fryer & Co., Bravington Works, Paddington.

Estimate, £1,081 W. J. Fryer & Co., Bravington Works, Paddington.

**LONDON.**—For repairs, painting, and other works at the Public Garden and urinals, for Islington Borough Council. Mr. J. Patten Barber, Borough Engineer, Town Hall, Upper-street, N. Quantities by Engineer.—

	Public Gardens.	Public Urinals.
Bray & Co.	£287 17 0	£259 10 7
H. R. Brown	244 18 0	401 16 0
F. W. Harris & Co., Ltd.	243 17 0	213 10 9
J. P. Haddley	223 0 0	275 0 6
C. & W. Hunnings	546 4 6	294 15 2
R. Isles, Ltd.	552 1 7	—
J. Johnson	508 14 6	307 7 0
Marshall & Markham	1,039 16 6	329 10 9
R. Metcalf & Son	636 17 8	—
R. E. Metcalf	612 4 10	288 4 0
G. A. Rowley	538 18 7	—
Stevens Bros.	539 11 0	271 12 0
Victoria Sanitary Engineering Co., Victoria-street, S.W.	478 14 1	164 3 3

**LONDON.**—For laying mastic asphalt on the footway on the south side of Newington Green, for the Islington Borough Council. Mr. J. Patten Barber, Borough Engineer, Town Hall, Upper-street, N.—

Rowland, Carr, & Co.	£272 17 6
Asphaltic Limestone Concrete Co., Ltd.	235 15 7
Immer Asphaltic Paving Co.	231 9 6
International Asphalt Co.	245 16 0
Val de Travers Asphaltic Paving Co., Ltd.	243 6 0
French Asphalt Co., Ltd.	243 1 1
T. Faldo & Co., Ltd.	242 5 7
Trinidad Lake Asphaltic Paving Co., Ltd.	240 5 3
London Asphalt Co., Ltd.	238 2 7
Bruswick Rock Asphaltic Paving Co.	228 12 10
Bruswick & Co.	228 8 4
F. Smart & Son	227 4 2
Grounds & Newton, South Tottenham	192 19 6

**LONDON.**—For constructing conveniences and a caretaker's lodge at the playground, Morton-road, N., for the Islington Borough Council. Mr. J. Patten Barber, Borough Engineer, Town Hall, Upper-street, N.—

C. Castle & Son	£233 4 8
Stevens Bros.	232 0 0
H. Kent	232 0 0
H. Johnson	354 10 0
G. F. Holliday	345 18 5
General Builders, Ltd.	339 0 0
A. G. Crisp	318 0 0
Mattook & Parsons	297 0 0
F. H. Pearce	290 0 0
S. Reid, 564, High-road, Leytonstone	268 10 0

**LONDON.**—For electric lighting, hot-water heating, terrazzo paving, etc., at the Hilda-road School, Canning Town, for the West Ham Education Committee. Mr. W. Jacques, architect, 2, Fen-court, Fenchurch-street, E.C.—

Estimate, £487 Brightside Engineering Co., Westminster.

**Terrazzo Paving.**

British Mosaic Co., London. £137 18 0  
 [No tender accepted yet for electric lighting.]

**LONDON.**—For paving with asphalt the carriage-way of America-square, E.C., for the Corporation of London.—

Estimate, £564 10 London Asphalt Co.

**LONDON.**—For paving with asphalt the footways of Aldgate, for the Corporation of London.—

Estimate, £107 London Asphalt Co.

**LONDON.**—For proposed factory premises at Crofton Park-road, London, S.E., for Messrs. Alfred Graham & Co. Messrs. Blugham & Broughton, architects, Crofton Park, S.E. Quantities by Mr. T. Arthur Lewis, Croydon.—

F. Ward & Sons	£7,466
J. Burke	7,234
Courtney & Fairbairn	7,089
Payne Bros.	6,977
Longley & Co.	6,945
A. W. Jagers & Co.	6,900
Ashby Bros.	6,879
Kennard Bros.	6,800
Holloway Bros.	6,793
Ltd.	6,793
J. Smith & Sons, Ltd.	26,571
Thomas & Edge	6,560
T. D. Legg	6,500
H. L. Holloway	6,444
E. B. Nightingale	6,444
Edwards & Medway	6,429
W. H. Hyde	6,400
W. Nash	6,275

TENDERS—Continued on Page 141.



## COMPETITION AND CONTRACTS.

(For some Contracts, &amp;c., still open, but not included in this List, see previous issues)

## COMPETITION.

Nature of Work.	By whom Required.	Prize.	Deadline for Delivery.
*PLANS, ETC., PUB. SCHOLS, ADLINGTON, ETC.	Cheshire C.C. Education Committee	Not stated	A-6-5

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tender to be Delivered by
125 tons of Wrought Iron	Benzel and N.W. Railway Co.	A. Izat, 237, Gresham-house, Old Broad-street, E.C.	July 1
Sewerage Works, Dunham Massey	Bucklow R.D.C.	J. P. Wilkinson, Engineer, 301, Cathedral-street, Manchester.	Aug. 1
Water Supply, Iweraven School	Corporation	G.C. Dolg, C.E. Eng.	Aug. 1
Paving, Park-terrace, Tynemouth	Brentford Guardians	J. F. Smith, Borough Surveyor, Tynemouth	Aug. 1
Decoration and Screens at Union Offices, Isleworth	Harrogate Gasworks Committee	W. Stephens, Clerk, Union Offices, Isleworth	Aug. 1
Furniture and Fittings, Carnegie Library, Harrogate	Building Committee	J. T. Taylor, Town Clerk, Gasworks, Harrogate	Aug. 1
Carting Work for Two Years at Gasworks	Mr. H. B. Putney	P. Vivian Jones, Architect and Surveyor, Hengood	Aug. 1
Office Furniture, ETC., H. OF C., BUSEN-RD.	East Indian Railway Co.	C. W. Young, Secretary, 23, Strutt-street, Manchester	Aug. 1
Houses, Hongkong	Manchester Guardians	A. J. Macartney, Architect, 23, Strutt-street, Manchester	Aug. 1
Rebuilding Gateway and Paving, Crumpton Works	Prestwich U.D.C.	W. Nuttall, Engineer, Council Offices, Chester-bank, Prestwich	Aug. 1
Timber, etc.	Manchester Cleansing Committee	R. Williamson, Town Hall, Manchester	Aug. 1
Skewen Sewerage (Contract No. 2)	North R.D.C.	W. E. Clason Thomas, Eng., Council Offices, Orchard-st., North	Aug. 1
Broken Stone	Kingsdown U.D.C.	Town Surveyor, Town Hall, Kingston, Ireland	Aug. 1
Ventilation Works, Hill Cott School	Newcastle-on-Tyne Education Com.	A. Goldard, Sec., Educ. Office, Northumberland-rd., Newcastle	Aug. 1
Street Works, Castleford	Castleford U.D.C.	H. H. Broadbent, Clerk, G.D.C. Office, Castleford	Aug. 1
Extension of Laundry Premises	Rotherham Guardians	H. L. Tacon, Architect, 14, Westgate, Rotherham	Aug. 1
Painting Outside of Workhouse Premises	do.	do.	Aug. 1
Paving at Danston	Belper Guardians	Workhouse Master	Aug. 1
Repairs in Scullery and Yard of Workhouse	Whitcham U.D.C.	J. B. Benton, Surveyor, Council Offices, Whitcham	Aug. 1
*NEW, SIDS, ETC., CEN. LEE, WOOLWICH-RD.	King's Lynn Guardians	J. Jarvis and Sons, Architects, Paradise-parade, Lynn	Aug. 1
Making-up Roads, Chorlton and Whalley Range	Metropolitan Boro. of Greenwich	Town Clerk, Town Hall, Greenwich, S.E.	Aug. 1
Oliver Grove Depot Painting, etc.	Manchester Corp. (Widening Com.)	Surveyor to the Committee, Town Hall, W. Disbury	Aug. 1
North Sea Outrage Commemorative Statue	Sheffield Highway, etc., Committee	C. F. Wike, City Surveyor, Town Hall, Sheffield	Aug. 1
Asphalting and Alterations, Wash-up, Deane School	Scottish Fish Oil, etc., Co.	A. Sisk, Secretary, 244, St. George's-road, Hull	Aug. 1
Nine Houses at Yarnbooth, near Abercromby	Town Council	Carmichael & Sharnan, Engineers, 14, Queen-street, Edinburgh	Aug. 1
Roofing of Bar and Erecting Pigsty at Tregassow	West Riding Education Committee	W. Beddoe Rees, Architect, 3, Dumfries-place, Cardiff	Aug. 1
Cloakroom, etc., Pearthweir School	Miners' Homes, Land, etc. Co.	A. R. Carey, Eng., Westminster-chbrs., 3, Victoria-st., Westminster	Aug. 1
Renovating, Painting, etc., Newtown School	Right Hon. Viscount Falkland	J. Vickers Edwards, County Architect, County Hall, Wakefield	Aug. 1
Painting, etc., Darsdale Infant School	Mountain Ash Education Committee	T. W. Jones, Cynon-chambers, Abercromby	Aug. 1
Painting, etc., Navigation School, Abercromby	do.	G. G. Jones, Tregothan Office, Tregothan	Aug. 1
110 yds. of 12 in. Sewer, etc., at Backworth	do.	Surveyor's Office, Town Hall, Mountain Ash	Aug. 1
600 yds. of 8 in. Water Mains	do.	do.	Aug. 1
School, Upperthorpe	do.	do.	Aug. 1
Villa Grant-street, Elgin	do.	do.	Aug. 1
*ALTERATIONS TO LINGFIELD SCHOOL	do.	do.	Aug. 1
Nursery, etc., at Workhouse	do.	do.	Aug. 1
Birmingham and North Warwickshire Railway	do.	do.	Aug. 1
Stores	do.	do.	Aug. 1
Heating Apparatus at Rhodes School	do.	do.	Aug. 1
Painting and Decorating Council Chamber, Town Hall	do.	do.	Aug. 1
Alterations, etc., to Borough Police-station, etc.	do.	do.	Aug. 1
*FIRE STATION & READING-ROOM, HAMPTON HILL	do.	do.	Aug. 1
*CHapel, ETC., IN GREEN-ROAD CEMETERY	do.	do.	Aug. 1
*CONCRETE TUBE, SEWAGE	do.	do.	Aug. 1
Paving Works, etc.	do.	do.	Aug. 1
Additional, Middleton Cheney Schools	do.	do.	Aug. 1
Boilers, Economiser, etc.	do.	do.	Aug. 1
Boiler-house, etc.	do.	do.	Aug. 1
Alterations to Sear Welch Con. Chapel, Clydach Vale	do.	do.	Aug. 1
Mixed School at Hemsforth, near Wakefield	do.	do.	Aug. 1
Water Mains, etc.	do.	do.	Aug. 1
Sewage Pumping Machinery, etc.	do.	do.	Aug. 1
Painting, Distemper, etc., Concert Hall	do.	do.	Aug. 1
Making-up Part of Holden-road	do.	do.	Aug. 1
Shop and Warehouse at Queensbury	do.	do.	Aug. 1
Supply of Water Mains	do.	do.	Aug. 1
Excavating and Laying Water Mains	do.	do.	Aug. 1
Engine House, etc., Ripponden Mills, near Halifax	do.	do.	Aug. 1
400 tons of Broken Granite, etc.	do.	do.	Aug. 1
*NEW COTTAGES, ETC., AT WATERWORKS	do.	do.	Aug. 1
*PAINTING SEWER DUCT AND VENTILATORS	do.	do.	Aug. 1
*EXCAVATING AND BURNING FILTER BEDS	do.	do.	Aug. 1
*PLASTERING WALLS OF CONT. FILTER BEDS	do.	do.	Aug. 1
*CONCRETE AND STEEL SERVICE RESERVOIR	do.	do.	Aug. 1
*NEW SCHOOL AT MAYBURY, WORKING	do.	do.	Aug. 1
*SANITARY WORK, BROOK-ST. INFIRMARY	do.	do.	Aug. 1
*ISOLATION HOSPITAL AT MINEHEAD	do.	do.	Aug. 1
Sinking Borehole	do.	do.	Aug. 1
Sewage Disposal Works, Barseley Hall Asylum	do.	do.	Aug. 1
House for Land Steward	do.	do.	Aug. 1
Additional, etc., to Asylum Sewerage System	do.	do.	Aug. 1
*SKIPTON CATTLE MARKET	do.	do.	Aug. 1
*STREET WORKS, FITZJOHN'S AVENUE	do.	do.	Aug. 1
*RD. & SEWER, MANOR ESTATE, L.B. TOOTING	do.	do.	Aug. 1
Horse Fire Engine, Engine, and Horse Carriage	do.	do.	Aug. 1
Stuart-town Railway Contract	do.	do.	Aug. 1
Paving Stone	do.	do.	Aug. 1
Pumping Engines	do.	do.	Aug. 1
Cliff rd-road Council School	do.	do.	Aug. 1
Pumping Engines at Sewage Pumping Station	do.	do.	Aug. 1
*CONSTRUCT. NEW DOCK, ETC., IMMINGHAM	do.	do.	Aug. 1
Enlargement of Somersham Council Schools	do.	do.	Aug. 1
Works at Dudley Church, Co. Meath	do.	do.	Aug. 1
House, Newbridge-on-Wye, Radnorshire	do.	do.	Aug. 1
Alterations to Junction Hotel, Wyke	do.	do.	Aug. 1
Twenty Houses at Fleet-rd-Lis	do.	do.	Aug. 1
Additional, etc., to Victoria Hotel, Woodhall Spa	do.	do.	Aug. 1
St. Peter's School, Leamford	do.	do.	Aug. 1
Barley Drying Kiln, The Hythe, Colchester	do.	do.	Aug. 1
Additional, etc., to School Buildings, Brixton	do.	do.	Aug. 1
*INF. SCH. AT BROWNHILLS, WALSHALL WD.	do.	do.	Aug. 1
*TEN SMALL VILLAGES	do.	do.	Aug. 1

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. viii. x.

Public Appointments -





## THE BUILDER.

142

LONDON.—For the construction of a shelter-house at the disinfecting station, Seven Sisters-road, Holloway, for the Islington Borough Council. Mr. J. Patton Barber, Borough Engineer, Town Hall, Upper-street, N.

J. Johnson ..... 5,655 1 Steven Bros. .... 5,618  
J. C. Mather ..... 824 W. Webber ..... 316  
Saber & Son, Ltd. .... 670 Liverpool-road, N. 602

LONDON.—For flood relief works, extension of Hackney-wick to Abbey-mills relief sewer, for the London County Council.

F. H. English £6,412 0 G. J. Anderson ..... £4,500 6 3  
E. C. Brener ..... 5,928 11 2 E. J. Hardy, ..... 4,545 18 0  
D. B. Pater ..... 5,841 8 6 C. Ford ..... 4,867 15 2  
Johnson & ..... 5,622 4 0 C.W. Killing- ..... 4,310 8 7  
Langley ..... 5,622 4 0 back & Co. J. & E. Bloomfield ..... 4,115 17 11  
Muirhead, Greig, ..... 5,596 14 7 J. Bentley ..... 4,067 19 0  
Matthews ..... 5,517 10 1 J. Kellett, Ltd. ..... 4,072 19 8  
G. Hay & Co. ..... 4,989 0 0 W. Moss & ..... 3,960 14 3  
O.T. Gibbons ..... 4,746 18 2 W. Sons, Ltd. Lougborough\*  
Lawton & Co. .... 4,644 5 5  
E. Strickland & Co. .... 4,635 1 9

LONDON.—For lighting by electricity the Ranger's house, Blackheath, for the London County Council.

Bailebury Electrical Engineering Co. .... £245 10 0  
Jackson Bros. .... 239 11 0  
W. Dickinson ..... 222 10 0  
Sweet Bros. .... 190 0 0  
Lea & Warren ..... 189 0 0  
B. Probert & Co. .... 189 0 0  
A. H. Marshall & Co. .... 187 10 0  
F. J. Coley & Co. .... 187 6 0  
Hooper, Henry & Co. .... 176 7 6  
Tampin & Makowski, Ltd. .... 174 2 0  
Ward Bros. .... 174 2 0  
Wright, Methuen, & Co., Manchester

LONDON.—For the erection of a laundry on site of Nos. 136 and 138, New Kent-road, S.E., for Mr. F. W. Bellfield. Mr. G. A. Zaadown, architect, 9, Regent-street, S.W.

W. Pith ..... £7,492 C. Ansell ..... £6,040  
Spencer, Santo, & Co. .... 6,595 J. Marshall & Sons ..... 6,030  
H. Burman & Son, Ltd. .... 6,520 W. Downs ..... 5,973  
Raby & Son, Ltd. .... 6,459 Battelley, Sons, & Holness ..... 5,947  
W. Smith & Sons ..... 6,438 Johnson & Co. .... 5,915  
H. & E. Lee ..... 6,237 R. & B. Evans ..... 5,518  
Sayer & Son ..... 6,227 E. G. Sharpington ..... 5,748  
Kirk & Kirk ..... 6,178

MUTLEY PLAIN.—For the conversion of No. 16, Mutley Plain, into a shop as per plans, specifications, and quantities prepared by Mr. G. B. Hill, 41, Mount-aid-road, Plymouth.

Pearn Bros. .... £239 S. Stevenson ..... £180  
G. B. Turpin ..... 197 A. C. Jones ..... 176  
[Architect's estimate, £180.]  
[All of Plymouth.]

NORWICH.—For heating apparatus and ventilating appliances, etc., at Free Library, St. Andrew-street, for the Free Library Committee. Mr. A. E. Collins, City Engineer, Guildhall, Norwich.

Dilworth & Carr, Preston? ..... 5315  
Including certain extras.

PLYMOUTH.—For alterations at St. Peter's Schools, Plymouth.

Dart ..... £323 4 6 Flashman ..... £290 0 0  
W. E. Blake ..... 335 0 0 Kerwell ..... 289 0 0  
Adams ..... 310 0 0 Stevenson ..... 278 0 0  
Stanbury, Devonport? ..... 300 0 0 Finch ..... 255 0 0  
Greet ..... 248 0 0

SHEPHERD.—For the erection of a public elementary school at Manor, for the Education Committee. Messrs. C. & C. M. Hadfield, architects, Cairns chambers, 19, St. James-street, Sheffield. Quantities by Mr. Leon A. Francis, 8, John-street, Adelphi, W.C.

Ath. Son, & J. & H. When ..... £6,870 0  
Biggin ..... £7,870 0 H. Book & Son ..... 6,800 0  
A. Bradbury ..... 7,747 0 J. S. Robertson ..... 6,767 0  
W. & A. Fordike ..... 7,600 0 Dawson, Jones, & Co. .... 6,739 0  
R. C. Boul ..... 7,449 0 D. O'Neill & Son ..... 6,824 0  
W. May & Son ..... 7,200 0 T. Wilkinson & Sons, Guernsey-road, Sheffield? ..... 6,214 0  
J. Vasey & Son ..... 7,066 0  
J. Fidler, Ltd. .... 7,017 0  
Wellerman Bros. .... 6,970 16  
J. Ebeby & Son ..... 6,895 0  
[Architect's estimate, £6,500]

SHENLEY HILL (Herts.).—For rebuilding house, etc., for Mr. F. W. Banks, 50, Boman-street, Oxford-street, W. Quantities by Mr. F. R. Smith, surveyor, 18, Victoria-street, Westminster, S.W.

W. Holt & Sons ..... £7,850 N. Lidstone ..... £6,392  
J. Simpson & Sons ..... 7,188 O. Miskin & Sons ..... 6,000  
W. H. Laseelle & Boff Bros. .... 6,752  
Co. .... 7,050

SHEPHERD.—For laying-out sewage farm, for the Urban District Council. Mr. J. G. Foster, Surveyor to Council.

J. T. Ball, Barrow-on-Soar ..... £166 4 8

SUDBURY.—For sanitary alterations, etc., for the Sudbury Guardians. Messrs. Clark & Ross, architects, 1, West-street, Finsbury-circus, E.C.

G. C. Gooday £3,493 17 0 H. J. Linell £2,833 0 0  
W. Bell & Sons ..... £320 0 0 Robins ..... 2,775 0 0  
Oak Building Co. .... 3,100 0 0 Mason & Son ..... 2,719 0 0  
Cubitt & Gotts ..... 2,940 0 0 Brown & Gra- ..... 2,715 2 8  
Coulson & Leifs ..... 2,900 0 0 Portway & Co. A. Snodgrass & Co., Halstead? ..... 2,675 0 0  
Redding & Sons ..... 2,890 0 0  
G. Grimwood & Sons ..... 2,848 0 0

SWINDON.—For alterations to stables, etc., at the King's Arms Hotel, for Messrs. T. and J. Arkell, Messrs. Drew & Sons, architects, Regent-circus, Swindon.

H. C. Speckman, Swindon? ..... £140

TIPTON.—For roadworks, Eagle-street and part of Hall-street, for the Urban District Council. Mr. W. H. Jukes, Surveyor, Public Offices, Owen-street, Tipton.

Quantities by Surveyor—

T. Mayes ..... £274 17 3 [May & Co. .... £215 0 0  
T. Allcock ..... 274 19 3  
[Surveyor's estimate, £284.]

WINSFORD.—For erecting a bakery in Weaver-street, for the Winsford Industrial Co-operative Society, Ltd. Messrs. J. Baker & Sons, architects, Willenden Junction, London.

H. Bergeant's Executors ..... £2,134  
J. Fowler & Sons, High-street, Winsford? ..... 1,990

WIRRAL.—For constructing sewers at Moreton, Riston, and Upton, for the Rural District Council. Mr. F. E. Priest, engineer, 18, Harrington-street, Liverpool.

B. C. Brener & Co., 44, St. Andrew's-square, Edinburgh? ..... £2,921 14 0

WORKSOP.—For erecting a house in Queen-street, for Mr. P. Wheeler. Mr. A. H. Richardson, architect, Victoria-buildings, Worksop. Quantities by architect—

C. Sprakes & Sons £515 0 G. Wright ..... £390 0  
J. Doncaster ..... 456 10 C. A. Leverton ..... 373 15  
F. I. Rowell ..... 411 0 A. Chadwick, Worksop? ..... 388 0  
G. G. Middleton 405 0

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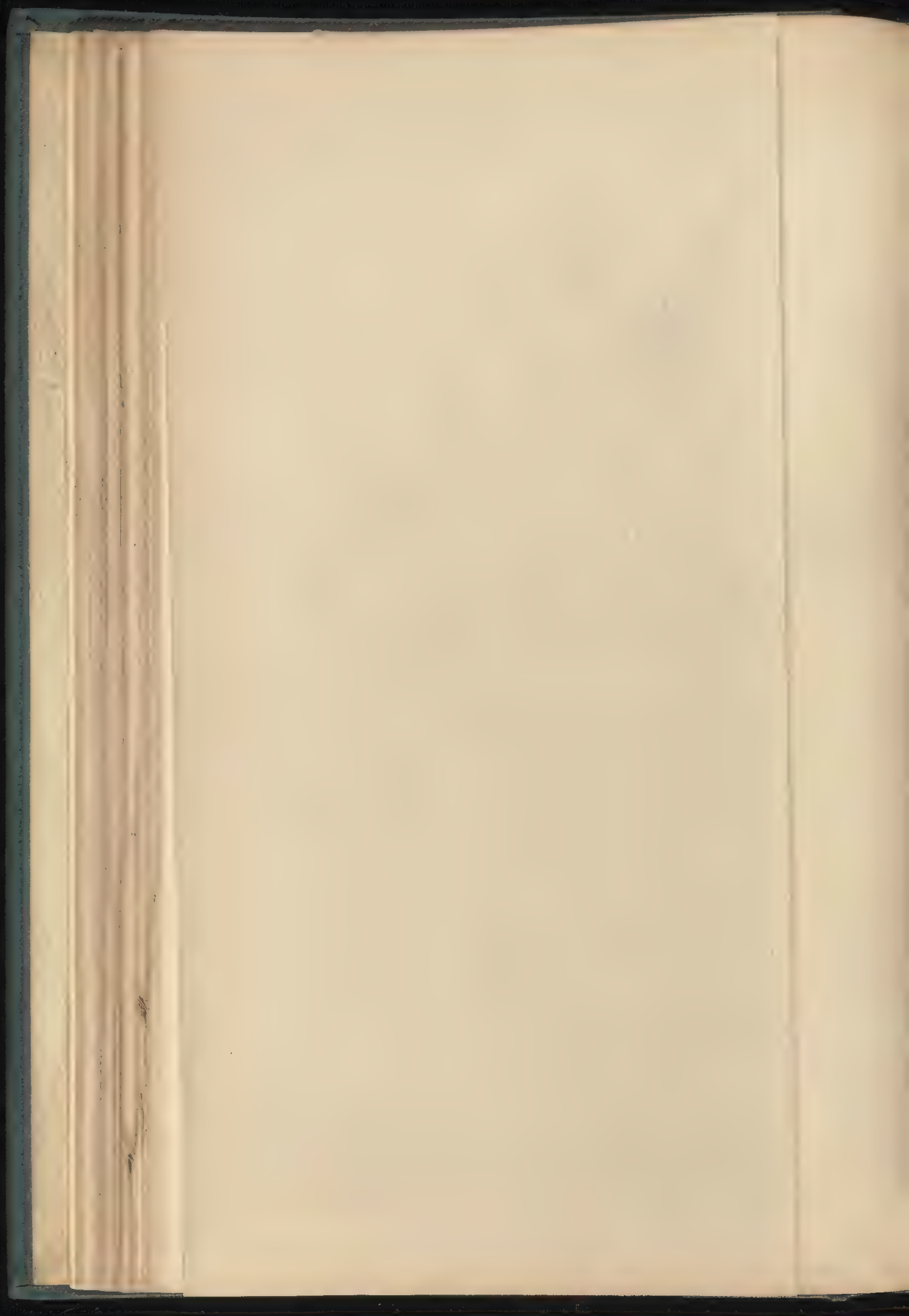
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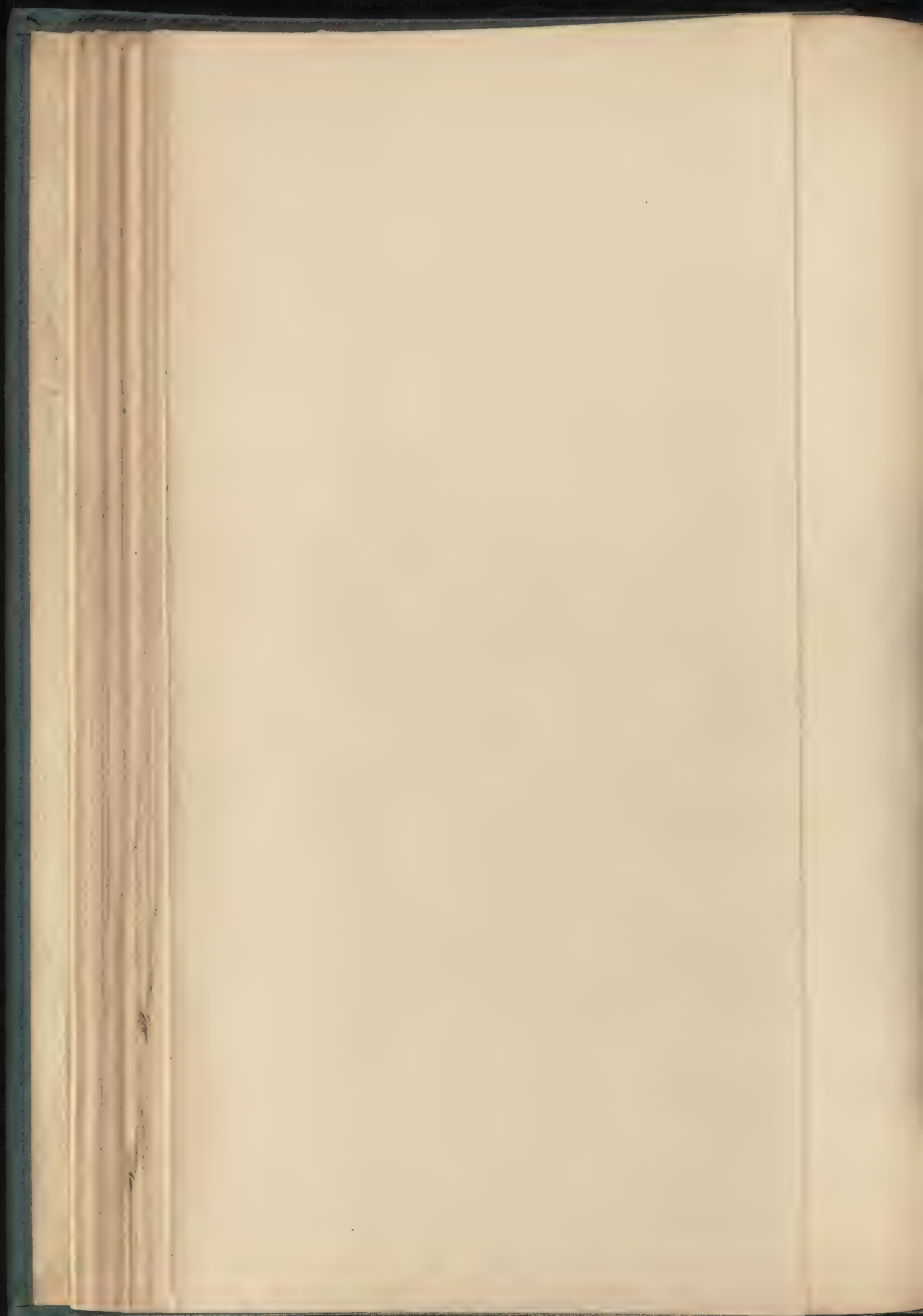






WESLEYAN HALL COMPETITION —DESIGN BY MESSRS CROUCH, BUTLER & SAVAGE



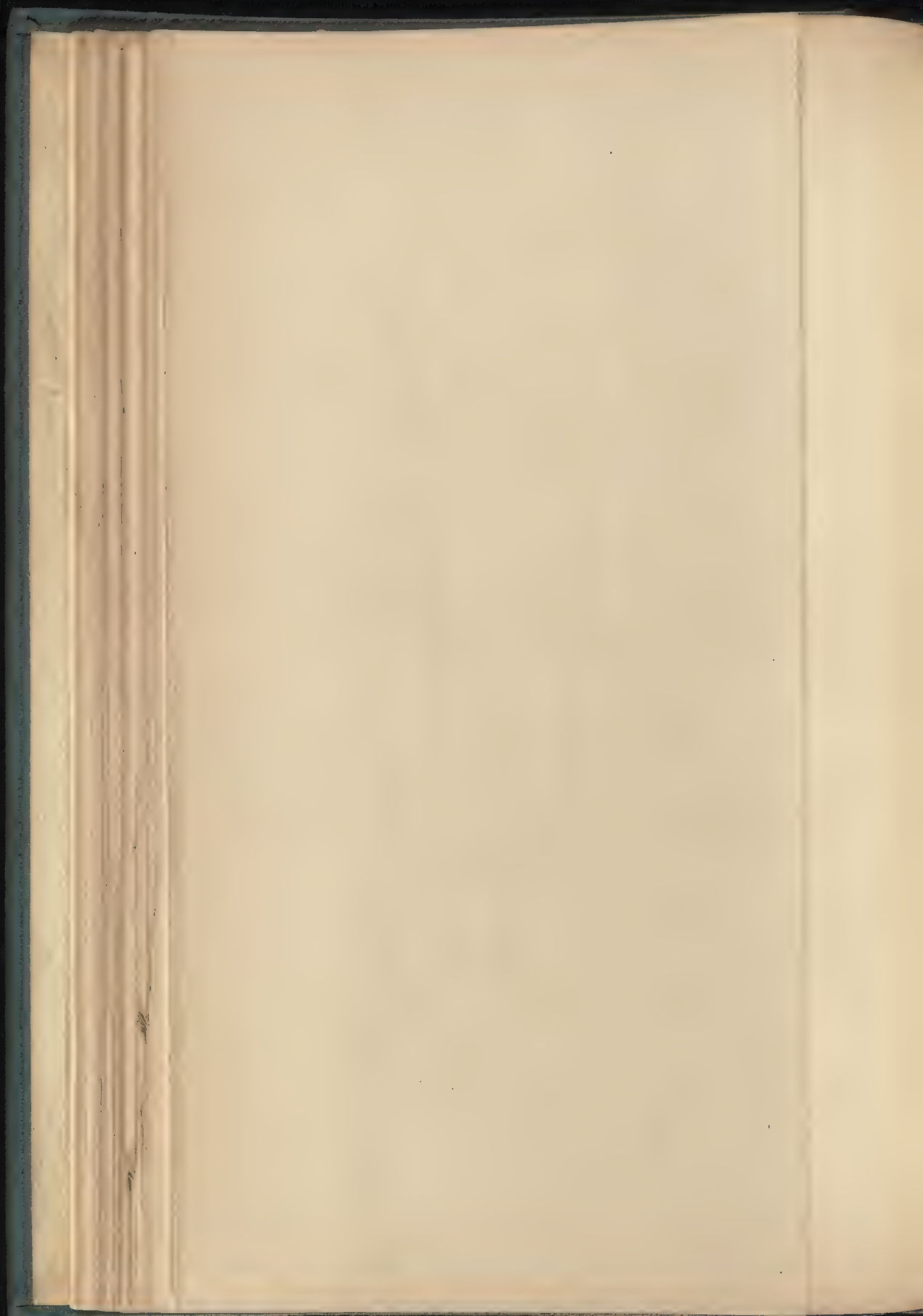


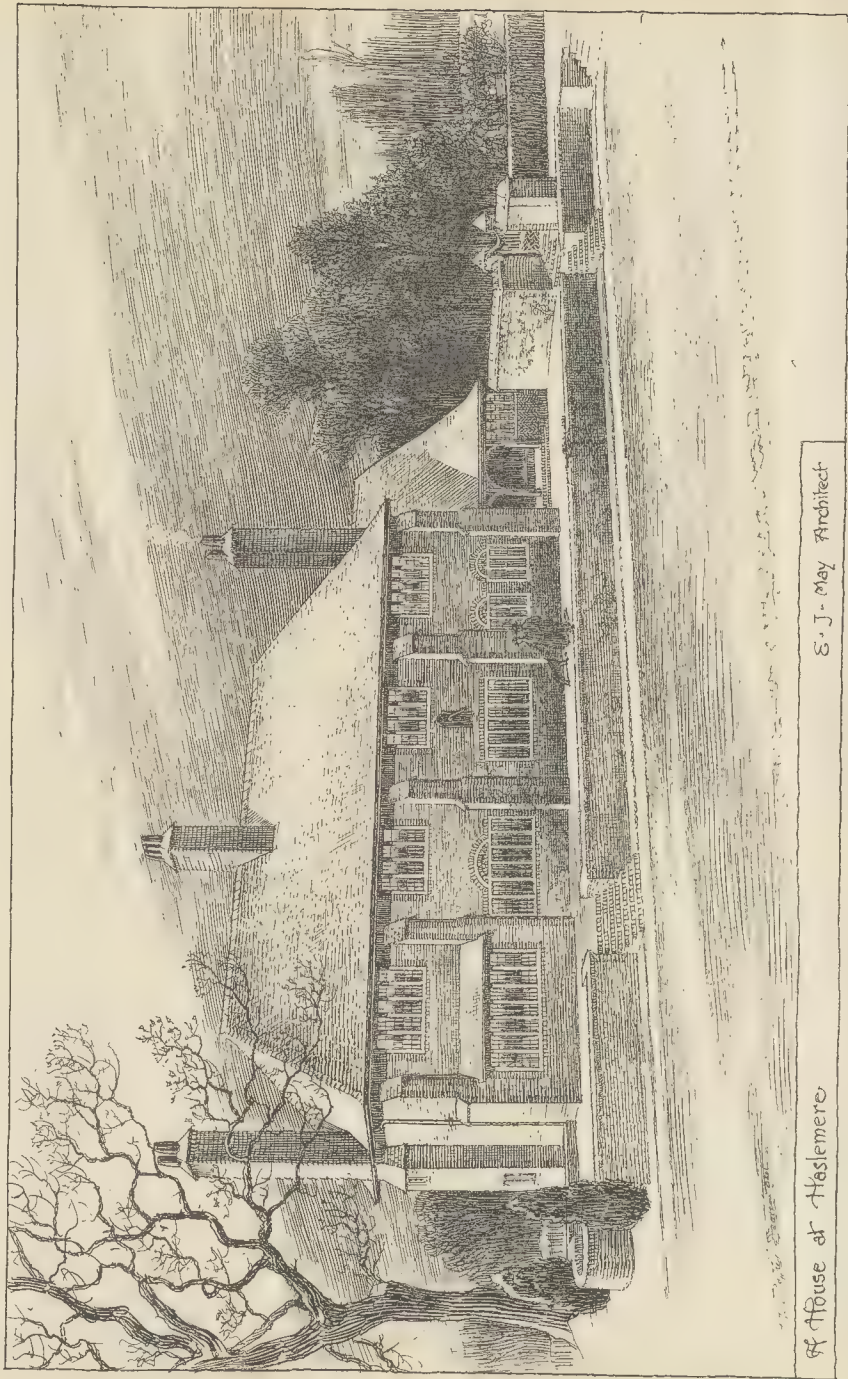


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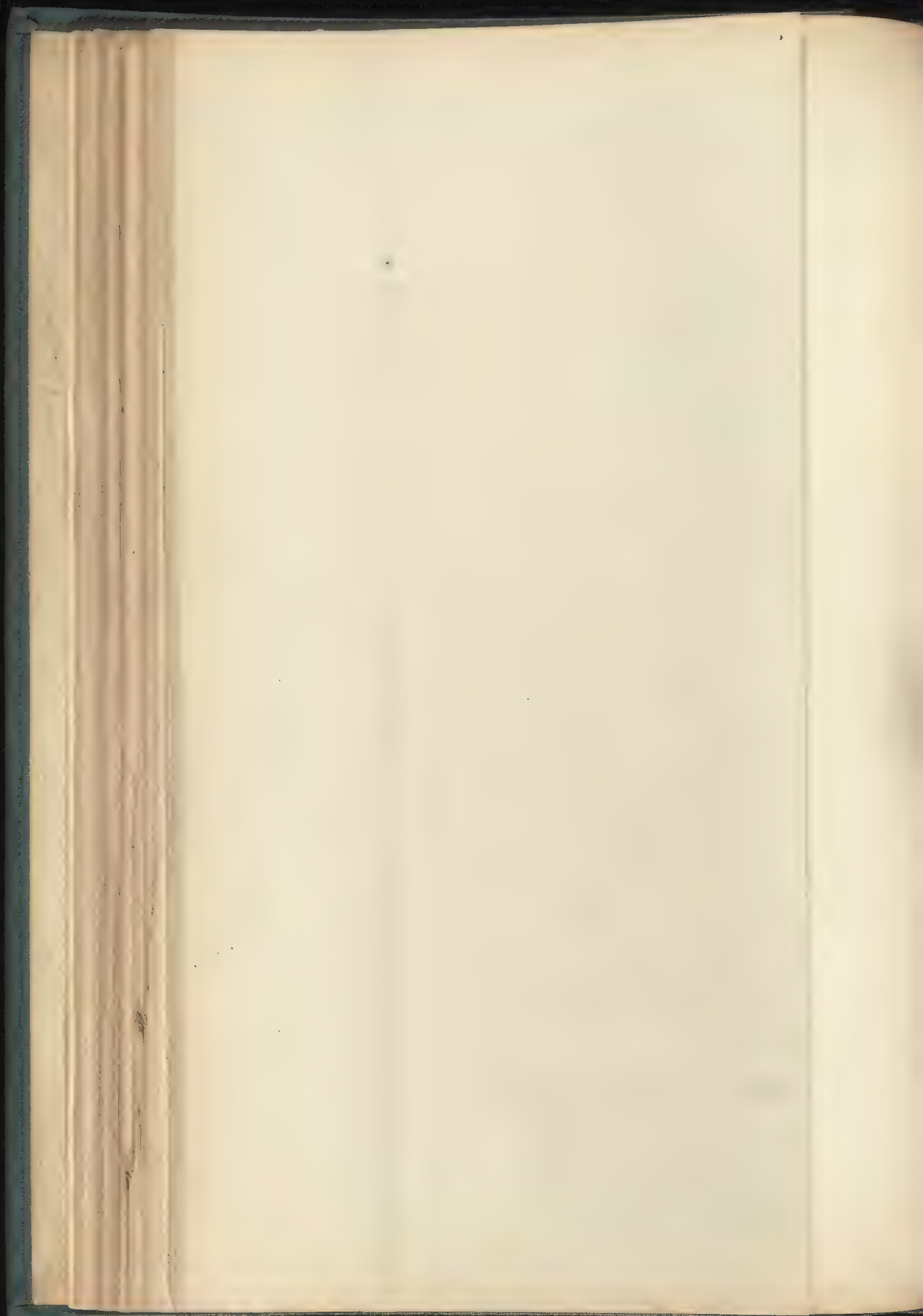




House at Haslemere

E. J. May Architect





# The Builder.

VOL. LXXXIX.—No. 3261.

AUGUST 5, 1905.

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Sketches with the Architectural Association in Normandy.....By Mr. W. Curtis Green.

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### The Cheap Cottages Exhibition.



It is to be regretted that those who organised the Cheap Cottages Exhibition at Letchworth should have let it be known beforehand, either officially or non-officially, that they were in search of a cottage which could be adequately built for 150*l*. If, instead of that, they had announced that they wished to offer a prize for the most economically built cottage which would be comfortable and weatherproof, and sufficiently large to accommodate a certain number of persons, there would have been more chance of getting a fair statement as to the cost of each. As it is, we find that nearly everything on the ground, of all kinds of different shapes, sizes, and materials, can be built for 150*l*.; or sometimes, with an affectation of greater exactitude, for 149*l*. or 148*l*. 10*s*., and so on. As to the majority of these statements we fear that we must avow an entire scepticism. Whether any of the cottages, and which, could really be built for the sums stated, it would be impossible to say without a much more detailed examination and computation than was possible on the ground. But we think the number would be very small.

The exhibition may be considered to resolve itself, geographically speaking, into two groups; the set which are concentrated near the railway station, and a smaller group which are at some distance

off across Norton Common. These latter we cannot speak of on the present occasion, as the first-named group were in themselves sufficiently numerous to occupy a long morning in their examination. But there are a good many exhibits still unfinished, and we shall take an opportunity of making another visit, when we can examine the outer group as well as those of the nearer group which are not completed at present. There is also in a temporary building an exhibition of plans, which we will examine on another occasion.

On the left of the entry to the grounds Dando's windmill pump is seen at work raising water from an artesian well, and on the right is a specimen of a bungalow (No. 1), or what they call "a week-end cottage," erected by Messrs. J. Hawkins & Co., of Ashford, which has some good points. This is a wood-framed cottage with a fireproof lining (composed mainly of asbestos) and "Stonewod" floors, which latter are very satisfactory; we have not come across the material actually laid down in a house before. The mistake of the exterior design is that it wants simplicity, and makes an effort to be picturesque in a rather feeble manner. And we may add that this striving after the artificial picturesque is a weakness which permeates a considerable proportion of the exhibition. That cheap cottages should be picturesque if possible is certainly desirable; but the picturesque will not always come when called. The old country cottages of England which are picturesque were not built to be so; they were built merely with the

readiest materials and in the most convenient method known to their builders; when they strike us as picturesque, it is because of age, of the toning and weathering of materials by which they become part of the colour of the landscape, and of a certain association with the past which appeals to the imagination. This quality of the picturesque cannot be consciously produced to order; the attempt to do it defeats itself, and is apt to turn away the mind of the designer from what in this case is the real object—the production of a soundly-constructed cottage at a cheap rate. We see instances of this in the exhibition; the introduction of foolish sham timber-work on the face of walls, and the constant employment of very high-pitched roofs, for which there is no necessity, and which are only a concession to the supposed demands of the picturesque. There appears to be only one cottage in the whole number in which the now perfectly easy expedient of a flat roof is taken into account\*; this, which we have only examined from the illustrations attached to the catalogue, is one designed by Mr. Brodie, the City Engineer of Liverpool; it is in the outlying group which we have not yet inspected. We should certainly have expected that some among the competitors might have remembered that it is possible now to roof a cottage without cutting it up into high-pitched gables and dormers.

Messrs. Hawkins's bungalow, just

\* It is perhaps needless to say that by "a flat roof" we do not mean one literally and geometrically flat.



referred to, though very nice for "a week-end cottage" in summer or autumn, is not however a house to winter in, and hence does not really fall within the scope of the exhibition, which is to provide cheap cottages as permanent houses. We fear that some of those exhibited as such would be found wanting under stress of time and weather. This is an exhibition of thin-walled houses. External walls of more than 9 in. thick are not to be found. Ordinary 9-in. brickwork we have always said is not sufficient for external walls, whether in town or country; but in most of the buildings shown we are not left to this; either the brick walls are covered with some weather-fending material, or the wall is of concrete or other material. There are some walls even thinner than 9 in. which nevertheless we think may prove practically sufficient. An unfinished house by Messrs. Williams & Hodgson (not in the catalogue) seems to promise well in this way; the walls (9 in. thick) are built of a patent perforated brick made by the London & Brighton Brick Co., which appears likely to make a more weather-proof wall than ordinary 9 in. brickwork; the upper part is rough-cast. Mr. John McManus exhibits a very nicely finished cottage (11) with walls of timber and boarding and partly of cement, 6 in. thick; unfortunately it is partly constructed (as described in the catalogue) "with overlays representing open timber work," a mere piece of sham; but it is a pretty cottage externally; of the interior nothing can be said, as it was locked up, as was the case with a few others in the show; a foolish thing to do when the houses are put here to be looked over. Messrs. Green Bros. exhibit a cottage (14), designed by Mr. Houghton, of Chesterfield, which has a great deal to recommend it; the walls are of 9 in. brickwork covered by white cement rough-cast, with green-painted woodwork; the interior fittings are simple and solid (the circular window on the staircase ought to be made to open), and the whole in good taste. This is stated to have been built here for 150*l.*; but then comes the note "can be duplicated" (built somewhere else) "for 175*l.*, including profit, architects' fees, and men's travelling expenses"; so that this cannot be regarded as a 150*l.* cottage. Next to this is the cottage of which Messrs. Stanley Barrett & Driver are the architects, in somewhat the same style (it would be much better without the foolish sham half-timber work planted on to the gables). The architects contend that "for an ideal labourer's cottage a small parlour is an absolute necessity"; but here we are not seeking for an ideal labourer's cottage, but for a possible one at 150*l.* We are told this can be duplicated in any district at the same cost "provided the conditions are the same," a wily sentence which may cover a good deal. The walls are of 9 in. brickwork with a coat of cement, and while this is wet, small stones mixed with lime are thrown on; "this makes a 9 in. wall as good as an 18 in. one." Not quite, but it is certainly a different matter from the bare 9 in. wall. The same architects show another in much the same style, but "specially designed as a pleasure

cottage," at a cost of 210*l.*, and we are promised that a similar cottage can be erected in any district at the same cost. We doubt it, and we much more than doubt the promise of building Messrs. Picton & Hope's cottage (17: unfinished) for 150*l.*, which is absurd on the face of it; they may by some special arrangement be getting it up here for 150*l.*, but it could not possibly be regarded as a building to be generally carried out at that price.

A remarkable contrast is afforded by the next two exhibits. No. 19 is a picturesque cottage designed by Mr. Lionel F. Crane, a timber-framed building on concrete foundations with overlapping weather-boarding, treated with carbolineum to prevent rotting, and roofed with old local tiles on boarding and battens. It looks very well, as a specimen of the picturesque in cottage-building, but it is far too fanciful and too much cut up in its outline to afford a type for cheap cottages on an estate; it is the kind of thing an owner might build as an ornamental lodge at his park gate. As such it is good, as all the details are quiet and in good taste. Messrs. Heal & Son have filled it with some excellent cottage furniture of a solid type; the furniture of one of the bedrooms indicates that it is proposed to indoctrinate the agricultural labourer and his partner with the hygienic advantages of *lits jumeaux*, a point to which the labourer has probably not arrived even in France, the country of matrimonial refinements. The cottage No. 20, exhibited by the Bournville Estate Trust, is a plain square-lined erection of 9 in. walls of ordinary brickwork, the window frames under segmental arches. The note in the catalogue says—

"The central idea has been to give the maximum cubical contents for the least possible expense compatible with good construction and the selection of materials based on the Trust's experience in the erection of some 600 houses on the Bournville Estate."

We have found that the above are essential to the economy of erecting and maintaining small property. The cost limit of 150*l.* entails the most severe external treatment, but we have found that a few years' growth of shrubs and creepers quite eclipses man's efforts at decorating exteriors, if proportional treatment be maintained throughout."

This is sound common-sense, and this is a common-sense building. It might be possible to give a little more character to it without adding to the cost; but we should expect to find that this cottage would be standing and in sound condition long after one like No. 19 had either worn out or cost a good deal of money in repairs.

No. 22, designed by Mr. Whitbread (Carlton, Nottingham), is intended "to meet the requirements of By-laws based on the Model By-laws of the Local Government Board." The walls are of 9 in. brickwork, rough-cast on the upper story. It is very well planned, the entrances to rooms being grouped round a little entrance hall. There is only one external entrance door, which is sufficient as planned, and no room has more than one door in it (we see small rooms in some of these cottages with three or four doors in them). There is a small bathroom on the ground floor, placed so as to get hot water from the scullery copper. This is a very creditable attempt, one of the best in the exhibition.

The cottage by "Ealing Tenants Ltd." (26) has something of the same character as the Bournville Trust Cottage, but the water-closet opening by an internal door from the scullery is most objectionable. In these small houses the water-closet or earth closet should always be entered by an external door; it is impossible for it to be quite sanitary otherwise. Even the water-closet opening from a small porch without a door, as in Mr. Allen Foxley's cottage, No. 27, is in too close contiguity; but this last is a simple and sensible design in the main, and the architect is right in his judgment that the average workman (this is a town cottage) resembles features that others might call " quaint" or picturesque; and that materials and methods of construction should be used with which all builders and their men are familiar; the employment of unusual features "involves close and continuous supervision of the workmen employed, difficult even on large jobs, and almost impossible on works of this size." The block of three cottages (31) exhibited by Mr. Ivor Tuckett and designed by Mr. Curtis Green has the merit of simplicity; the walls are 9 in. brick limewashed, with dark green woodwork; this procures what is now a favourite effect in "aesthetic" cottages, of dark details against a mass of white; but limewash does not add materially to the weather-resisting qualities of a 9-in. wall, as rough-cast or some such covering would. The planning is rather naive; the three cottages differ, but they all have the water-closet opening internally out of the scullery, a fatal objection; and in the bedroom plan part of the space is sacrificed to a passage, owing to the arrangement of walls and stairs. The two-cottage block by the same architect, but exhibited by Mr. Gooch (32, 33), has the same exterior character but is better planned and altogether a good exhibit. The cottage (34) designed and exhibited by Mr. C. A. Agate (Manchester) has merits of somewhat the same nature, and is a pleasing and fairly economical little building. In regard to the remark that the cottage is self-contained, "without any outbuildings and their attendant backyards, which only encourage untidiness and squalor," there may be truth in this, but the "little covered yard," a small arched lobby without a door, is not quite sufficient to separate the water-closet from the scullery door, though it is not so objectionable as a direct opening from the scullery.

Messrs. Potter & Co. exhibit in two blocks (both numbered 35) examples of what they think can be done with concrete for cottages. One of these is of simple concrete, the other, a two-cottage block, of steel construction filled in with concrete, plastered inside and rough-cast outside. The outside finish in both cases is of a disagreeable grey tinge. The two-cottage block is a one-story building with a high red-tiled roof with very wide eaves. It would have been more to the purpose, as they were dealing with steel and concrete, to have shown how well this material would have answered for a flat roof; but we imagine that in this and other cases the high red-tiled roof is used because its effect is supposed to be attractive to the



possible purchaser or client. The plan of these houses is of the most naive description; scullery 12 ft. by 8 ft., with bedrooms 10 ft. by 9 ft. 6 in. and 10 ft. by 8 ft. 6 in., just because the walls fell in with that; and one of the bedrooms is entered through the scullery. The firm should have got an architect to make them a plan, and they might then have made a more useful contribution to the show. The next exhibit (36), designed by Mr. W. Moss Settle for Messrs. Gradwell & Co. (Barrow-in-Furness), is interesting as a specimen of genuine half-timber work—solid oak posts grooved for 3-in. compressed cement concrete slabs: a lesson at all events for the employers of sham half-timber work. The concrete slabs seem as solid and impervious as could be wished, but one is afraid there may be trouble with all this joint-line between timber and concrete. The plan shows a kitchen and living-room of equal size, the kitchen performing also the function of scullery; this is a more expensive plan than a fair-sized kitchen which forms the living-room, and a small scullery separate; is it a better one in other respects? There are arguments in favour of either arrangement, but we think that for the smallest class of cottage the kitchen must be the living-room; it is so in most small country cottages, and people who live in small cottages are used to it. As to this one being built for 150l., or even "repeated for 165l.," as promised, we have difficulty in believing it. The construction is one which, simple as it is in one sense, would require very careful workmanship.

Messrs. Harrison & Hattrell's design (37) for a cottage with brick walls rough-cast looks simple and suitable, but as it was locked we could not form a decisive opinion on it. The Cement Products Company show a rather large cottage built of 10-in. and 8-in. hollow concrete blocks, a very good construction; but when they say it can be duplicated for 148l., we presume that means the carcass, without any finishing; at all events, we should not advise anyone to order such a house in the faith that it could be done for that sum, ready to be furnished and inhabited. The Fireproof Partition and Spandrel Wall Company exhibit a house (40) in their system of construction; the walls are described as of brick on edge reinforced with ironwork and built in cement, and self-supporting (they do not say over what bearing), so that foundations are required under the stanchions only. The construction in this house appears to be a wall (as just described) inside, and a thin wall of rough-cast concrete on steel lathing outside, with a space of about 6 in. between; a piece of the outer skin is left open to show the structure. This seems rather complicated; we can hardly believe that it is cheaper than 9-in. brick rough-cast, and we do not like large hollow spaces in the walls which can never be got at.

Some exhibits which have nothing very special for mention we must pass over; and the two buildings by the Expanded Metal Company (47) were in too unfinished a state to judge of. Messrs. J. A. King & Co. were erecting a one-story cottage (48A) with walls and partitions of "Mack slabs" 4 in.

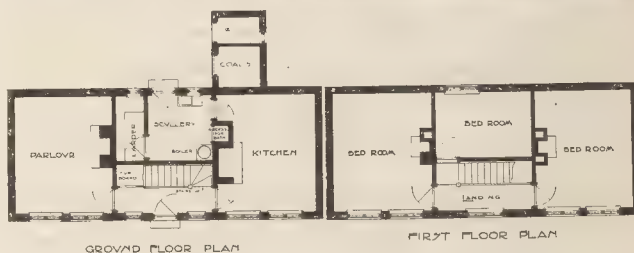


Fig. 1. View and Plans of Cottage (No. 58) by the Concrete Machinery Co.  
Mr. Gilbert Fraser, Architect.

thick, the outer walls covered with rough-cast. This is well planned, with no space lost; the rooms all open out of a little central lobby top-lighted (this looks like a fixed skylight—it ought to open), and no space is lost, but the water-closet door ought to be round outside and not where it is. The Mack slabs, which (our readers may remember) are slabs of fine concrete with circular vertical spaces inside, which are filled up (we believe) with liquid cement after they are in position, seem to form one of the most solid of the types of thin walls which it is proposed to substitute for brick, and as they are in large slabs and with finished surfaces there is considerable saving in labour in comparison with brickwork; also some saving of space, and they may be more impervious to weather than a 9 in. brick wall unprotected externally, but that can only be decided by practical experience. The same firm are erecting another block (48b) of which they say in the catalogue, "the outer walls, to the height of the first floor window sills, are of *Mackolith*, a material composed of Mack slabs faced with tiles to represent brickwork." We did not see this effect; the building was probably not finished. This is absurd; it is all right to face them with tiles for a better effect, but why imitate brickwork?

The British Uralite Co. exhibit a pretty-looking cottage externally (53: it was locked up) of which the walls are described as "studding covered with Uralite Kent board both sides, painted and sanded externally, and whitened internally." But what is between the

inner and outer boards? Is it hollow space, or is it filled in with anything; and if so, with what? Anyhow, we do not think this is a system for anything but a temporary or summer cottage. Passing over some others not worth special notice, we come to the house built by the "Concrete Machinery Co." (58) stated to have been built where it is for 150l., though the representative of the firm admitted that they would not undertake to rebuild it for actual use for that sum, which in fact seems absurd at a mere glance. It is built of concrete blocks, which were made on the spot by a very simple hand-worked machine; large blocks, with two hollow spaces which, in setting, form continuous vertical spaces, the right-hand space in one block corresponding to the left-hand one in the block breaking joint with it. Thus we have a wall honeycombed with vertical tubes; the process saves material and may conduce to warmth, but on the whole we would rather these hollows were grouted up. This is, however, a cheap walling, and not thin or flimsy, and as such deserves attention, and it looks almost as well as coursed stonework. The design is a simple parallelogram with a hipped roof, and looks perfectly well; the plan is very good except for the fact that kitchen and living room have similar windows in front facing the road (apparently for external symmetry), in which case either one of them must have too much sun or the other too little. We give a reduction, however, of the plan and view of this (Fig. 1), as it is one of the best illustrations appended



to the catalogue; but at the same time we must say that we cannot regard it as a solution of the problem of providing the smallest class of agricultural labourer's cottage; it belongs to a class of cottages a grade above that. Messrs. Clare & Ross's one-story cottage (59), on the other hand, seems to come nearer to what is wanted than most of them, if their small kitchen, 8 ft. by 8 ft., which also fills the function of a scullery, can be accepted. They provide a pretty large living-room with an ingle-nook, and a large fireplace with a range, which has a back opening into the kitchen; we give the plan (Fig. 2).

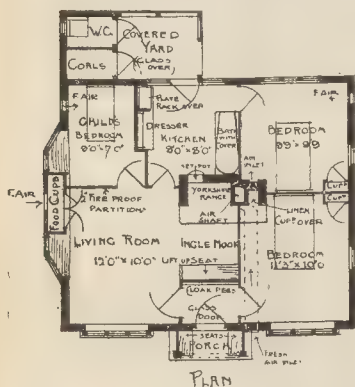


Fig. 2. Plan of One-story Cottage (No. 59).  
Messrs. Clare & Ross, Architects.

Most of the cooking would obviously have to be done in the living-room, so that what is called the kitchen after all becomes practically the scullery. The walls are described as of breeze concrete 7 in. thick, "fitted in between a special system of lattice skeleton framing." The partitions and ceilings are in Mack slabs; "floors and partitions absolutely solid, and no unseen spaces below the ceiling where vermin can harbour"; which is also a good point. It is almost amusing to find the author of No. 61, on the contrary, specially advocating hollow spaces and describing the upper part of the walls as "timber framing plastered inside and out, thus leaving a hollow space and ensuring dry and healthy rooms": a most undesirable form of construction. How could one tell what may be accumulating in those "hollow spaces" between two sheets of plaster?

One (the nearest) among the outlying cottages we went to see, having received a special card calling attention to it. This is a pair of semi-detached cottages designed by Mr. Baillie Scott, at a cost price stated as £420. for the pair. This is a very picturesque building, and planned inside in a manner both pleasant and practical. One of the cottages has been filled with a collection of old cottage furniture, not all of it presenting models worth repeating, though they look very nice here; for instance, an old four-post bed has been put in one of the rooms, an unhealthy form of furniture which ought to be considered as rightly extinct, and only historically interesting. The small

forecourt to the cottages is prettily laid out in a simple form of ornamental paving, with a sundial in the middle; but this part of the work does not come into the £420.

On another occasion we will consider the outlying cottages, and some of those which are not yet finished. By that time there ought also to be available a new and revised edition of the catalogue, which, although very well laid out, has still some inaccuracies and omissions to be set right.

## NOTES.

The narrow escape and difficult rescue of two youths from a live rail on a Lancashire railway point to the dangers lurking in the unprotected third rail. One of these youths, by accidental contact, became glued to the line, a friend who attempted to disengage him was also caught in the toils, and the two were only dragged off in time to escape being cut up by a passing train. An alternative method of traction, which obviates such risks, and promises to reduce both capital cost and maintenance by nearly one-third, is one embodying the use of single-phase alternating current motors in connexion with overhead conductors. At the same time it avoids the possibility of disorganisation during times of flood that attaches to the third-rail system. Single-phase motors have been in practical use for more than a year on the Ballston extension—about 11½ miles long—of the Schenectady Railway in the United States, and, so far, the results appear to be quite satisfactory. This method of traction deserves careful investigation by railway authorities, for it certainly possesses advantages over the prevailing system, and should do much to hasten the electrification of steam railways and, we may add, to encourage tramway and light railway construction in country districts.

The case of the Attorney-General v. Corporation of Dorchester is one of extreme importance, but, as at present reported, is somewhat difficult to follow. The action was brought by the Attorney-General at the relation of Mr. Talbot, who was also a plaintiff, in respect of a nuisance created by the defendants' sewage works, and the defence was that the works were properly carried out under Provisional Order and statutory authority. The defendants are the sanitary authority acting under the provisions of the Public Health Act, 1875. In 1900 the defendants were seeking to enlarge the limits of the borough, and the co-operation of the Local Government Board seems to have been obtained with the condition that the Corporation should carry out a system for the disposal of the sewage, which works were to be approved by the Local Government Board, and the Provisional Order provided that, in the event of the Corporation not proceeding to carry out such works within the period limited, then they could be compelled to do so under sect. 299 of the Public Health Act, 1875. The finding of the Court appears to be that this Order only

compelled the Corporation to carry out the proper works in exercise of the powers conferred upon them by the Public Health Act, 1875, and that the statutory obligation did not extend to carrying them out according to the plans submitted and approved, and that therefore, under sect. 27 of the Public Health Act, 1875, the powers must be executed in such way as not to create a nuisance. The court found as a fact that the works did cause a public and private nuisance, and therefore the plaintiffs were entitled to succeed. There was also a subsidiary question as to whether the defendants had infringed sect. 17 of the Act by discharging sewage insufficiently purified into the river Frome, but this cause of complaint, though existing at the time action was taken, had since been discontinued.

The Strength of Reinforced Concrete. DURING the last two years more than two hundred scientific tests of concrete-steel beams have been conducted at various institutions in the United States. With the object of making a comparative study of these tests, Mr. T. L. Condon has calculated, for each beam included in the above-mentioned tests, the ultimate bending moment and the percentage of reinforcement. The results so arrived at are stated in a series of diagrams to be found in a paper recently read before the Western Society of Engineers. The data presented by the author are perhaps more useful than the conclusions drawn by him, and the discussion evoked by the communication was particularly valuable, including contributions from two or three leading American authorities on the subject. This paper is in marked contrast with the purely descriptive treatment of concrete-steel which characterises several papers read lately before British engineering institutions, the members of which ought by this time to be prepared to discuss the principles of construction in a mutually helpful manner.

MR. A. CAMPBELL, of the National Physical Laboratory, has communicated to the *Journal* of the Institution of Electrical Engineers an important paper on the compensation of ammeters for measuring electric currents. It is well known to experts that practically all shunt ammeters are affected with serious temperature errors. Owing to the resistance of the coil of wire which forms part of the instrument varying considerably with the temperature of the coil and to the difficulty of determining its real temperature, the accurate measurement of current is almost impossible. Mr. Campbell gets over this difficulty in an exceedingly ingenious manner. Making use of the fact that the resistance of coils of wire made from certain metals vary in different ways, he has designed an arrangement which compensates almost perfectly for changes of temperature. An instrument fitted with this compensator was found to read correctly, although the temperature was varied from 67 deg. to 98 deg. Fahr. In the latter part of the paper formulae are found for taking into account the effect of shunting a broad strip of metal by a galvanometer connected across two points of the strip. The problem is one



of extreme difficulty, and has hitherto been attacked only by the application of the most advanced analytical methods. The author, however, by using a general theorem on the reciprocal relations between current and pressure, has found the correct solution in an exceedingly simple way. A particular case of the general theorem he uses was proved by Kirchhoff, but it is to Lord Rayleigh we are indebted for the complete development of the reciprocal relations between physical quantities. These relations are useful in practical work not only in simplifying the calculation of formulae, but also in suggesting new instruments and new methods of testing. To continental electricians the "method of duality" is well known, but it has been mainly applied to developing reciprocal relations between dynamos and motors. Mr. Campbell has shown how useful it can be in the testing-room.

**THE Court of Common Council** have adopted a scheme propounded by their Finance and Improvements Committee for an improvement to be caused by the re-building of Nos. 1 to 6, Lombard-street, between Mansion House-place and St. Swithin's-lane. The former Nos. 1-10, on the south side of Lombard-street, were, together with Dove-court and Little Lombard-street, pulled down for the laying-out by William Mountague, the City architect, of King William-street in 1824-30. The present block, consisting of Nos. 1-6, was then built after plans and designs by Sir Robert Smirke, R.A. No. 1, Union Bank of London and Smiths, stands on the site of a house, occupied by the sign of the Angel, by John Lindsay, goldsmith, before the Great Fire; as rebuilt after the fire it became the banking-house, by the sign of the Cock, of Harley & Co., into which Smith, Payne, & Smiths, founded in the Midland provinces by Thomas Smith in 1688, removed at the close of the XVIIIth century, their London house having been established in 1758 at No. 18, Lombard-street. No. 18, by the signs in the XVIIIth century of the Hare, and the Hat and Harrow, was bought from them in 1782 by the now Phoenix Fire Assurance Co. In July, 1902, the firm was amalgamated with the Union Bank of London. Twenty-five years ago, during some alterations at No. 1, was found a cast-iron slab, bearing the device of a cock and figures "1652." In next autumn will be offered for sale the freehold property, Nos. 80-1, which stands nearly opposite, on the site of houses distinguished in turn, as Mr. F. G. Hilton Price records, by some of the oldest signs in the street—the Seven Stars, the Saw, the Heart and Crown, the White Horse, and the Halbert and Hart. The premises, latterly Brooks & Co.'s banking-house, were (with No. 82) re-built after designs of Edward P. Anson, and are held on lease for a term of eighty years from mid-day, 1855, at a ground-rent of 4s. per annum.

**THE premises of the Morning Post** in the Strand will shortly be vacated for new buildings, designed for Lord Glenesk by Messrs. Mewes & Davis, upon an adjoining

plot of land abutting upon Aldwych and Exeter-street. The present offices of that paper, at the angle of the Strand and Wellington-street, were erected after Mr. H. O. Cresswell's design—illustrated, and with two plans, in the *Builder* of February 18, 1893—upon the site of a house, No. 346, Strand, which was built in 1838 from designs by S. Beazley. That house, latterly the offices of the *Queen* and *Field* journals, supplanted one which had been the noted shop of A. Walker & Co., formerly D'Oyley's, standing on the site of Wimbledon House. Wimbledon House was built by Sir Edward Cecil, first Viscount Wimbledon, son of Thomas, Earl of Exeter, and grandson of Lord Burghley, from whose adjacent town mansion Exeter and Burleigh streets derive their names. D'Oyley gave his name to a once highly-popular fabric, a union of silk and wool, for cloths, towels, and other small-ware articles, as well as to, it is said, the little dessert or wine-glass napkins commonly so called; though he may have adapted that name from the low German *Dwihle* or old high German *Dwahilla*, the English "towel." Gay cites "thy D'Oily habit" in his "Trivia," book I.; similar allusions are made by Dryden, Budgell, and Steele, and in Moser's "Vestiges." A site has been cleared at the corner (west) of the Strand and Milford-lane for the new premises of the United Kingdom Provident Institution, of which Mr. H. T. Hare is appointed architect. The former buildings on that site included No. 198, where, on May 14, 1892, the *Illustrated London News* completed the first fifty years of its publication. An attic in the adjoining house, now pulled down, was the studio of Charles Keene, of *Punch*.

#### SOME ENGINEERING WORKS IN BELGIUM.

MUCH attention is being directed to Belgium this year as a result of the Liège International Exhibition, the visits of the Institution of Mechanical Engineers, and the South Wales Institute of Mining Engineers, the Convention of the International Congress of Mining, Metallurgy, Mechanics, and Applied Geology, the meeting of the International Congress of the Chamber of Commerce, and the fêtes organised by the Government to commemorate the seventy-fifth anniversary of the national independence.

Some of these functions have already taken place, and many British engineers have availed themselves of the opportunities thereby afforded for studying the most recent developments that are to be found within the boundaries of a country which enters into friendly competition with us in various departments of industry. For a few years past the bugbear of American competition has been on the nerves of many people in Great Britain, and some seem to think that the only hope for British manufacturers is to mould their practice on that of the United States.

Numerous visits have been paid to that country, and voluminous accounts have been published of the wonders to be seen in the engineering and kindred works there to be found.

No doubt all this has done good. We must point out, however, that it is equally important to know what is taking place nearer home. Belgium offers a favourable field for the purpose of such an inquiry owing to facility of access and the compact grouping of its engineering industries in the Walloon district. No better centre than Liège could be selected for a tour among the mines and ironworks of Belgium, for that town is literally founded on coal, and is in

the midst of a region rich in other mineral resources. In some of the suburbs coal crops out at the surface, and it has been found necessary to prohibit the working of mines extending below inhabited districts. The development of Liège is said to have been due, in the first instance, to the discovery of coal by a blacksmith named Hullos, whose name has given the French word "houille" which distinguishes coal in the seam from "charbon," or coal in its commercial form.

The coal concessions in the province of Liège alone cover an area of nearly 100,000 acres, and provide employment for fully 35,000 men. Among the most interesting undertakings of the kind is the Charbonnage du Hasard, having pits at Micherol and Fléron. Electric winding machinery has been adopted with considerable advantage at the last-mentioned pit, power being furnished by a central station containing three sets of 300-h.p. three-phase generators. These sets also provide current for pumping, ventilation, coal cleaning, and other plant.

Electrically-driven winding machines have also been installed at the St. Nicholas pits of the Espérance and Bonne Fortune collieries, Montegnée. This winding plant is capable of raising 500 tons from a depth of 800 metres in eight hours, and has replaced a steam-driven machine, with the result that the company have saved the expense of renewing a battery of six boilers, and have effected a considerable reduction in wages.

Although the data at present available do not appear to prove that electrically-driven winding machines are invariably superior in point of economy to steam-winding engines, their advantages are sufficiently demonstrated at the pits of St. Nicholas, where the establishment of a central power station and the distribution of energy therefrom to different points is far more economical than the previous methods of employing separate boiler and engine houses.

Some of the largest collieries in the province belong to great iron and steel works, to which we shall make reference a little later. Thus the Société Ougrée-Marbais use nearly 275,000 tons of coal a year. This company own five collieries, with an output of about 350,000 tons a year, and covering an area of 4,025 acres, beneath Flémelle, Yvoz-Ramet, Chokier, Val St. Lambert, and Seraing. The system of working is noteworthy for the reason that the use of explosives has been entirely displaced by mechanical appliances, the Dubois-François driver being largely employed. This apparatus first drills a hole in the coal, and afterwards drives in a multiple wedge of circular cross-section, by which a large mass of mineral is detached. The colliery department includes seventy-one Smet-Solvay coke ovens and sixty-eight coke ovens of the Collin type, about half of the latter being at the Seraing colliery. Extensive workshops are also provided for the screening and washing of coal and the manufacture of briquettes. A sixth colliery, with an area of 660 acres, is situated near the blast furnaces of the company. In this department there are ten Appolt system vertical ovens, each with sixteen retorts, and three Bernard system horizontal ovens, each with forty retorts.

The Société John Cockerill are also extensive colliery owners, having a concession in the Meuse valley occupying 750 acres. The Colard pit is the most important, yielding about 2,000 tons of coal a day.

Ventilation of the workings is effected by an electrically-driven Mortier ventilator, with an exhaust capacity of 1,400 cubic ft. of air per second. Well-appointed bathrooms are provided in the buildings at the brow of each pit, a convenience which is much appreciated by the miners.

Many of the other collieries in the Liège district have entered into the combination known as the "Union des Charbonnages, Mines, et Usines Métallurgiques," founded in 1866, the total output of the province being about 6,500,000 tons a year. Including mines in other provinces, the total coal production of Belgium, in 1904, was 23,500,000 tons, giving employment to 135,000 miners.

The most important of all the industrial firms in Belgium is the historic Société John Cockerill, whose property includes the



immense works at Seraing, a dockyard at Antwerp, collieries in the Meuse valley, iron mines at Rumelange and in the Grand Duchy of Luxembourg. The company are part proprietors of iron mines in German Lorraine, in French Lorraine, and Bilbao, in Spain. Further, in addition to lighters and steam vessels on the Meuse, they own a fleet of nine cargo steamers, three of 300 tons built for a daily service between Ostend and London, and six, including two of 2,400 tons and four of 4,000 tons, calling regularly at different ports in Spain, Italy, Tunis, and Algiers.

Seraing stretches for about a mile along the right bank of the Meuse, and is connected by a suspension bridge with Jemeppe, about three miles from Liège. John Cockerill, the founder of the Seraing works, was also the founder of modern engineering in Belgium. The son of an English emigrant, he established a small factory at Liège in 1802, and, in 1817, his great mechanical genius was recognised by the King of Holland, who granted to him the old Château des Prince-Évêques de Liège, together with its dependencies and grounds, for the establishment of works to be devoted to the manufacture of engines and machinery, particularly for the flax-spinning and mining industries. We may here explain that the Château of Seraing should not be confounded with the later seat of the prince bishops, built on the Place St. Lambert, Liège, during 1508-1540. Both buildings still remain in excellent preservation, and the world has to thank Cockerill and his successors for maintaining the old Château of Seraing very much as it was except in the matter of environment. The mansion is now used as the residence of the managing director and for the chief offices of the company. Around the Cour d'honneur occupying the centre are the offices of the manager and secretary, the sales and buying departments, the offices of the accountant, the archives, and the library. The offices of the engineering department occupy the first floor of a building forming one wing of the old Cour de Service, which we regret to find has been transformed into a workshop. However, the ancient council hall of the States-General of the Liège Principality has been preserved intact, and is used as a board-room and meeting-place for shareholders. The château stands close to the bank of the river and, with its adjoining park and gardens, still maintains some appearance of its mediæval grandeur.

In 1824, a coke-fired blast furnace was erected at Seraing, and, although not actually the first built on the Continent, it was the first to be provided with a blowing engine. So excellent was the working of this furnace that it may justly be said to have revolutionised pig-iron manufacture on the Continent. Between 1825 and 1827 Cockerill and his associates turned attention to the design of steam vessels with high-pressure boilers and compound condensing engines. In 1835, the first wrought-iron rails made on the Continent were rolled at the Seraing works, and the first locomotive built on the Continent was turned out for the Belgian State Railway. After the death of John Cockerill, in 1840, his nephew, Gustave Pastor, formed a limited company to continue the business, which has steadily progressed until at the present day the Seraing works alone cover an area of nearly 300 acres, and provide employment for about 10,000 men. The growth of the Société Cockerill has continued side by side with the development of the Belgian engineering industries, which owe much of their reputation in foreign countries to the admirable design and high-class workmanship of the products turned out by the Seraing works. Although other establishments on the Continent now exceed them in point of size, these works possess a historic interest which is unique, and an unsurpassed interest to the practical engineer owing to the varied metallurgical and manufacturing arts conducted under one management.

In addition to the production of coal and iron, the company are extensive makers of steel rails, joists, bars, and plates; iron and steel castings and forgings; marine, stationary, and locomotive engines; gas engines, steam boilers, bridges, and structural work, iron and steel wheels and axles, gun carriages, ordnance and projectiles.

They have devoted themselves particularly to the manufacture of compressed-air plant, the manufacture of blast-furnace gas engines of production of blast-furnace gas engines of large powers, the manufacture of steam turbines, and the building of steamships, and, at the present time, they are actively engaged in studying the application of superheated steam to locomotive design—one of the most recent developments in railway engineering.

Throughout the works ample evidence is presented in every department of the fact that the management have fully appreciated the necessity for continued improvement in the plant. Several of the shops have been rebuilt and others re-equipped within recent years with machinery of the latest types. Electric cranes are everywhere to be seen in the shops and yards, electric and hydraulic tools are freely employed in the boiler and other shops, the latest types of blast-furnace gas engines are taking the place of steam engines and boilers for blowing and for the generation of electricity. In the central generating station 1,800 h.p. are produced by engines utilising gas from the furnaces, and 1,500 h.p. by steam engines. The latter, with their generators, formed the equipment of the original central station built in 1889. This machinery will shortly be replaced by a 1,500 h.p. furnace-gas engine generator now under construction in the works.

The foregoing brief notes show that the company are fully alive to the necessity of keeping abreast with the times. It is satisfying to find that they also recognise the duties they owe as modern successors to part of the ancient principality. The industrial school of Seraing owes its creation to the initiative of the Société John Cockerill, and several of their engineers take part in the instruction there conducted. A school of mining has also been established at Seraing. A hospital was founded in 1849 after an epidemic of cholera, and, in 1866, an orphan asylum was added to the institution, which now contains 230 beds, and provides for the gratuitous treatment of patients. There are also on the works an infirmary for first aid in case of accidents, and a surgery whence medicines are supplied without charge to workmen and their families. Five physicians are retained who attend daily at the works and at the dwelling-houses of employees who are sick or otherwise disabled. The works also comprise well-appointed mess-rooms for men who live too far away to enable them to take their meals at home.

We may add, in conclusion, that the network of railways within the boundaries of the Seraing works has a total length of forty-seven miles, all the lines being of standard gauge. The rolling stock includes thirty-five locomotives and 530 vehicles for the transport of coal, coke, ore, slag, and finished goods. For transport on the Meuse a steam-tug, six lighters, and two steam barges are maintained, the lighters and barges having a capacity of 300 tons each.

On the opposite side of the river at Jemeppe are the works of the Société Maison Beer, where an engineering laboratory has been established in connexion with the Liège University. The experimental boiler and engine here provided were those used by Professor Dery for the purpose of his well-known investigation into the thermal efficiency of the steam engine.

Not far off are the Tilleur works of the Société des Acieries d'Angleur, which comprise eighty-four regenerative coke ovens of the Coppée type, with an annual production of 120,000 tons, four blast furnaces, with an output of 150,000 tons of pig-iron, and three Thomas steel-converters, producing 130,000 tons a year. A new steel plant of four 12-ton converters is now being laid down, and when this is finished the annual steel production of the works will be 250,000 tons. At the rolling mills in the same establishment plant is already provided for making 200,000 tons of girders, rails, and other rolled sections. Bridges and constructional steelwork receive attention in another range of buildings, which includes shops for the manufacture of railway and tramway switches, points, and permanent-way material generally.

Electricity is extensively employed in these works for transporting materials and for driving machinery, among which may be

specially mentioned the mills for grinding basic slag to be used in the manufacture of cement and artificial manure. The Angleur works of the same firm, a little nearer to Liège, are devoted to the production of Bessemer and Siemens steel by the acid steel basic processes and the rolling of structural sections and bars. The works also contain shops for the manufacture of axles, tyres and springs. About 3,000 men are employed at the two establishments of the company.

On the opposite side of the Meuse, near the Ile des Corbeaux, are the blast-furnace and steelworks of the Société Ognon Marihay, the ground covered by the furnaces and yards being fully 54 acres and the steelworks 91 acres, independent of 214 acres reserved for extensions and partly occupied by the dwellings of workmen.

The first department includes four furnaces, each with an output of about 75 tons a day of 24 hours, all these being built on a straight line and fed by an electric overhead traveller. A fifth furnace of 100 tons capacity was blown in this year. The furnaces are blown by four Cockerill engines, two working with steam and two with blast-furnace gas. At these works a large transporter has been installed, which, we believe, is the only appliance of the kind hitherto introduced into Belgium. The central electricity station is provided with three 600-h.p. generating sets operated by steam, and arrangements are now being made for the addition of two 1,200-h.p. furnace-gas engines and generators.

The steelworks, situated a few hundred metres away, contain a 100-ton mixing machine, three cupolas, four 12-ton Thomas converters, two 15-ton Siemens-Martin furnaces, and several large rolling mills for rails, beams, plates, and bars. The largest mill is driven by a 10,000-h.p. condensing engine, and two small mills are driven by electric motors, one of the first applications of the kind in Belgium. Here, also, a large shop is provided for crushing basic slag into cement and other purposes. The Ognon Marihay Company has recently entered into amalgamation with the smelting works of Viroux and La Chiers, in France, and at Rodange, in the Grand Duchy of Luxembourg, thus acquiring a most prominent position among the greatest industrial undertakings of the world.

Sclessin, on the bend of the river which turns northwards to Liège, is the seat of numerous engineering works. Here, in succession come the Fonderies Ketin, where castings for the largest rolling mills and for engines and machinery are produced on a large scale, and up to 100 tons in weight; the cut-gear works of M. Recq de Malines; and the Ateliers de la Meuse, where accumulative and stationary engines, winding engines, mine pumps, and machinery for iron and steel works form the staple articles of manufacture. Here, also, is the Usine Electrique du Pays de Liège, where current is generated for the Communal tramways of Liège and for distribution to works and districts between Liège and Huy.

This station has been erected and equipped within the short period of six months, an achievement of which people in Liège are justifiably proud. The station is furnished with two Parsons turbines of 2,500 h.p. each, built by the Société John Cockerill, direct-coupled to alternators supplying 50-volt direct current to the Liège tramways and 6,000-volt current to Seraing and other places on the Meuse. The engine-house as built was intended for the reception of generating sets up to 20,000 h.p., but the plan provides for future extensions up to 100,000 h.p., so that when the scheme has been completely developed this establishment will take rank with the largest power stations in the world. The boiler-house comprises an installation of Galloway-type boilers, made by the Cleve-dronneries Piedbœuf, and is supplied with the most approved types of apparatus for stoking and the disposal of ashes.

Near Angleur, in the valley of the Ourthe, are the works of the Société de la Vieille Montagne, a company which owes its origin to the Vieille Montagne at Morenet in the north-east of Liège. The deposit of calamine or carbonate of zinc in this place formed the subject of a concession dating as far back as the year 1435. In 1765 the mine was worked by the Government of the



French Republic; in 1806 the Emperor Napoleon granted them to a Liège chemist named Dony, on condition that he should insure into the possibility of producing zinc in the metallic form. To Dony the world owes what is termed the Liège method of reducing zinc ore by distillation, the principle of which remains to the present day. The Société de la Vieille Montagne was founded by the successors of Dony, in 1818, the property then including the mines at Moresnet, a foundry at Liège, the works at Angleur, and two rolling mills in France. Since that date the operations of the company have been widely extended in various countries, but the chief offices still remain at Angleur.

Besides its interest as the starting-point of the world's zinc industry, Moresnet has other claims to the attention of engineers. It was here that Wolf installed his first compound pumping engine, and Clay his first rotary pump. The company were the first to make crucibles by machinery and to apply zinc sheets to the roofing of buildings.

Passing into Liège itself, numerous evidences of industrial activity are presented to the inquiring visitor. From an early period in its history the prosperity of the town has depended very much upon the manufacture of firearms. Thousands of men, women, and children occupy themselves even to-day in making parts of guns and rifles in their own homes. The most important place of manufacture on modern lines, however, is at Herstal, about three miles from the centre of the town, where are the works of the Société des Fabricants d'Armes de Guerre Réunis, this establishment being well laid out and equipped with automatic machinery of recent type. To avoid discontinuity of work owing to the intermittent demand for weapons of war the company have recently undertaken the manufacture of sporting guns, bicycles, motor-bicycles, motor-cars, and other articles of less deadly character for which their machinery is well adapted. From 1,500 to 2,000 persons are occupied in these works.

An extensive organisation connected with the electrical industry is the Compagnie Internationale d'Electricité established in 1889. The operations of the company have been extended to several foreign countries, where works have been built, all affiliated with the parent establishment. The first overhead electric tramway-cars in Belgium were built by this company, by whom numerous power stations for traction and lighting have been equipped in various continental towns.

The Société St. Leonard is another firm which is closely associated with the industrial development of Liège and of Belgium generally. Started in 1825 by Regnier-Poncelet for the manufacture of steel files and small tools, their operations were successively extended to machine tools, marine engines, mining pumps, and locomotives. The first steam engine designed in their works was built in 1836, and the first locomotive in 1840. In 1877, they introduced steam traction on urban tramway systems, and in more recent times have turned attention to gas-engine construction, being now prepared to erect and test engines up to 2,000 h.p.

It would be easy to fill pages by referring to the many other large works in Liège and its immediate vicinity, but we have written enough to demonstrate the remarkable enterprise displayed in this industrial centre. At the same time, technical education is not neglected. The University of Liège, founded in 1817, is attended by 1,600 students, under sixty professors, and affords to engineering students the opportunity of gaining both theoretical and practical training. The technical departments cover mining, arts, and manufacture, mechanical engineering, and electrical engineering, the tuition of electrical students being conducted at the Electro-Technical Institute, founded in 1885. In addition to the University, Liège now has a school of mechanical engineering, opened in 1902, and attended by about 400 pupils. This institution is well equipped with machinery, and is specially intended to train youths for entrance into engineering workshops.

Further evidences of industrial activity are to be found in the adjoining provinces of Hainaut, Namur, and Luxembourg, where there are many important coal, iron, zinc,

and lead mines, iron and steel and general engineering works, and quarries yielding marble, granite, slate, and other building stones. One of the largest establishments in the arrondissement of Charleroi is that of the Société de Marcinelle et Couillet. The works of this company date from the early part of the nineteenth century. In 1821, puddling furnaces were equipped on the English model at Couillet, and during the next year a blast furnace was built at the branch works of Hauchies. In 1828 blast furnaces were erected at the Couillet works, and in 1834 the rolling mills were equipped on an extensive scale. In 1889, the manufacture of steel was commenced on the Siemens-Martin system, and in 1892 the Thomas system was adopted. Continued extensions took place until the works of the company covered a total area of 178 acres, including establishments at Couillet and Châtelaineau for the production of iron and steel and the manufacture of blooms, billets, rails, bars, sleepers, locomotive, stationary engines, war material for artillery, and fortifications, bridges, constructions, steelwork, and motor vehicles. Moreover, the company own coalpits extending over nearly 5,000 acres, and have concessions for working iron ores in various parts of the country as well as in France and Grand-Ducal Luxembourg. As in the case of other large Belgian corporations, the Société de Marcinelle et Couillet are not unmindful of their social obligations. Dwellings have been built, and are let at low rents to workpeople, who are supplied with flour and bread at cost price. Infant and elementary schools have been built for the children of employees, as well as schools for adults for housewifery, drawing, and music, and a technical school for apprentices. There is also a well-equipped accident hospital in connexion with the works, and the company have established a provident institution, affording medical attendance to workmen and their families, advances of money in case of illness, and old-age pensions.

Another striking instance of Belgian perseverance is presented by the history of the Société des Ateliers Germain. The works at Monceau-sur-Sambre, near Charleroi, were established in 1857 for the manufacture of railway rolling stock which, together with tramway vehicles taken up later, have found their way to all parts of the world. Within recent years the workshops have been extended so as to provide for the prompt execution of the largest orders, and a special factory has been built for the manufacture of motor vehicles. These works are remarkable for their admirable organisation and the perfection of the tools and machinery employed. It is a significant, and, from the British point of view, by no means a satisfactory, fact that the new omnibuses employed by the London Road Car Company have been supplied from these works.

In addition to the thickly-clustered works in the essentially manufacturing regions, large engineering establishments are to be found in and around Brussels and even in the Flemish provinces of Belgium.

A tour of inspection through the works to which we have directed attention, in this review will prove a veritable revelation to those who are prone to think Belgian products are necessarily inferior because their price is low. Personal investigation will suffice to show that this is quite a mistaken idea. That mercantile sections of steel and some types of machinery produced in Belgium are inferior to those general in this country is certainly a fact; but such productions are specially intended for buyers to whom price is the first object, and it should be thoroughly recognised that many Belgian engineering firms in the present day are fully equipped with the most perfect modern machinery and scientific knowledge, so that they are perfectly able to compete on level terms with the best talent in our own country. And in their favour also are the frugal habits, the steadiness, and the painstaking character of the Walloon artisan.

Further, the engineering industries of this enterprising country are wonderfully assisted by the cheap means of transport provided by the Belgian State Railways and the splendid system of navigable waterways under Government control, which provide a complete network of internal communications and ready access to other countries. The canal policy

of the Belgian Government is dictated by the desire to encourage trade or commerce, and with this object in view more than 15,000,000, have been spent on the improvement of inland waterways and the ports connected therewith. This enlightened policy has undoubtedly been of most material assistance in enabling the Belgian producer to become a successful competitor in the great markets of the world, and deserves to be carefully studied by all who are working for the regeneration of the British canal system.

#### THE ROYAL ARCHEOLOGICAL INSTITUTE AT TUNBRIDGE WELLS.

The Royal Archaeological Institute this year fixed upon Tunbridge Wells as the place of its annual meeting, not so much on account of the historical associations of the place, which is hardly, at present, one of antiquarian interest, but because it forms a convenient centre with sufficient hotel accommodation for a large party.

The proceedings opened on Tuesday, July 25, when the Mayor of Tunbridge Wells (Alderman H. Thorpe) met the assembled members at the Pump Room at noon, and accorded them a hearty welcome. The President of the Institute (Sir Henry H. Howarth) then took the chair and proceeded to deliver an interesting address. After commenting on the natural beauties of the district the Institute had come to explore, the President spoke of the wonderful history of the county of Kent, so replete with old abbeys, castles, and primeval monuments. He also referred to the fact that Kent had two cities, two sees, and two cathedral churches (Canterbury and Rochester), a feature that occurred in but one other county (Yorkshire). Sir Henry also briefly traced the history of Kent in the Middle Ages, and mentioned its traditions, its folklore, the great tragedy of the murder of St. Thomas at Canterbury, and the splendid poems of Geoffrey Chaucer descriptive of the pilgrims travelling to St. Thomas's shrine. He also pointed out that Caxton was born in the Weald of Kent, and reverted to the place in history that Tunbridge Wells had begun to make for itself as a consequence of the discovery there, in the XVIIIth century, of the medicinal springs to which it owed its fame.

After an interval for luncheon, a party of about seventy set out in brakes for Bayham Abbey. Here Mr. W. H. St. John Hope gave an account of the Premonstratensian, or White Canons, to whom the abbey belonged,\* and described the leading features of the ruins. The abbey was founded about 1200, and its remains consist chiefly of the church, the chapter-house, the dormitory and refectory, the chapter-house, the dormitory and refectory, and part of the western range, and also of the front of the gatehouse. The church is of special interest on account of the way in which it was enlarged early in the XIVth century, when a new crossing and steeple, with north and south transepts, and an apsidal presbytery were built on to the east of the then existing cruciform church, and connected with it by narrow aisles. At a later date, before the close of the century, the nave was remodelled and furnished with a ribbed vault, with singular vaulting shafts. Mr. Hope referred to the recent judicious stripping of the ivy from the walls by the present Marquess Camden, which enabled various hitherto concealed features to become visible. Mr. Micklethwaite added a few remarks on the difference between the Black and the White Canons, who, in their day, were somewhat analogous of the present time. The Black Canons favoured elaborate ritual at their services, whereas the White Canons of Bayham were more of the Puritan type, and would have scarcely any carving about their buildings. They took care, however, like the Quakers, that what was introduced should be of the best, and the mouldings and architecture were as good here as could be found anywhere in England. After a vote of thanks to the Marquess Camden for allowing them to visit the ruins, the party returned to Tunbridge Wells. In the evening the Mayor and Mayoress held a reception in honour of the visit of the Institute in the Town Hall, where the members of the

\* An illustrated description of the ruins of Bayham Abbey, with a ground plan, will be found in the *Builder* for July 3, 1897.







## THE ROYAL INSTITUTE OF PUBLIC HEALTH.

The following is the conclusion of our report of the Congress of the Royal Institute of Public Health, which was recently held in London:—

## THIRD DAY'S SITTING.

Professor Adams presided over the third sitting of Section D, when further papers were read with regard to the disposal of sewage.

## The Tanking of Sewage.

Mr. F. Wallis Stoddart, who opened the proceedings with a paper on this subject, said the inspection and comparison of a large number of sewage works, all based more or less completely on biological principles, has brought into prominence the fact that there is an imperfectly understood difference in the final results obtained in different places under apparently identical conditions. This had not hitherto received adequate explanation, being usually attributed to some obscure difference between the sewage produced by various communities. Putting aside, however, the comparatively limited number of examples in which the predominance of trade wastes, or other local circumstances, causes the sewage to depart appreciably from the normal, there remains abundant instances of works quite similar in construction and dealing with sewage of purely domestic type, under apparently parallel conditions, where the effect, including in this term both demand for supervision and perfection of final effluent, is by no means uniformly satisfactory, the chief cause of complaint being the production of offensive odours. On carefully tabulating these instances it becomes quite unmistakably evident that the most variable factor is the length of time occupied by the treatment, and the degree of putridity attained by the sewage before arriving at the final stage of oxidation. It is further noticeable that the acuteness of the trouble is in direct proportion to the completeness of putrefaction, and that in cases where the detention of sewage is exceptionally prolonged there is a very abundant production of offensive gases, the effect of filtration is but slight, and the interior of the filter, of whatever type, when dismantled, is found to be occupied to a large extent by a black slime, which coats the particles of the medium with a tenacious and offensive layer, or even fills up the interstices altogether. A consideration of these and other facts led to a series of experiments, having for their object and determination the conditions of working which allow of the most complete destruction of original sewage solids, with a minimum formation of the offensive and otherwise objectionable secondary products. With regard to the construction of the tank the result of the experiments was that the author came to the conclusion that a fixed cover is a disadvantage—it renders the tank more difficult of access, increases the expense, and permits the formation of a thick scum on the surface of the liquid. He also disagreed with the submerged inlet into the tank. As to the rate of flow two series of experiments were undertaken, and, from the first, it was concluded that the most rapid uniform rate at which full-strength sewage could be passed through the tank with the most satisfactory results as regards both destruction of sewage solids and quantity of tank effluent, is insured by providing a tank capacity equal to one-third the day's supply of sewage, or 1 cubic ft. for 20 gals., and that the extreme limits between which satisfactory results can be obtained are 12 gals. and 35 gals. per cubic ft. respectively. The second series of experiments were that in which the maximum rate determined as satisfactory would be adopted as the maximum threefold flow; but in which the actual rate of flow would follow the natural variations, the tank capacity being so adjusted that the average dry-weather flow would be one-third this maximum. The effect of this experiment has been exactly what was desired, and the tank effluent has always been inoffensive and sufficiently free from suspended solids.

## Design and Management of Sewage Disposal Works.

Mr. A. P. I. Cotterell, M.Inst.C.E., F.S.I., then read a paper entitled, "The Developments in the Design and Management

of Works of Sewage Disposal." Speaking generally, he said the commonly accepted practice of to-day might be said to consist of two processes:—First, reduction of the solids by sedimentation, precipitation, or bacterial liquefaction, or by all these combined; followed, secondly, by oxidation of the resultant liquid by means of bacterial agency. There were many varieties of these processes, and, in some cases, the two might be said to intermingle. . . . It seemed strange at first sight that there should be at the present time so many apparently different modes of dealing with a common problem. It was clear, however, that they are all concentrated methods of doing what, in ancient days, the land was expected to undertake, and that they have all been rendered necessary by the concentration of the population in such numbers in particular spots, that land, with its broad and easy-going ways, was no longer capable of doing the work efficiently. Land treatment was still the ideal method of sewage disposal, but it is becoming less and less practicable. There were numerous factors governing the problem which lead to the adoption of one method in preference to another, such as the character of the sewage; its quantity, the quantity and quality of the storm water; topographical considerations; levels and floods; the neighbourhood of tidal waters; the proximity of the population; matters of sentiment, and, last, but not least, the question of cost. With so many factors to be taken into consideration, there was plenty of room for variety in design; but it was striking to notice in the rules laid down how comparatively little attention is paid to the quality of the sewage, and how much more importance was given to the quantity to be treated. Whilst quantity was certainly a most important factor, the quality of the sewage surely required greater attention than had hitherto been bestowed upon it. In his opinion, any rules should be based upon this factor, as well as upon that of quantity, or they should be made sufficiently elastic to allow of the adaptation of each individual installation to its special needs. It was inadvisable to attempt conformity with a fixed rule, supposed to be applicable to all sewage-disposal works alike, no matter what their particular circumstances might be.

Dealing with specific portions of the problem, the author considered the liquefying or preliminary tank process. "If we examine the internal working of an ordinary septic tank constructed to hold one day's dry-weather flow, in accordance with the prevailing rule, it will be found that the deposition of solids takes place in practically the first third of the length nearest to the inlet. In the middle third scarcely any solids collect, whilst in the third nearest to the outlet solids are again thrown down, though in smaller quantity than in the first division. It would appear as if the liquid is fit for filtration after having traversed one-third only of the length of tank usually assigned to it. This would mean that a sedimentation tank only might suffice to bring the liquid into proper condition. Doubtless septic action would thus be minimised, but so long as the sewage is made ready for oxidation, what does that matter? A reduction in the size of the septic tank would be welcome, if only on the score of reduced cost; but it would also mean that the special cultivation of anaerobic organisms is less important than we have been accustomed to consider it, and might be more or less abandoned. Probably none of us would be sorry to do without the small tank too often accompanies anaerobic treatment. If the above view is correct, it is easy to see that the days of precipitation by chemical agency are not yet by any means played out. The way in which chemical precipitation still holds its own in England is a proof of this. Indeed, in many instances it may be said to be the only feasible method, where it is imperative to reduce the sewage to oxidisable conditions in the smallest possible time, or where the adoption of septic methods would make the works altogether too unwieldy. Of course, we cannot touch chemical precipitation or even sedimentation without also having to face the sludge question. In spite of all efforts to abolish it, the sludge question is still with us, and is likely to be. Only in broad irrigation, and not always even there, can it be said to be

eliminated. . . . It is in the oxidising process that the greatest developments have taken place, and are still likely to come. Can oxidation be more efficiently carried out, and, if so, by what means? Developments already made show that by careful selection of the materials a larger quantity of sewage can be purified in a given cubic space. Have we yet got the best materials for the purpose? Large pebbles have been tried, with success so long as the flow was small; clinkers, coal, limestone, layers of slate, and many other media. On the whole, the most successful material has been clinker, because of the large surface it affords for the growth of bacteria. But clinker has also the disadvantage of breaking up too readily. A short time ago an inventor advertised a filter composed of small balls of some indestructible material about 2 in. diameter, claiming by this to obtain a very large surface for bacteria action. Is it possible to hit upon some material artificially made up that shall give the maximum surface within a given cubic space?

The largest possible number of oxidising bacteria should be cultivated by maintaining the maximum surface, and by providing the maximum amount of food that they are capable of dealing with.

The supply of air should be ample, and should circulate in every portion of the filter. So far mechanical systems of introducing air have not been very successful.

The bacteria should be kept regularly at work. Nothing appears to be gained by allowing them periods of rest.

On the other hand, the bacteria must not be overworked or put under conditions where, even for a time, their energies are paralysed.

Every portion of the oxidising or filtering medium should be put to its fullest possible use.

In the application of the liquid any kind of moving mechanism is undesirable, for the reason that all machinery, however simple, is liable to get out of order unless constantly kept under view. In large works, with men on the spot both night and day, the objection does not hold good so much as in small installations, where the cost of annual upkeep bulks largely, and where there is a tendency therefore to reduce all expenses of labour to a minimum.

There should be plenty of elasticity, so as to accommodate considerable variations of flow. In this connexion sewage works should be capable of treating a larger storm flow than they do at present. Ideally, all storm water that comes down through the sewers should be treated to the extent necessary to render it at least equal in purification to the best effluent the works are capable of turning out.

Some arrangement for thoroughly distributing the liquid and keeping it distributed throughout the oxidising medium, whilst at the same time affording the organisms an ample supply of air, would seem to promise best. In the writer's opinion it is in this direction that progress should be encouraged. Then, instead of reducing the present allowable flow of 168 gals. per cubic yd., the Local Government Board will be able largely to increase it, especially when it becomes very dilute, and will thus enable us to reduce the cost of one of the chief items in sewage-disposal works, whilst at the same time improving the efficiency.

As a result of the first interim report of the Royal Commission, the rule laid down by the Local Government Board has been so far modified that final land irrigation may be abandoned so long as the filter is doubled in size. Apparently this may be effected by double contact in the case of contact beds, or double filtration when continuous filters are employed. Surely, however, this is a step in the wrong direction. Instead of reducing the cost of sewage disposal it simply increases it by making the conditions more onerous than before, without necessarily ensuring corresponding efficiency.

In one other respect great development has taken place in sewage-disposal works. Formerly any intelligent labourer was considered to be capable of looking after the business. . . . It is a great advance to have it recognised that the management of sewage disposal must be the work of trained specialists. We may, indeed, welcome the advent of the Association of Sewage Works



Managers, which crystallises this development.

In this connexion it is well to bear in mind that sewage disposal has now been established in a number of small towns and villages, where it is too expensive to provide fully qualified caretakers. A useful development for all such cases would be the grouping of a number of sewage works under a qualified inspector (appointed, say, by the County Council), whose business it should be to pay surprise visits, and to assist and instruct the various managers within his particular area."

Summing up, the author said it might be submitted:—

1. That future development is likely to proceed on the line already adopted.
2. That on account of the many factors governing the problem, no one system is likely to supersede all others.
3. That in the design of sewerage works quite as much attention should be paid to the quality and character of the sewage as to its quantity.
4. That the cost of the preliminary process may probably be reduced—at any rate, so far as septic methods are concerned.
5. That there is no chance of eliminating the sludge question, although there are indications that it may be more and more brought under control.
6. That the oxidising process is capable of further development.
7. That future sewage-disposal works must be much more elastic.
8. That such works must be capable of dealing with most, if not all, the storm water that enters the sewers.
9. That it is essential that the management of sewage-disposal works should be in the hands of thoroughly qualified men.

#### Richmond Sewage Purification Works.

Mr. W. Fairley submitted a paper on "The Sewage Purification Works of the Richmond Main Drainage Sewerage Board," which, in the author's absence, was read by Mr. A. P. Martin. The works are situated at Mordlake, on 11 acres of land adjacent to the Thames. The whole area is enclosed, but about 3 acres are yet available for future extension. The works comprise pumping, station, chemical precipitation appliances and tanks, sludge-pressing plant, filtration areas, bacterial tanks and filters, dock, cottages, stables, etc. The pumping machinery is unusually extensive for the population, amounting to a total capacity of about 36,000,000 gals. in twenty-four hours, in units ranging from 4,000,000 gals. to 14,000,000 gals. In the chemical process the sewage is treated with milk of lime and sulphate of alumina, with the addition at certain times of proto-sulphate of iron or permanganate of potash. The precipitation tanks have a capacity of 1,200,000 gals., and are eleven in number; the dry-weather flow is about 3,000,000 gals. per day; at times of rainfall the flow is increased to 6,000,000 gals., and during heavy rain-storms to 15,000,000 gals. per day, while during short periods the flow often is at the rate of 30,000,000 gals. per day. The tanks can be worked on either the intermittent or continuous system as may be convenient at the time. On being discharged from the tanks the effluent can be delivered into the river by an outfall pipe, or further purified in continuous filtration areas. The sludge from the precipitation process is dealt with by filter presses, and from 6,000 tons to 7,000 tons of pressed cake are produced during a year. The works have now been in operation since 1891, and up to the present have satisfactorily fulfilled all requirements by chemical treatment without complaint of any kind either from the Thames Conservancy or the residents. The recent addition on bacterial lines is meant to decide whether extensions, which are proposed in the near future, will be on the old or more recent process. Experiments made during the past two years show that the effluent from a chemical precipitation process treated in contact filters gives uniform and good results, with considerable economy in the amount of chemicals used.

Dr. Kinnicutt (U.S.A.), in opening the general discussion, agreed with Mr. Stoddart as to the rate of flow of sewage. In America they heard of "over septic sewage," which Mr. Stoddart had explained. The

sewage was often kept so long in the tank that they got a secondary decomposition, which, he thought, should be avoided. The rate of flow entirely depended on the character of the sewage. He could not quite understand why Mr. Stoddart did not believe in the submerged inlet, for he did not see why there should be more disturbance if the inlet was 6 in. below the surface than if it was 6 in. above, and he had found no difficulty with regard to this. In Worcester (U.S.A.) they had a very strong manufacturing sewage containing much free acid, and they were considering whether they should not treat this by chemicals, and afterwards treat the effluent on intermittent filtration beds rather than use septic tanks. That was not because they did not agree with septic tank treatment for ordinary sewage, but with a strong manufacturing sewage chemical precipitation might be the best.

Mr. McDonald (Glasgow) said it used to be said that bacteria treatment annihilated all sludge, but they did not appear to have got rid of it. In Glasgow they tried, experimentally, the bacteria plan, and if they had liked to spend enough money they could have got the sewage to a purity in excess of drinking water. No one, however, would suggest that they should treat sewage on those lines, and if they in Glasgow could produce a degree of purification which the chemist placed as high as 68.8 per cent., and at a cost which compared favourably with the cost of other local authorities, then they were not warranted in applying the more costly method of bacteria treatment after sedimentation.

Mr. Whyatt (Grimsby) took exception to the statement by Mr. Cotterell that there should be a grouping of local authorities, and that the County Council inspector should pay surprise visits and give instructions to the manager. As a matter of fact, the County Council inspectors did pay surprise visits to the works by local authorities, and if they found anything wrong they reported to the County Council. He thought that if the inspector attempted to accept such instructions, and the committee of the local authority, who were responsible, and had to solve the problem, would also object.

Mr. Stewart (Bridgnorth) said that he did not agree with what had been said against bacteria, for they had no sludge to deal with. They had a small grit chamber, which was emptied once in six weeks, but which practically contained nothing but sand. The bacteria treatment, first in the tanks and then on the beds, had been satisfactory to them. He felt, however, that there was a great deal to be learned in respect of how long the liquid should remain in the septic tank. For a perfect sewage he thought they wanted a secondary bed as well as a primary bed.

Mr. A. J. Martin remarked that Mr. Stoddart had given practical information on a subject on which there had been a great deal of theorising, but little practical work. In the Leeds Report the conclusion arrived at was that twelve hours did not give satisfaction, but twenty-four hours did, and thirty-six hours was no better. He thoroughly agreed with Mr. Cotterell that the nature of the sewage, as well as the quantity, ought to be taken into account. Mr. Whyatt said that that was always done. They who were engineers did endeavour to do so, but, unfortunately, the matter did not rest solely with the engineer. The works had to conform with certain requirements of the Local Government Board, and their rules did not take that into consideration. With regard to the annihilation of sludge, he would like to make it clear that the responsible advocates of the bacteria treatment did not make that contention.

The Chairman said that, with regard to the annihilation of sludge, twenty-five years ago he put a cesspool in his grounds which was not ventilated, and at the end of seven years, when it was opened, there was nothing there. He let the house on a seven-years' lease, and when, at the end of that period, the cesspool was again opened, there was nothing there. That was a case in which the sludge entirely disappeared.

Replying to questions, the Chairman said of course this was purely domestic sewage treated in the cesspool.

Mr. Stoddart said undoubtedly such

sewage as Dr. Kinnicutt had spoken of would have to be separately considered, but he felt that domestic sewage was of one character, although it differed in strength and in the degree of putridity in which it reached the works. He thought that too much was made of the individual treatment of individual localities.

Mr. Cotterell said that what he pleaded for was a greater elasticity in regard to the rate laid down for the treatment of localities, and the way to get at that was to take into account the character of the sewage to be treated. With respect to the point raised by Mr. Whyatt, he meant that in a small place they could not afford skilled management, and if they grouped localities together there would be better management at a smaller cost. At present an inspector came down and went away with his thoughts, and the cumbersome process of reporting took place. He thought the aim should be to make sewage disposal as cheap as possible, and thus engaged in this subject ought not to stand too much on their dignity.

#### Sewer Ventilation.

Dr. J. T. Neech (Halifax) opened a discussion on "Sewer Ventilation," and said it was a question which had engaged the attention of engineers for years past, and the ideas held were very diverse. He intended to touch on only one aspect of the subject, that to which he considered sufficient consideration had not been given. It was the emanation of foul-smelling air from sewers which was the chief cause of the necessity for ventilating sewers, and it was not in the main sewers that the largest volume of foul air was present. Sewer air was present in a much greater quantity in the branch sewers. The smaller drains, he thought, were generally made larger than were necessary, and he was of opinion that the ordinary house did not need a drain pipe of the diameter of 6 in. The amount of sewage in an ordinary house did not exceed 100 gals., and a 4-in. drain would dispatch that in about forty seconds. Therefore, house drains were made small, there would be less sewer air to deal with. With regard to the cause of the foul air, an unevenly-laid sewer would, of course, cause it, but sewers, however well laid, were at times filled with it. Dr. Neech proceeded to take Halifax in illustration of his argument, and said that, taking the street gullies and the gullies or traps from the houses, it gave a total capacity of the open gullies of 92,000 gals., and that means that the sewage had to pass through a septic tank of a 92,000-gals. capacity. Would they not be surprised if the air of the sewers was not foul? He advocated that, so far as possible the size and the number of the existing gullies should be reduced, and exhibited a diagram of a trap which contained a smaller quantity of water than that ordinarily used, and which was self-cleaning.

Dr. Weaver (Southport) said that, after dealing for ten years with the problem in Southport, they had solved it by the adoption of Webb's patent lamps. Their policy in future was to close their surface pipes and trust to the lamps. They had reduced their typhoid cases from thirty a year to two this year.

Mr. Whyatt strongly recommended the closing of surface openings in every position. In Grimsby they put up tall ventilating shafts.

Dr. Neech, in reply, said that he had dealt with the subject on the lines of prevention. He agreed with closing all surface openings. With regard to Dr. Weaver's observations, he thought they had better give the system five years' trial before basing definite views on it. He agreed that tall shafts were valuable but sometimes the air descended and mixed with the air people breathed.

#### Destruction of Town Refuse and its Utilization.

Mr. P. Atkinson (Hull) had prepared a paper on this subject, which was read by Mr. Alderman Cohen. The author laid down the following as the necessary conditions for a perfect destructor:—(1) To destroy rapidly all town refuse without committing any offence or possible nuisance; (2) to fuse and reduce the refuse dealt with to the least possible amount of clinkers; (3) to deal with the refuse residue and by-products with the greatest economy and efficiency.



In the new destructor erected in 1901 in Hull these conditions are complied with and successfully carried out. It has now been in operation, working night and day, since February, 1902.

Hull has two destructors. In 1897 a Horsell destructor was erected. During the time that this destructor has been at work, no complaint has been made by the inhabitants of the district in which it is situated of any nuisance arising from it. The work at the present time is carried out by four men, who work one shift of ten hours and are paid at the rate of 6s. 6d. per hour. The number of loads dealt with during 1904 was 10,244, equal to about 10,000 tons, and the working cost was 611. 10s. 7d., or equal to 14.75d. per ton. A second destructor by the same company was put into operation in February, 1902, the total cost being 24,593s., including 4,119s. paid for the site. The number of loads dealt with at this destructor during 1904 was 24,032, equal to about 15,436 tons, and the working cost was 2,137s., or equal to 22.82d. per ton. At present the only use the Hull Corporation are making of the steam generated at this destructor (besides the forced draught) is in connexion with the car-boiler in use at the destructor, the lighting of the destructor by electricity, and the supplying of steam to the Corporation disinfecting station, which is only a few yards away. Such destructors, however, are capable of being utilised for other purposes, and they hoped in the near future to make greater use of them.

Mr. Whyatt said that at Grimsby they disposed of their slag at 1s. 6d. per load, and in these circumstances there was no need to put down plant for slag making.

Mr. Melville (Leeds) remarked that in Bradford they made mortar, and architects there specified for composition mortar, as they would get a good thing.

Mr. Cohen said that at present they were not utilising the Hull destructors for manufacturing purposes.

#### FOURTH DAY'S SITTING.

Professor Adams presided on Tuesday over the fourth and final sittings of Section D, when papers dealing with ventilation and heating, smoke abatement, and fog were discussed.

#### Ventilation and Heating.

A paper on "Ventilating and Heating" was read by Mr. E. G. Rivers, M.Inst.C.E. He said that the supply of air per person per minute was placed by some authorities at 30 cubic ft., while others assert that as much as 50 cubic ft. is required. Personally, he inclined to the opinion that a computation based upon the 30 ft. or minimum scale would suffice very well, if the air was of good quality. Given an enclosed space occupied by a number of persons, the computation as to the change of air, viewed either way—4 ft. at per person, or the change of the cube of the room so many times in the hour became one of simple arithmetic. As to the means by which this change was to be achieved, he had often wondered at the credulity of users of certain appliances for the alleged securing of the required change of air in a building on the principle of so-called "natural ventilation." Without much thought, such appliances were piled into building contracts and were expected to do great things in the change direction, and in a good many cases no provision was made for the admission of air to replace that alleged to be removed. Given a certain wind velocity and means of admitting fresh air, there would probably be an upcast to a certain extent in such appliances, but something totally ineffective for dealing with the change incidental to a considerable occupation. Under winter conditions, with still outer air, there was no upcast, but, on the contrary, a descent of the colder and heavier air into the building.

The concentration of persons in an enclosed space demanded, therefore, a concentrated supply of air, large in volume but low in velocity, and this could not possibly be effected save by mechanical means. In the ventilation of buildings very satisfactory results could be obtained by using fans of suitable type, properly applied, either dealing with the input or the extraction—preferably a combination of both.

As to cleansing and humidifying the incoming air, by cleansing he meant the removal of free carbon and other mechanical impurities chiefly; but in removing these effectually it was fair to assume that at the same time we reduced the presence of the many terrible species of bacteria which medical investigators allege to have discovered, to a harmless minimum. The presence of such bacteria in a place to which a washed fresh air-supply had been given was quite within the bounds of possibility; but if bacteria could not be located in the air-supply, we must look to other sources of origin, when their exclusion altogether might be found to be absolutely impossible. In all properly-designed systems there must be a main air-intake for winter work, and the best position for this was near the ground-level—just sufficiently protected from the entry of heavy impurities by a low wall. From this point the incoming air should be taken into the screen chamber, steam coils being placed between the point of air entry and the screen to guard against the freezing of the washing water in winter-time. The input fan should be placed some distance away from the screen, through which the emulsion of air and water was first drawn, and then propelled into the main airways for heating and distribution. As to the washing-screen, it appeared to him that the points in connexion with a washing-screen might be classified as follows:—

1. That the materials of construction should not be decaying.
2. That the impurities removed from the air should not be retained upon the screen.
3. That the interstices should not allow of the passing of untreated air.
4. That the consumption of water should not be excessive.

The author then described the type of washing-screen which he recommended to the committee appointed to consider the ventilation of the House of Commons, and which had been adopted. Proceeding, he said the next point which called for attention was the warming and distribution of the incoming air. The alleged advantage of the initial heating-battery system did not appeal to him, for the following reasons:—

"It is necessary under this system to have either a battery with a very high temperature upon the elements, which are often inaccessible for proper cleaning or repairs, or else one of very large superficial area. If the former is adopted, the air is likely to be devitalised from overheating, but in this sense the latter is not so objectionable, though a serious loss of thermal units occurs in both cases in the main and distributing flues. (In all systems of flue-distribution, whether of hot or cold air, it is necessary that the flues be constructed of glazed brick, and with ready access for cleaning.) Continuing my observations upon the initial heating-battery system, either of absolute plenum, or combined plenum and exhaust, the question of the velocity of the air passing over the battery is one of vital importance. This is a rock upon which many people come to grief, and the height of absurdity seems to be reached when we hear of such things as 'high velocity plenum.' In such a system the high temperature of the steam units in the battery is speedily lowered on the side of the elements facing the incoming air, and the whole approaches the condition of an air condenser. The passing air is not allowed sufficient time of contact to pick up the thermal units, and the arrangement is therefore inefficient and wasteful. The question of velocities is one to which engineers should devote more attention, and they should keep in mind the intimate relations of cause and effect as applied to these principles. It will be found that the effective collecting of thermal units from a heating surface demands a low velocity comprised within a very limited range, and I venture to think that this reason alone goes a good way towards the condemnation of the initial heating-battery system. As the result of many years' experience and study of the subject, I incline to the opinion that the most economical and efficient arrangement should include the following points: With the air-intake and washing-screen arranged as before described, the input fan would send fresh air into horizontal airways of sufficient size—say, in the basement of a building—and from these controllable distributing-flues would be taken up in the main walls to radiator positions in the rooms to be warmed. In

this arrangement the main airways receive the maximum velocity of the fan discharge—this being subsequently lowered in the distributing-flues. The ventilating radiators would take their inlet-air from these flues, imparting the thermal units at a low velocity. To counteract the chill arising from glass surfaces exposed to the outer air, radiator positions should preferably occur under windows, and under this arrangement warmed fresh air would enter at a low level.

"We now have to consider the direction of the supply, in order to insure an efficient change of air in a room. Taking open-air conditions as a guide, it will be found that air-currents take a horizontal direction, coupled with a tendency to rise slightly from contact with the warm earth in the summer season—of course, at low velocities. When velocities are high, the tendency to rise practically disappears. Fresh air being admitted low down on one side of a room, the direction of the flow should be across the room, and the extraction apertures should be at two levels—one at the same height as the point of entry, and one at the ceiling-line—both communicating with the same extraction-flue.

"The system of fresh air admission at the floor-line in the debating chamber of the House of Commons has been much criticised. It is, perhaps, not an ideal arrangement, and had the chamber been constructed to allow of floor-gratings of large area at each end—these gratings being reserved for inlet and extraction respectively—the passage of air across the chamber would, perhaps, have been better than the present system; of course, the gratings would have been railed off from the walkable floor of the House. However, the present conditions cannot be altered, and, as matters are, the small extent of possible vibration attendant upon walking over the air-inlet gratings is reduced to a veritable minimum by the dilution incidental to the abnormal number of changes of air per hour.

"Extraction of vitiated air requires as much attention as the inlet supply, seeing that without removal no circulation can occur—the truism as to the impossibility of filling an enclosed space beyond its capacity should be borne in mind. With an input fan exercising water-gauge, it might be contended that the warmed, and therefore lighter, air would readily travel through vertical extracting-flues to an egress-point without further assistance; and under summer conditions this might be so, to a certain extent. When, however, we have to face the winter problem, with density and weight in the outer air, we must either increase the plenum input to an objectionable velocity which would affect the heating, or preferably we must supplement the fan input by similar extraction.

"The direction of extraction by water-gauge fan may be either upward or downward—if the latter, a slight increase of power becomes necessary. Undoubtedly the best results have been obtained by a judicious combination of plenum and exhaust. The point sometimes urged against such a system is the cost of installing and working it. To this I would observe that in other countries, notably in the United States, a large percentage of the cost of an important building is devoted to warming and ventilating it—surely the matter should be considered equally important here?

"Hitherto I have dealt with the horizontal system of air-change, which I consider to be the best suited to the majority of cases, when such a system can be applied; but for theatres and other similar places of public assembly, there is no valid objection to the downward plenum system, coupled with ultimate upward extraction *via* flues in the main walls. In this case the ultimate outlet for the vitiated air must be carried well above and away from the inlet, unless the latter is first taken from below. The ancient idea that extraction must necessarily be upward, because heated air rises, must be dismissed from our minds. What we have to keep in view in the case of a theatre is the periodic change of the air without draught to the audience and irrespective of direction. The air admission in the downward plenum system should be over as large an area as possible and at a low velocity; therefore in the construction of a new building this can be best effected by the interposition of a separate roof-space as an equalising chamber. The inconvenience and danger of 'streak' ventilation by the injudicious use of







increase in values analogous to death dues upon granting and renewal of leases. By this method the open spaces of London would then be provided for out of the unearned increment; (3) that in the case of schools and public assembly-rooms of all kinds, provision should be made to admit a standard quantity of fresh air to each person the schools or assembly-rooms are intended to accommodate; (4) a department of public health should be formed with a Minister sitting in the Cabinet.

Mr. Rivers remarked that Sir Oliver Lodge had advocated the electrical dispersion of fog, but he (the speaker) thought it was better to grapple with the thing in its initial stage.

Mr. D. Archibald believed the London fog was, in a great measure, due to the smoke from kitchen chimneys. It was the richer people who burned the bituminous coal, and they ought to be called to book. There was a great deal to be done in the way of the building of flats to get the through ventilation, as suggested by Dr. Lyon, and also get rid of the offensive kitchen smells.

Capt. Carpenter considered that the factories were the worst sinners with regard to smoke, and thought that the improved grates in new houses was helping to remove the evil.

Mr. F. J. Brodie moved, and Mr. Baxter seconded a vote of thanks to the readers of the papers, and this was carried.

The resolution proposed by Mr. Des Vœux was also agreed to, and the sittings of the section concluded.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council took place on Tuesday in the County Hall, Spring-gardens, S.W., Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 1,934*l.* for street-lighting purposes; Camberwell Borough Council 5,500*l.* for works at depot, and 6,667*l.* for works at housing estate and depot, and street improvements; Finsbury Borough Council 1,000*l.* for contribution to street improvements; Hackney Borough Council 21,708*l.* for electric-lighting and street-lighting extensions, etc.; Hampstead Borough Council 5,100*l.* for electricity meters, and 5,000*l.* for housing purposes; Islington Borough Council 27,275*l.* for paving works and sites for public libraries; Lewisham Borough Council 12,452*l.* for sewers; Paddington Borough Council 8,697*l.* for street widening; Paddington Guardians 11,225*l.* for poor law purposes; Shoreditch Borough Council 17,334*l.* for reconstruction and extension of town hall; St. Marylebone Borough Council 150,000*l.* for electric-lighting purposes; Stoke Newington Borough Council 3,000*l.* and 13,750*l.* (sanction) for electric-lighting purposes; Woolwich Borough Council 1,000*l.* for town hall and offices, 10,000*l.* for baths, and 1,030*l.* for advances under the Small Dwellings Acquisition Act, 1899.

**London County Council Westminster Technical Institute.**—On the recommendation of the Education Committee, it was agreed:—  
(a) That the estimate of 24,560*l.* submitted by the Finance Committee be approved.  
(b) That expenditure on capital account not exceeding 24,560*l.* be sanctioned in respect of the erection of the new buildings of the London County Council Westminster Technical Institute.  
(c) That tenders be invited for the erection of the buildings of the London County Council Westminster Technical Institute; and that separate tenders be invited from selected firms for the installation of ventilating appliances.

**Pupil Teachers' Centre, Hilldrop-road Site, Islington, N.**—On the recommendation of the same Committee, it was agreed:—

That the estimate of 5,883*l.* submitted by the Finance Committee in respect of (i) the purchase of the freehold interest of Balson's trustees in the Hilldrop-road site (Islington, N.), and (ii) the claim (exclusive of legal expenses) of Messrs. W. Grear & Son, the contractors, for the erection of the centre, be approved.  
That expenditure on capital account not exceeding 5,883*l.* in respect of (i) the purchase of the freehold interest of Balson's trustees in the Hilldrop-road site (Islington, N.), and (ii) the claim (exclusive of legal expenses) of Messrs. W. Grear & Son, the contractors, for the erection of the centre, be sanctioned; and that a notice to treat be served upon Balson's trustees immediately after the Royal Assent is given to the General Powers Bill.  
That the Education Committee be authorised to arrange for the settlement of the claim of Messrs. Grear & Son so soon as the Royal Assent is given to the General Powers Bill; and that instructions be given to the contractors to complete the erection of the building in accordance with the plans and specification.

**School, Wandsworth.**—The Education Committee recommended:—

(a) That the estimate of 22,333*l.* submitted by the Finance Committee in respect of the erection of a school to provide accommodation for 940 children on the Sellincourt-road site (Wandsworth) be approved.

(b) That expenditure on capital account not exceeding 23,204*l.* be sanctioned in respect of the erection of a school on the Sellincourt-road site (Wandsworth); that the erection of the building be carried out without the intervention of a contractor; and that the drawings, specification, quantities, and estimate of 21,200*l.* be referred to the Works Committee for the purpose.

The recommendations were carried.

**The Works Committee.**—On the reception of the report of the Works Committee submitting the statement of works completed during the half-year ended March 31 (for details, see our issue for July 22).

Mr. E. White said that there was very little to find fault with in the management of the Works Committee now, and he congratulated them on what had been accomplished. There was no evidence, however, that, if the whole sum involved in present undertakings was reported upon, it would not alter the result, but he hoped it would not.

Mr. Burns, M.P., said that the question of the Works Department was a closed incident now, and the Department was a recognised institution.

Mr. Torrance (Chairman of the Committee) said that they got good work for the wages paid. He believed in London doing as much of its work as was possible, because he believed that, in that way, the work would be better done.

The report was then adopted.

**Waterloo Bridge Lamps.**—The Bridges Committee reported that, after consultation with Mr. George Frampton, R.A., and Sir William Richmond, R.A., they had decided to recommend that the original bronze gas lamp-standards on Waterloo Bridge should be reinstated in place of the electric-light standards put up some years ago. Further, that the standards should be adapted for incandescent light, the cost of making the change being estimated at 650*l.* It was claimed that the reversion to the old standards, besides having the effect of bringing the lighting arrangements into keeping with the structure of the bridge, would result in a considerable annual saving of cost, while the light would be equally good.

Mr. Burns, M.P., said he had not succeeded in finding out who was responsible for removing the lamps. The lamps, which were an integral part of the beauty of the bridge, were needlessly removed.

Mr. Horniman said it was the duty of the Council, not only to improve London, but to keep what it possessed of beauty.

The recommendations of the Committee were agreed to.

**Banstead Asylum.**—The Asylums Committee reported that in March, 1904, the Council voted a sum of 1,000*l.* for the preparation of preliminary plans, etc., in connexion with the erection of permanent buildings at the Banstead Asylum to accommodate 300 male patients, to replace the existing temporary buildings. The proposal is to construct permanent one-story buildings of similar design to the temporary buildings, utilising the present foundations and also, as far as possible, the joinery work, sanitary fittings, gas and water services, heating system, rainwater pipes, drains, etc. An estimate had been prepared by Messrs. J. G. Mann & Son, quantity surveyors, amounting to 25,933*l.*, based upon 6½*d.* per foot cube (85*l.*, 8s. 10*d.* per bed). The approximate estimate of the asylum's engineer, however, is based upon 7½*d.* per foot cube, and amounts to 30,763*l.* (102*l.*, 10s. 10*d.* per bed). The Committee recommended, and it was agreed:—

(a) That the estimate of 30,763*l.* to be submitted by the Finance Committee for the erection of permanent buildings at the Banstead Asylum, to accommodate 300 male patients, to replace the temporary buildings there, be approved.

(b) That expenditure not exceeding 30,763*l.*, based on the figures of the asylum's engineer, be sanctioned for the erection of permanent buildings at Banstead Asylum to accommodate 300 male patients.

**New Fire Station in Substitution for the Knightsbridge Station.**—The Fire Brigade Committee recommended, and it was agreed:—

(a) That the estimate of 14,609*l.* submitted by the Finance Committee in respect of the erection of the new Knightsbridge fire-station, be approved.

(b) That expenditure not exceeding 14,350*l.* be authorised in respect of the erection of the new Knightsbridge fire-station.

(c) That expenditure not exceeding 250*l.* be authorised for the taking out of quantities of the work to be done in connexion with the erection of the new Knightsbridge fire-station.

**Housing: New King's-road Site, Fulham.**—Erection of Bearcroft-buildings.—The Housing of the Working Classes Committee recommended, and it was agreed:—

(a) That the estimate of expenditure on capital account of 10,475*l.*, submitted by the Finance Committee, be approved in respect of the erection of Bearcroft-buildings, in New King's-road, Fulham, for the accommodation of persons of the labouring class to be displaced by the Council in connexion with the Fulham Palace-road and High-street improvement.

(b) That expenditure not exceeding 10,475*l.* be sanctioned in respect of the erection of Bearcroft-buildings, New King's-road, Fulham, together with all expenses incidental to the work.  
[The dwellings will contain accommodation for 220 persons in ten tenements of two rooms and thirty tenements of three rooms.]

**London-street Site, Ratcliff.**—Erection of Bekesbourne-buildings (first section).—The same Committee recommended:—

(a) That the estimate of expenditure on capital account of 17,650*l.*, submitted by the Finance Committee, be approved in respect of the erection of the first section of Bekesbourne-buildings in London-street, Ratcliff, for the accommodation of persons of the labouring class to be displaced by the Council on the north side of the Thames through the construction of Rotherhithe Tunnel.

(b) That expenditure not exceeding 17,650*l.* be sanctioned in respect of the erection of the first section of Bekesbourne-buildings, London-street, Ratcliff, together with all expenses incidental to the work.

The recommendations were carried.

**Garden-row Area, St. Luke.**—Erection of Chadworth-buildings.—They also reported as follows:—

"The Garden-row, etc., scheme provides for the clearance of four insanitary areas known as Garden-row, Roby-street, Ballio-street, and Honduras-street areas respectively in the parish of St. Luke, Finsbury, and the Council is under obligation to erect dwellings for the accommodation of 1,193 persons of the working classes displaced. The Roby-street area was first cleared, and dwellings containing accommodation for 496 persons have since been provided on the site. Upon the completion of those dwellings steps were taken, with the approval of the confirming authority, to demolish the buildings on the Garden-row area, and as this work has been completed the Council is now in a position to proceed with the erection of working class dwellings upon the site. The dwellings, which will be known as Chadworth-buildings, will contain accommodation for 720 persons in fifty-eight tenements of two rooms, sixty-seven tenements of three rooms, and nine tenements of four rooms, one three-roomed cottage, and one four-roomed cottage. The buildings, which will have frontages to Central-street and Lever-street, will also contain nineteen shops. We think it desirable, however, that the work of fitting up the shops should not be included in the specification for the erection of the main building, so that fittings may be supplied to suit the requirements of intending tenants, and the settlement of the account for the building work may not be unduly delayed. Being of opinion that the work of erecting the dwellings should be executed without the intervention of a contractor, we asked the Works Committee whether they were prepared to undertake it at the amount of the estimate, viz., 34,900*l.*, and the Works Committee have expressed their willingness to do so. The estimate submitted to the Finance Committee contains sufficient provision to meet the cost of fitting up the shops and other incidental expenses. We recommend:—

(a) That the estimate of expenditure on capital account of 40,135*l.* submitted by the Finance Committee, be approved in respect of the erection of Chadworth-buildings, Garden-row site, St. Luke, Finsbury, for the accommodation of persons of the labouring class displaced by the Council under the London (Garden-row, etc., St. Luke) Improvement Scheme, 1899.

(b) That expenditure not exceeding 40,135*l.* be sanctioned in respect of the erection of Chadworth-buildings, Garden-row site, St. Luke, Finsbury, together with all expenses incidental to the work; that the work of erecting the buildings be carried out without the intervention of a contractor; and that the working drawings, specification, bills of quantities, and estimate of 34,900*l.* be referred to the Works Committee for that purpose.

The recommendations were agreed to.

**Tramways.**—The Highways Committee recommended:—

"That the estimate of expenditure on capital account of 53,394*l.*, made up of the undermentioned amounts, submitted by the Finance Committee, be approved in respect of the equipment of the tramways from the Strand, via the tramway-subway, to Theobalds-road, and the reconstruction and equipment of the tramways in Theobalds-road between the present tramway terminus and the authorised tramways in Rosebery-avenue, near Gray's-inn-road, namely:—

Rolling stock	£33,000
Trackwork	19,570
Cables, switchboards, etc.	5,024
Lighting, etc.	1,500
	£59,394

That the Highways Committee be authorised to make any necessary arrangements with the North



Metropolitan Tramways Company for the electric working, as a through route, of the tramways in the tramway-subway between the Strand and Southampton-row, and of the tramways between Theobald's-road and the "Angel," Islington.

That capital vote of 400l. approved on July 14, 1903, in respect of preliminary expenses in connexion with the erection of the Jew's-row (Wandsworth) carshed, be cancelled.

That the estimate of expenditure on capital account of 53,630l., submitted by the Finance Committee, namely, 37,810l., in respect of the rebuilding of the tramways carshed at Jew's-row, Wandsworth, and 15,820l. in respect of the erection of sub-stations at Battersea and Wandsworth, for the electrical working of portions of the London County Council Tramways, be approved.

That expenditure on capital account of sums not exceeding 36,810l. in all, be sanctioned in respect of (1) the rebuilding of the Jew's-row, Wandsworth, carshed of the London County Council tramways; (2) the execution of paving works, the laying of rails and the construction of conduits in, and in connexion with, the carshed; and (3) the wiring and fitting of the carshed for electric lighting, etc.

That the erection of the superstructure of the tramways carshed at Jew's-row, Wandsworth, be carried out without the intervention of a contractor, and that the drawings, specifications, and estimate of 29,000l. be referred to the Works Committee for that purpose.

That the paving works, the laying of the rails, and the construction of the conduits required for the Jew's-row, Wandsworth, carshed be done by the Council's permanent way staff under the supervision of the chief officer of tramways.

That the wiring and fitting of the Jew's-row, Wandsworth, carshed for electric lighting, etc., be done by the electrical staff of the tramways department, under the supervision of the chief officer of tramways.

That expenditure on capital account, of sums not exceeding 15,820l. in all, be sanctioned in respect of (1) the erection of the Battersea and Wandsworth sub-stations of the London County Council tramways; (2) the wiring and fitting of the buildings for electric lighting, etc.; and (3) the execution of the paving works in connexion with the sub-stations.

That the erection of the Battersea and Wandsworth sub-stations be executed without the intervention of a contractor, and that the drawings and specifications and estimates of 6,250l. and 7,560l., respectively, be referred to the Works Committee for that purpose.

That the paving works, etc., in connexion with the Battersea and Wandsworth sub-stations be executed by the Council's permanent way staff, under the supervision of the chief officer of tramways.

That the wiring and fitting for electric lighting, etc., of the Battersea and Wandsworth sub-stations be executed by the electrical staff of the tramways department, under the supervision of the chief officer of tramways.

That the estimate of 30,000l. of expenditure on capital account, submitted by the Finance Committee, in respect of the construction of the foundations and the erection of the chimneys for the second portion of the Greenwich electricity generating station be approved.

That expenditure, on capital account, not exceeding 30,000l. be sanctioned in respect of the construction of the foundations and the erection of the chimneys for the second portion of the Greenwich electricity generating station.

That the drawings, specifications, and estimate of 28,000l. for the construction of the foundations and the erection of the chimneys for the second portion of the Greenwich electricity generating station be referred to the Works Committee, with a view to the execution of the work without the intervention of a contractor.

That authority be sought in the session of Parliament of 1906 to confer upon the Council the powers included in the London County Council (Tramways) Bill, 1905, namely:—

Construction of tramways from the Westminster Bridge-road terminus via Westminster Bridge, Victoria Embankment, and Blackfriars Bridge, to the Blackfriars-road terminus, with the necessary junctions.

Extension of the tramways in the tramway-subway from the Strand to join the aforesaid lines near Waterloo Bridge.

Diversion of a portion of the tramway-subway near Waterloo Bridge.

Construction of electric tramways over the new Vauxhall Bridge.

Construction of tramways from the county boundary near the junction of Crystal Palace-parade and Anerley-road, via Crystal Palace-parade, to a point near the central transept entrance to the palace.

Diversion of a portion of the tramways from Lewisham High-road to Forest Hill via Standon Park, instead of along a portion of Brockley Rise, and

Construction of such of the new tramways authorised by the London County Tramways Act, 1900, the powers in respect of which have not yet been exercised.

That authority be sought in the session of Parliament of 1906 to enable the Council to construct loop-lines along Curtain-road and Harwar-street respectively, as alternative routes to single line sections of the existing tramways in Old-street and Kingsland-road.

That, subject to the approval of the estimate of 59,394l., submitted by the Finance Committee, expenditure on capital account, not exceeding 17,068l., be sanctioned for the execution of the road-work in connexion with the reconstruction of the tramways in Theobald's-road between the existing terminus and Rosebery-avenue.

That expenditure, on capital account, not exceeding 1,421l., be sanctioned, in respect of the electrical equipment of the trackwork of the tramways from Holborn Town Hall via Rosebery-avenue and St. John-street-road to the "Angel," Islington.

That the offer of Messrs. J. Mowlem & Co.,

Limited, to execute, as an addition to the work under the contract entered into with them under the resolution of January 31, 1905, for the construction of tramways along Rosebery-avenue and St. John-street-road (1), the road-work (exclusive of the supply of special works) in connexion with the reconstruction of the tramways in Theobald's-road, between the present terminus and Rosebery-avenue, and (2), the electrical equipment for the avenue, and (3), the electrical equipment for the trackwork of the new tramways from Holborn Town Hall via Rosebery-avenue and St. John-street-road to the "Angel," Islington, be accepted.

That, subject to the approval of the estimate of 59,394l., submitted by the Finance Committee, expenditure on capital account, not exceeding 5,355l., be sanctioned for the supply of the special trackwork required for the reconstruction of the tramways in Theobald's-road, between Rosebery-avenue and the existing terminus.

That the offer of the Hatfield Steel Foundry Company, Limited, to supply for the sum of 8,356l. the special trackwork for the tramways from Rosebery-avenue, via Theobald's-road and the tramway-subway, to the Strand, be accepted.

That the Highways Committee be authorised to obtain sixteen single-deck cars for use on the through tramways route between the Strand and the "Angel," Islington.

That the operation of standing order No. 23, which requires that all tenders where the estimated expenditure exceeds 500l. shall be opened by the Council by the chairman, be suspended so far as regards the tenders for the supply of thirty-four single-deck electric cars for use on the through tramways route between the Strand and the "Angel," Islington.

That, subject to the approval of the estimate of 59,394l., submitted by the Finance Committee, expenditure on capital account, not exceeding 1,500l., be sanctioned in connexion with the wiring and fitting for electric lighting of the tramway-subway between the Strand and Southampton-row.

The various recommendations were agreed to.

**Westminster Improvement—Paving, etc.**—The Improvements Committee recommended, and it was agreed:—

(a) That the working drawings, bills of quantities, specification, and estimate of 4,100l. for the paving, etc., of the new street between the Blackfriars-road and St. John-street, be formed in connexion with the Westminster improvement, authorised by the London County Council (Improvements) Act, 1900, be approved, and be referred to the Works Committee, with a view to the works being executed without the intervention of a contractor.

(b) That the employment of a clerk of works in connexion with the paving, etc., works in the new street between Blackfriars-road and Smith-square, be authorised at a cost not exceeding 75l.

**Main Drainage Extension—Northern Low-level Sewer No. 2—Section West of Counter's Creek Sewer.**—The Main Drainage Committee recommended, and it was agreed:—

(a) That the estimate of 19,600l., submitted by the Finance Committee for the construction of the portion of the northern low-level sewer No. 2, west of Counter's Creek sewer and for general incidentals, be approved.

(b) That expenditure not exceeding 17,000l. be sanctioned for the construction of the portion of the northern low-level sewer No. 2, west of Counter's Creek sewer, that the work be done without the intervention of a contractor; and that the drawings, specification, and estimate of 17,000l. be referred to the Works Committee for that purpose.

(c) That expenditure not exceeding 2,500l. be sanctioned for general incidental expenses, including the cost of the employment of assistant engineers, and the cost of the inspection required in connexion with the supervision of the work.

**Bridge over Surrey Canal, Neate-street, Camberwell.**—On the recommendation of the Parliamentary Committee, it was agreed that, on the understanding that the Council of the Metropolitan Borough of Camberwell will defray the cost involved, and render all necessary assistance, Parliamentary powers be sought in the session of 1906 to enable the borough council to expend an additional 1,200l. in the construction of a bridge over the Grand Surrey Canal between St. George's-road and Neate-street, Camberwell.

**Limehouse Pier.**—The Rivers Committee recommended, and it was agreed:—

"That, subject to the approval of the Thames Conservancy being obtained to the proposed construction of a Limehouse Pier, the offer of the Westminster Construction Company, Ltd., to carry out the work in connexion with the construction of the pier for the sum of 3,294l. as an extra on their existing contract in respect of Millwall, Hammer-smith (Wells-road), Putney, Wandsworth, Battersea-square, and Nine Elms piers be accepted."

**Theatres, etc.**—The Theatres and Music Halls Committee submitted several applications in regard to theatres, etc., and consent was given in the following cases:—

"To Messrs. Blow & Billery (reconstruction of the auditorium at the Avenue Theatre); to Mr. A. C. O. (alterations at the Café Vandeville, Strand); to Messrs. E. Runtz & Ford, for Mr. G. Edwards (for rearrangement of stalls seating at Daly's Shoreditch Town Hall)."

**Victoria-embankment—Remodelling, etc.**—The Bridges Committee recommended, and it was agreed:—

"That expenditure, not exceeding 3,250l., be

sanctioned for the remodelling of the carriage-way and for certain repairs to the footways of the Victoria-embankment; that the work be executed by the Council without the intervention of a contractor; and that the specification, drawings, and estimate be referred to the Works Committee for that purpose."

**Bethnal Green Fire Station—Enlargement and Alteration.**—On the recommendation of the Fire Brigade Committee, it was agreed:—

"That the estimate of 5,525l., submitted by the Finance Committee in respect of the enlargement and alteration of the Bethnal Green fire-station, be approved."

That the tender of Messrs. J. & V. May to provide a hot water installation at the Bethnal Green fire-station for 229l. 10s. be accepted; that the tender do prepare and obtain the execution of the necessary contract; and that the seal of the Council be affixed to the contract when ready."

**New "Morning Post" Office.**—The Improvements Committee recommended:—

"That approval be given under section 13, of the London County Council (Improvements) Act, 1899, to the Strand and Aldwych elevations, the exterior design of the building to be erected by Lord Glenesk, for the reinstatement of the Morning Post premises, as shown upon the plans presented to the Improvements Committee July 26, 1905."

Mr. Lewin Sharpe suggested that some representation should be made to the architect to treat the building other than by erecting a dome, seeing that it was so near the Grand Theatre.

Capt. Hemphill, in reply, said he had been in negotiation with the proprietors for some time. The building had been much improved; the dome was much better than originally proposed; the building was to be of granite, and would probably be one of the finest in London.

The recommendation was agreed to, and the Council adjourned for the summer holidays soon after nine o'clock until October 10.

## Illustrations.

### WESLEYAN HALL COMPETITION DESIGN.

**W**IN this scheme the architect endeavours to fulfil the requirements as set forth in the particulars of competition without allowing them to interfere with the monumental character of the building.

In setting out the plan the position of the main hall was fixed central on site, with the main axis east and west, being carried up so as to form the centre feature of the block, and the subsidiary apartments were grouped round about.

The main entrance to the great hall was arranged from Princes-street, leading to the entrance-hall, with retiring-rooms on either side, and the main stairs adjoining both crush at end of the great hall on the first floor, which was flanked by a general reading-room and conference hall, doors being provided out of the same so that in case of large receptions the whole area of the site except the portion reserved for letting office at the back, was available for these functions. Off the crush hall, stairs leading to the communication corridor linking up the galleries were provided, and special consideration was given to exits from the same. The main hall and reference library were placed over crush to main hall, with committee-rooms and departmental offices over.

The estimated cost of the building was 125,765l. E. VINCENT HARRIS

### SKETCHES WITH THE ARCHITECTURAL ASSOCIATION IN NORMANDY.

THESE sketches are given in connexion with the excursion to Normandy of the Architectural Association, which has just taken place, and they were to have accompanied a report in this issue by one of the party. Up to the time of going to press our contributor's copy has not arrived, though it was posted to us on Tuesday night. Next week, when we shall publish other sketches, we hope to give an account of the excursion.

**AN AMERICAN ACADEMY AT ROME.**—From a paragraph in an Italian paper we learn that the Americans are about to found an American academy at Rome, on the same lines as that the French academy at the Villa Medici. In America follows the French lead in everything connected with art.



## APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

*Lines of Frontage and Projections.*

**Deptford.**—Two iron and glass shelters at the "New Cross Empire" Music Hall, to abut upon New Cross-road and Watson-street, Deptford (Messrs. F. Matcham & Co.).—Consent.

**Marylebone.**—East.—Residential flats, with bay windows, upon the site of Nos. 79 to 105 (odd numbers only) inclusive, Park-road, Regent's-park (Sir Arthur Blomfield & Sons for Mr. H. Johnson). [Taken back in order that a map may be prepared to show what is proposed.

*Width of Way.*

**Southwark.** West.—Cottages on the eastern side of Bear-lane, Southwark (Mr. W. C. Jones for Messrs. Armstrong, Whitworth, & Co.).—Consent.

*Lines of Frontage and Construction.*

**Finsbury.** Central.—An addition to an iron gangway connecting the first floors of Nos. 87, 88, and 89, Turnmill-street, and No. 3, Printer's-buildings, Broad-yard, Finsbury (Mr. R. A. Jack for Messrs. K. S. Murray & Co.).—Consent.

*Lines of Frontage and Projections.*

**Strand.**—Iron and glass shelters in front of the Waldorf Theatre, Aldwych, and Catherine-street, Strand (Messrs. Jones & Willis, Ltd.).—Consent.

**Strand.**—Oriental windows and a balcony and porches to Nos. 166 to 173, Piccadilly (Mr. W. Woodward).—Consent.

**Hampstead.**—An iron and glass porch at No. 20, Lyndhurst-road, Hampstead (Mr. T. Wilson for Mr. J. Van den Bergh).—Consent.

**Kensington.** South.—New buildings of a porch at the angle of High-street and Horton-street, and a porch at the angle of High-street and Campden Hill-road, Kensington (Messrs. Chesterton & Sons for Messrs. C. A. Daw & Son).—Consent.

**Kensington.** South.—One-story shops on part of the forecourt of Nos. 24 and 26, Harrington-road, Kensington (Mr. F. E. Williams for Lord Ashburton).—Consent.

**Kensington.** South.—One-story shop on part of the forecourt of No. 28, Harrington-road, Kensington (Mr. F. E. Williams for Lord Ashburton).—Consent.

**Lewisham.**—An iron and glass covered way in front of No. 153, High-street, Lewisham (Mr. A. L. Guy).—Consent.

**Lewisham.**—Porches to sixteen houses on the west side of Birkhall-road, Hither-green (Messrs. Norfolk & Prior for Mr. W. Rolfe).—Consent.

**Paddington.** South.—Erection at No. 37, Gloucester-square, Paddington, to abut upon Radnor-place, of a water-closet addition on the basement and ground story, a projecting bay-window on the ground floor, and a projecting enclosure to a water-closet on the second floor (Messrs. Waring & Gillow for Mr. C. Oliverson).—Consent. (The erection of the proposed water-closet on the lead flat at the second floor level.—Refused.)

**Strand.** A building with architectural projections and a balcony on the site of St. Philip's Chapel, Regent-street (Mr. F. E. Williams for Mr. J. W. Lovell).—Consent.

**Wandsworth.**—Porches to a pair of semi-detached villas, on the west side of Enmore-street, Putney (Mr. J. C. Radford for Mr. W. H. George).—Consent.

**Wandsworth.**—A porch and sham half-timber work to a detached house on the east side of Elm-road, Putney (Mr. J. C. Radford for Mr. E. R. Parry).—Consent.

**Hammer-smith.**—A building upon a site abutting upon the southern side of Dalmeida-gardens and the western side of Bracewell-road, Hammer-smith (Mr. A. Dawkins for Mr. P. Tnekhham).—Refused.

**Islington.** East.—Four one-story shops on a piece of the eastern side of Arvon-road, Islington (Messrs. F. Chambers & Sons).—Refused.

**Woolwich.**—A one-story shop on part of the forecourt of No. 2, Wellington-street, Woolwich (Mr. E. H. Wright for Messrs. Dent, Ltd.).—Refused.

*Width of Way.*

**Stepney.**—A one-story building at the rear of No. 12, Heath-street, Stepney, with external walls at less than the prescribed distance from the centre of the roadway of Old Church-road (Mr. W. E. H. Crawley for Mr. L. Cooperstein).—Consent.

**Kensington.** North.—For the retention of a one-story building on a site abutting upon Walmer-road and Beckwith-place, Kensington (Mr. W. K. Renshaw).—Consent.

*Width of Way and Lines of Frontage.*

**Hendon.**—Four workshops in Providence-

place, Scruton-street, Hoxton (Mr. G. H. Lovegrove for Mr. R. Darby).—Consent.

**Hampstead.**—An iron and glass covered way in front of "Normanhurst," Priory-road, West Hampstead, to abut upon Canfield-gardens (Messrs. Baker & May for Mr. F. P. Scholte).—Consent.

*Line of Frontage and Construction.*

**Poplar.**—The erection over a street leading out of the west side of Emmet-street, Poplar, of an iron gangway to connect the premises of Messrs. Venesta, Ltd., with the premises of the Aberdeen Steam Navigation Company (Fireproof Company, Ltd., for Messrs. Venesta, Ltd.).—Consent.

*Width of Way, Line of Frontage and Space at Rear.*

**St. George.** Hanover-square.—Buildings on a site abutting upon a new street, to lead out of Ebury-street, and also upon Grosvenor-gardens-mews, North, Piccadilly (Mr. A. F. Faulkner for Mr. Willett).—Consent.

*Formation of Streets.*

**Wandsworth.**—That an order be issued to Mr. W. N. Dunn sanctioning the formation or laying out of new streets for carriage traffic, to lead out of the north side of Streatham-common North to Deepdene-road, Wandsworth, and in connexion therewith the widening of portions of Streatham-common North and Deepdene-road (for Mr. H. N. Grenside).—Consent.

**Dulwich.**—That an order be issued to Mr. C. E. Bary sanctioning the formation or laying out of a new street for carriage traffic, to lead from Dulwich-village to Turney-road, Dulwich (for the Governors of Alley's College).—Consent.

**Kensington.** North.—That an order be issued to Messrs. Trant Brown & Humphreys sanctioning the formation or laying out of new streets for carriage traffic on the St. Quintin Estate, Quintin-avenue, Kensington (for Mr. W. H. St. Quintin).—Consent.

**Greenwich.**—That an order be issued to Messrs. Crickmay & Heath, refusing to sanction the formation or laying out of a new street for carriage traffic to lead out of the south side of the Westcombe-park-road, to the east side of Mycenaroad, Greenwich (for Mr. W. C. Johnson).—Refused.

**Wandsworth.**—That an order be issued to Mr. A. Wiggins refusing to sanction the formation or laying out of new streets for carriage traffic on a site abutting upon the east side of Trinity-road and the south side of Upper Tooting-park, Wandsworth, and in connexion therewith the erection of buildings upon such site.—Refused.

*Space at Rear.*

**Lewisham.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of four houses on the western side of Wallbuton-road, Brockley, with irregular open spaces at the rear (Mr. T. H. Sawyer).—Consent.

**Lewisham.**—A modification of the provisions of section 41 with regard to open spaces about buildings so far as relates to the proposed erection of a building on the eastern side of Gethersham-road, Honor-oak-park, with an irregular open space at the rear (Mr. G. Dunsmure for Messrs. Dunsmure Brothers).—Consent.

*Deviation from Certified Plans.*

**Strand.**—Certain deviations from the plan certified by the District Surveyor under section 43 of the Act, so far as relates to the proposed rebuilding of No. 3, Lower John-street, Golden-square (Mr. W. Lockwood for Mr. J. Madge).—Refused.

*Cubical Extent.*

**Kennington.**—For the erection at Beulah Laundry, South Lambeth-road, Kennington, of a building exceeding in extent 250,000 but not 450,000 cubic ft. (Messrs. Treadwell & Martin for Messrs. Rogers & Cook).—Refused.

**Battersea.**—An addition to a machine shop at Ransomes-wharf, Wellington-road, Battersea, and the omission of a layer of concrete over the site of such machine-shop (Messrs. Drew Bear, Perkins, & Co., Ltd.).—Consent.

The recommendations marked † are contrary to the views of the local authority.

## HOSPITAL EXTENSION, MILTON, HAMPSHIRE.—

On the 29th ult. the foundation-stone of the new block which is to be added to the Infectious Diseases Hospital at Milton was laid. The building will contain two main wards, with twelve beds each, together with four "acute" wards and an observation ward. There will also be accommodation for the nurses, while the heating will be accomplished by means of hot-water pipes and radiators with Manchester stoves. The contractor for the work, as well as for the building of a boundary wall, is Mr. M. Coltherup. The plans were prepared in the office of the Borough Engineer, Mr. C. W. Ball dealt with the quantities, and Mr. Burr is the clerk of the works.

## Correspondence.

## THE LATE MR. JOSEPH FOSTER, M.A.

SIR,—Though I never had the pleasure of knowing the late Mr. Joseph Foster, M.A., the learned genealogist and antiquary, whose death is just announced, it is well not to forget that if any man ever did enjoy (?) the honour of suffering no little ill-merited criticism for trying to speak the truth, it surely was he. Anyone who possesses a copy of his "Peerage and Baronetage" may live to be assured of its value if kept long enough! Whatever may be thought of his wide learning as a genealogist, there cannot, I think, be two opinions that, for bravely-drawn heraldries, that book has rarely, if ever, been beaten, and his pages, showing the descent of Queen Victoria, and others, teem with interest to all lovers of historical science; my own copy, 1881, now all to pieces with much usage, is a silent testimony of the deep interest it has afforded myself, and all I can now do is to try and keep his memory green by placing it on record. That such a costly and laborious effort should not have been continued year by year is, I believe, solely due to the preference for romance to reality, though, so far as I know, even disputed points in his "Chaos" were never given to the public as final, but were expressly described by him as tentative only. He was a nephew of Birkett Foster, and himself a descendant of an old family.

E. SWINFEN HARRIS.

## The Student's Column.

## STEAM BOILERS AND PIPES.—V.

## FEED-WATER HEATING (continued).

IN addition to increasing the productivity of a steam boiler, the employment of feed water at a temperature approaching that within the boiler itself has an important effect in minimising the alternate expansion and contraction, which would otherwise cause serious strains to the structure and materially shorten its life.

So great are the advantages of employing feed water at a temperature nearly approaching the boiling point corresponding with the pressure adopted, that live steam is more economical than exhaust steam as a heating medium. This result appears somewhat paradoxical, yet the facts are beyond dispute.

Many years ago Mr. James Weir proved that fuel could be saved by heating feed water with steam taken from the first intermediate receiver of a triple-expansion engine. Later, Mr. John Kirkaldy demonstrated the economy to be secured by heating feed water with live steam drawn direct from the boiler. In spite of arguments intended to show the absurdity of these methods, both of them have been largely applied to marine and land boilers with admittedly beneficial results.

Mr. Druiitt Halpin afterwards introduced the "thermal storage" system of dealing with feed water for boilers. The apparatus required for this system is very simple, consisting essentially of a cylindrical water vessel fixed above the boiler and connected with it by a stand-pipe of suitable diameter. This pipe forms a permanent connexion between the steam space of the boiler and the storage cylinder, so that the pressure and temperature in both are always equal. All feed water is introduced through the storage cylinder, where it is heated to full boiler temperature by passing through the steam. Water enters the boiler through a feed-regulating cock, which is operated by means of a spindle passing through the front end of the cylinder. During times of light load the cylinder can be filled up, when the water is heated by live steam, represented in great part by the surplus steam that, in ordinary circumstances, would blow off from the safety valve. The heat so stored is returned to the boiler in the feed water when the demand for steam again becomes heavy.

It is easy to understand that the conservation and restoration of heat in this way must result in economy during a certain limited number of hours daily, but not so easy to see why the apparatus should be able to effect the important savings during continuous work which have been obtained in practice.

The first thermal storage plant on Mr. Druiitt Halpin's system was installed above two Cornish boilers in a large London hotel,



where steam was required for electric light and laundry engines, pumps for hydraulic lifts, cooking and heating apparatus, and hot-water supplies. Each boiler measured 26 ft. 6 in. long by 5 ft. 6 in. diameter, and the storage cylinder measured 25 ft. long by 4 ft. diameter. Before thermal storage was adopted the boilers were evaporating 10 lb. of water per pound of coal from and at 212 deg. F.

Two series of trials were made under the direction of Professor Unwin for the purpose of comparison, each series extending over one week. During the first trials one of the boilers was worked in the ordinary manner and the other was shut down. All coal was weighed, and the feed water measured by a Schönhayder meter. During the second trials the other boiler was taken into service and fed through the thermal-storage cylinder. Readings of the electrical output, records of lift journeys, and estimates of power and heat used in the laundry and elsewhere in the hotel indicated that the requirements of the two weeks were practically equal. The results ascertained by Professor Unwin were certainly surprising, for they showed that the saving of coal during the second week amounted to no less than 19.7 per cent.

Some equally remarkable results have been obtained more recently by Mr. H. W. Miller, M.Inst.C.E., by applying the thermal-storage system to watertube boilers capable of evaporating 12,000 lb. of water per hour. After the thermal-storage apparatus had been fitted it was found that the same boilers were able to generate as much as 25,000 lb. of steam per hour, and at the same time to effect an appreciable saving of fuel per pound of water evaporated.

The greatly increased output obtained by Mr. Miller points to a far less expensive way of providing additional supplies of steam than the usual expedient of laying down a second boiler. Conversely, it shows that, for a given output, a much smaller boiler may be employed if thermal storage be applied than would otherwise be the case. The direct saving so rendered possible, and the additional savings to be realised by reduction of land area and the dimensions of boiler-house buildings are distinct inducements for the architect to inquire carefully into the merits of the system.

Messrs. Booth & Kershaw, in a paper read before the Institution of Electrical Engineers, suggest that the gain observed when feeding boilers with water at high temperature may be attributed in a measure to the avoidance of convection currents absorbing a portion of the heat energy of the fuel and converting it into mechanical work. This may account for some part of the benefit derived from thermal storage, but it does not explain why the system should be able to give results that cannot be attained by the use of fuel economisers and live steam heaters, also furnishing feed water at high temperature. The probability is that the success of the system owes much to the absolute equality of temperature in the storage cylinder and the boiler alike, and to the perfect regularity with which the feed water descends by gravity from the cylinder to the boiler below.

The process of steam generation is very readily disturbed, and we may find in the success of the cylinder feed a suggestion that existing methods of feeding boilers might be altered with considerable advantage.

Those who desire to pursue further the general subject of high-temperature boiler feeding will find some suggestive material in a paper read by Mr. A. W. Hamilton before the Belfast Mechanical and Engineering Association in 1902. The author of this communication expresses the opinion that, by raising the temperature of the feed water to the boiling point, the efficiency of the whole heating surface of the boiler is largely increased, because it is employed solely in the generation of steam and has not also to heat the water up to the boiling point.

To make this matter clear, let us take the case of a boiler working at the pressure of 65 lb. per sq. in. The temperature of the water and the boiling point will then be 312 deg. F. First, assume the feed water to be furnished from an exhaust steam heater at 180 deg. F. Then, before any steam can be produced, every pound of the water must receive 132 heat units.

Next, assume water to be supplied from an

economiser or a live steam heater at 212 deg. F. In this case each pound of water must receive 100 heat units before the boiling point is reached.

Now assume that the feed water is at the boiling point when delivered to the boiler. Then, instead of a small demand for heat by the comparatively non-receptive water. On the contrary, there is an instant call for heat on a large scale, for every pound of water is in readiness to burst out in the form of steam, and, therefore, to absorb 894 thermal units, this quantity representing the latent heat required to convert one pound of water into steam.

As the process of evaporation necessarily has a cooling effect upon the water, the difference of temperature between the two sides of the boiler plates is increased. Hence the result is a great augmentation in the rate of heat transmission through the plates.

So we have a very reasonable hypothesis accounting for the apparent paradox presented by the economy of live steam heating, especially when the feed water is heated up to the boiling point corresponding with the pressure adopted.

Considerable attention has been devoted to this subject of late, and it is not improbable that the steam boiler of the future may be designed so as to provide facilities for two distinct operations of raising water to the boiling point and of converting water at that point into steam.

Finally, the reader should bear in mind the fact that all forms of water heater are beneficial for the additional reason that they constitute more or less efficient types of water-softening apparatus. By reducing the proportion of mineral salts entering the boiler, a water heater reduces the thickness of non-conducting scale forming on the inside surfaces, and makes a corresponding reduction in the annual cost of fuel and of boiler cleaning.

It may be added that, in all places where only hard water is available for boiler feeding, it is always desirable to employ a properly-designed softening apparatus, which is far more efficient and more convenient for the intended purpose than any type of water heater.

We do not propose to describe and illustrate the different types of apparatus mentioned in the present article. To do this properly would require much space, and the task is scarcely necessary, as full particulars are readily obtainable from the excellent catalogues published by many well-known manufacturers.

#### WESTMINSTER CITY COUNCIL.

At the fortnightly meeting of the Westminster City Council on Thursday last week the General Purposes Committee recommended that Messrs. Thomas Agnew & Sons, of 399, Old Bond-street, be invited to submit a tender for periodically inspecting and reporting upon the paintings and pictures belonging to the Council.—Agreed to.

**Reorganisation of Works Department.**—The General Purposes Committee, in a report dealing with the reorganisation of the Works Department, recommended:—(a) That the Works Department be divided into three branches—viz., the general, drawing-office, and outdoor. (b) That the outdoor branch be sub-divided into two divisions, east and west, with an assistant surveyor in each division to supervise and be responsible to the City Engineer and Surveyor for the staff of the division.—The report was agreed to.

**Building Obstruction.**—The Highways Committee, having had their attention directed to several instances of obstruction of the streets during the busiest hours of the day by the unloading and loading of machinery, cranes, etc., in connexion with building operations, it was agreed that a condition be attached to licences for loadings prohibiting the loading or cranes used in connexion with building operations between the hours of 9 a.m. and 6 p.m.

**Sky Signs.**—Attention having been called by the Superintendent Architect of the London County Council to the erection of an alleged sky sign at No. 19, Leicester-square, the Town Clerk was instructed to take steps for the removal of such sign.

**New Street.**—A communication was received from the London County Council stating that it was the intention of that body to form a new street 60 ft. wide between Smith-square and Horseferry-road. It had been suggested that trees should be planted in the street, but as the cost of maintenance of the road would fall on the City Council, the County Council, before

proceeding further, wished to learn the views of the City Council on the matter. It was resolved that the City Council should offer an objection, and that they would be prepared to maintain such trees.

**Duke of Cambridge Memorial Statue.**—Application had been received on behalf of the fund for the memorial to the late Duke of Cambridge for permission to place an equestrian statue on a site in Whitehall opposite the Horse Guards and the new War Office. The base of the statue will be about 10 ft. wide. It was agreed to give the required consent subject to the design of the base being submitted to and approved by the Council.

**The Gladstone Statue.**—It was resolved to authorise the Chairman and the City Engineer to act in reference to the site in the Strand at the western end of St. Clement Danes Church to be handed over by the London County Council for the Gladstone statue. The Council has provisionally approved of the suggested site.

#### COURT OF COMMON COUNCIL.

At a sitting of the Court of Common Council on Thursday last week it was resolved, on the recommendation of the Streets Committee, to enter into the following contracts:—With the Tottelsham Homebique Contracting Company, for a reinforced concrete wall, etc., to the river wall at Horsham Marshes for 6,240. 7s.; and with Messrs. C. W. Killingbeck & Co., for the construction of 8-in. pipe sewer and works in Sun-street—passage for 247l.

**Renovating Buildings.**—A report was submitted relative to the sand-blast process for renovating buildings, and it was resolved that Messrs. Farnham, Ltd., be called upon to shelve the nuisance.

**The City Mortuary.**—It was resolved to accept the tender of Messrs. E. Lawrence & Sons to rebuild the portion of the City Mortuary destroyed by fire, at a cost of 1,389l.

**City of London Cemetery.**—On the recommendation of the Sanitary Committee, it was agreed to improve and augment the sanitary arrangements at the church and chapel of the City of London Cemetery at an estimated cost of 240l.

#### GENERAL BUILDING NEWS.

**CHURCH, PARSONAGE.**—The new church at St. Osmond's Parkston was dedicated recently by the Bishop of Salisbury. The new church is only part—the chancel and north transept—of the projected building, together with structural preparation for future work and a temporary brick nave. The architect is Mr. G. A. Blyth Livesey, and the plan of the church is cruciform, and the central crossing, of which the four piers are built, is to be surmounted by a dome. The chancel terminates in an apse, with semi-circular vault, and is surrounded by a wide ambulatory, divided from it by Ionic columns. The altar is of oak and carved ebony, with a slab of red Devon marble, and it stands under a baldachin. Round the altar is a narrow passage, and a seat for the bishop in the centre, behind the altar, in basilica fashion. There is some beautiful XVIIIth century wrought iron work between the columns of the apse, which was formerly in the Church of St. Mary le Bow, Cheapside, London. This was designed by the rector and his wife, Mrs. Mary, and her husband remodelled and placed in position by Messrs. Seller. The chancel extends under the crossing, and there are two ambones. The floor and steps of chancel, sanctuary, and ambulatory are of terrazzo. There are four stalls for clergy and four for choirmen, as well as seats for the twelve choir-boys in the chancel itself, and the rest of the choir will have places in the ambulatory on either side. All the chief permanent work of the interior is of terra-cotta, supplied by the firm of Messrs. Carter & Co., of Poole. The considerable elevation of the chancel floor has given opportunity for a spacious crypt, which has accommodation for the heating apparatus and for the appliances necessary for the supply of water, gas, and electricity, as well as for a temporary vestry for clergy and choir. The church will be warmed by hot water on the low-pressure system, and the lighting is partly by gas and partly by electricity. The ornaments of the altar are as in the case of the church of St. Osmond's, and the sanctuary are from the firm of Watts & Co. as in the case of the church of St. Osmond's. The organ is by Mr. Johnson, of Bristol. Nearly all the furniture, fittings, and ornaments have been designed by the architect. The ancient font, which has been in use in the iron chapel, has been retained in the new church, and stands in the north-west corner of the nave. The firm who have been engaged in the structure and fittings include Messrs. Miller & Sons, J. McWilliam & Sons, William Hoare, builders; Homan & Rogers, steel construction; Diespeker & Co., masonry and terrazzo; William Morris, glass; Henry Hargrett-Heaton, electric lighting; Sons, heating, etc.; Earp, electric lighting; Seller & Co., gas and electricity; West & Collier, painting; Anderson & Co.; Caslake; and Blackwell & Co. Mr. F. Broad prepared the quantities.



About 5,000l. has been expended on the chancel, north transept, and temporary nave, and it is estimated that the whole church, when completed, with vestries, side chapel, aisles, campanile, and baptistery, would cost 12,000l.—*Bournemouth Observer.*

**St. Mark's Church, Harrogate.**—St. Mark's Church at Harrogate was consecrated by the Bishop of Ripon on Saturday last week. The building has been erected of Pateley stone, from the design of Mr. J. Oldrid Scott, and at present the church consists of nave and chancel. The nave was built about five or six years ago, at a cost of some 9,000l., the site having been given by Mr. John Puley. The chancel has only lately been added, and its cost is estimated at about 5,000l. In due time it is proposed to erect a tower.

**Church, Murroe, County Limerick.**—The new Church of the Holy Rosary at Murroe is nearing completion. The church is of Romano-Norman character, and was designed by, and is being erected under the care of, Mr. O'Malley, architect, Limerick.

**Roman Catholic Church, Reading.**—The Bishop of Portsmouth (the Rev. John Baptist Challinor) recently laid the foundation-stone of a new Roman Catholic Church on a piece of land acquired in the Upper Redlands-road. The building when completed will be 90 ft. long and 40 ft. wide, with seating capacity for 450 persons, but until sufficient money is raised the erection of the sanctuary will remain in abeyance, and a building 63 ft. long by 24 ft. wide, capable of holding 200 persons, will be erected. The architects are the Rev. Canon A. J. C. Scoles and Mr. G. Raymont, of Basingstoke, whilst the builder is Mr. Herbert, of Playtch, Chaversham.

**Baptist Church, South Bank, Yorkshire.**—The foundation-stones of this building were laid on the 2nd inst. The building is late Gothic in style, the dressing being of terra-cotta, and facings of red brick. The present contract is for the church, church parlour, and vestries only (complete without the upper portion of tower). Provision is made for a large future school. The contract is let to Messrs. Bastiman Bros., Middlebrough, the amount being 3,234l. The architects are Messrs. George Baines & Son, Clements-inn, Strand, London.

**Organ and Vestries, Christ Church, Penzance.**—The new organ and the vestries which have been added to the building of Christ Church, Penzance, were dedicated recently by the Lord Bishop of Rochester (the Right Rev. Dr. Harner). The organ—built by Messrs. Brindley & Foster, of Sheffield, London, and Glasgow, and designed by them in collaboration with Mr. William Parley, the organist and choir-master of the church—has been erected at a cost of about 1,000l. The vestries have cost about 600l. The architect was Mr. Bassett Smith, and the builders Messrs. Pitter, of Croydon.

**Wesleyan Chapel, Bradford.**—On the 15th ult. the memorial stones were laid of a new chapel and school at Bradford. The chapel will front Legrams-lane, the school being situated in the row of the principal entrances to the chapel from Legrams-lane, and leading into a large vestibule, divided at each end from the inner halls and gallery staircases by ornamental screens and folding doors. The seating accommodation in the chapel will be for 286 persons—170 in the gallery, 111 in the children's gallery, and thirty in the choir, a total of 556 persons. There will be a rostrum and communion platform, with choir gallery and organ loft behind. In the school, which was opened about a month ago, there are two assembly halls, one for seniors and the other for juniors, each 62 ft. by 30 ft., each of ten classrooms, two large ones for sewing assemblies, etc. On special occasions the senior rooms having movable partitions. There is a basement. The work is being carried out from the designs and under the superintendence of Mr. Abram Sharp, architect, Bradford, by the following contractors:—Messrs. A. A. Braxup & Son, Bradford; joiner, Mr. I. Taylor; plasterers, Messrs. J. & W. Bates, Bradford; glazier, Mr. J. Smith, Bradford; painter, Mr. A. Fulman & Sons, Halifax; and heating apparatus, Mr. J. Anderson, Bradford.

**United Methodist Chapel, Crimbleham.**—The new chapel has been erected in the Coldham-relieved with white moulded brick. It is entered by a porch, which projects beyond the face of the main building, and from a porch two passages lead to the main hall. The hall is 33 ft. 6 in. high, and 24 ft. wide. Beyond the main hall is a retiring-room, which can be divided by means of folding partitions into two rooms. The floors are of maple wood laid on cement. The heating is by means of radiators, and the ventilation is arranged in the roof with Mr. Lynn, are the architects, and Messrs. Tash, Langley, & Co., the builders.

**School, Bristol.**—The Wick-road Council Schools have just been completed for the Bristol Education Committee. The buildings are situated in Wick-road, Brinsford, about 200 yds. from main road to Bath. There are three separate departments—boys, girls and infants, each accommodating 360 scholars. These have been planned so as to allow of the addition of two classrooms to each department, which when carried out will make the total accommodation sufficient for 1,800 scholars. In each department there is a central hall, from which all the classrooms are entered. The buildings are of red pennant stone with Monks' Park stone dressings, and the roofs are covered with Welsh green slates. The heating scheme is by Mr. W. Jones, of Stourbridge, the system adopted being low-pressure hot water. The contractors for the various works were:—Building, Mr. T. R. Lewis, Bishopston; heating, Messrs. Skinner, Board & Co., Rupert-street; plumbing, Mr. G. F. Tuckey, St. Paul's; tar-paving, Mr. G. Melsom, Victoria-road, St. Philip's. The total cost of the buildings has been 12,377l. The architects' estimate was 12,940l. Mr. H. Prigg acted as clerk of works, and the architects were Messrs. Holbrow & Oaten, Bristol.

**School, Dundee.**—The Ancon-road Public School, Dundee, has been reconstructed. The additions are designed upon the central hall principle, there being two large central halls, one on each floor, giving access to the classrooms. For the first time in Dundee electric light will be introduced into the school, the old as well as the new portion being illuminated by that means. Heating and ventilating will be done by mechanical power. Accommodation will be given to over 1,400 children. The cost of the reconstruction will be over 8,000l. The architect is Mr. J. H. Langlands. The principal contractors for the work are:—Masons, Messrs. A. & T. Craig; joiner, John F. Sherr, Louisa-alley; and plumber, David Brown, Tay-street and Overgate.

**National Schools, Howden-on-Ouse.**—Lieut.-Colonel Saltmarsh recently laid the foundation-stone of the new National Schools at Howden. The new schools, which are in the lower end of Pinfold-street, are of Gothic design, and will cost between 1,200l. and 1,500l. The chief room is 37 ft. long by 22 ft. wide, with two other rooms 24 ft. long by 20 ft. wide. There are outbuildings and accommodation for about 200 scholars. Mr. W. H. Blackburn, of Howden, is the architect.

**School, St. George, Bristol.**—On the 24th ult. the new Air Balloon Hill Council School, St. George, was publicly opened. The school is situated near the main Hanham road, and consists of three departments—boys, girls, and infants—each department providing accommodation for 360 children. The buildings include a cookery centre, a manual instruction centre, and a caretaker's house. The cookery centre is placed over two of the classrooms, and the teachers' rooms are over the cloakrooms in each case, likewise the rooms are on the ground-floor. Pennant stone is used, and a small proportion of Bath Stone being used for dressings. Two entrances, with cloakroom adjoining, are provided for each department, and in each building is a central hall with large windows at both ends as well as side windows. The cookery room provides for eighteen students at practice, or fifty-four at demonstration. The manual instruction room provides for a class of twenty, and contains a master's desk, lockers for tools and show-cases for patterns and finished work. The walls generally are plastered, the classrooms having high cement dadoes, and the floors are generally of wood blocks, the passages and cloakrooms having asphalted floors. The architects of the buildings are Messrs. La Trobe & Weston, of Bristol.

**West Jesmond Council Schools.**—The Mayoress of Newcastle on the 26th ult. opened the new Council schools in Forsyth-road, West Jesmond. The mixed junior department is in a separate building of one story, and the senior departments are located in a two-storied building. The teaching rooms are all placed with sunny aspects, the cloak-rooms face north, and the playgrounds are open to the south. The ventilation is by means of fresh air inlets in the walls and extractors in the roofs. The contract price for the senior and junior school was 11,460l. Mr. E. T. George was the general contractor, from the designs and under the superintendence of Mr. Charles S. Errington, of Newcastle.

**School, Newburghall.**—Offers by contractors for the erection of the new school at Newburghall were under consideration at a meeting of Inveresk School Board on the 26th ult. The total estimated cost is 3,760l., and it is anticipated that the school will accommodate 420 scholars. The cost works out at about 8l. 9s. per head. The architect is Mr. A. Murray Hardie, Edinburgh.

**Eton College War Memorial.**—On the 29th ult. Prince Alexander of Teck laid the foundation-stone of the buildings which are

being erected at Eton College in memory of the old Etonians who fell in South Africa. The buildings will consist of a new school hall, large enough to hold the whole school, 140 ft. long, 55 ft. wide, and 45 ft. high; a domed octagonal library, about 55 ft. in diameter—both facing the college—and a classical museum. The whole will be in the Renaissance style, of Portland stone and red brick, the architects being Messrs. L. K. Hall & S. K. Greenfield.

**Laboratory, Oswestry Grammar School.**—The foundation-stone has just been laid at Oswestry Grammar School grounds of the new laboratory. The building was designed by the architect, Mr. W. H. Spaul, and is in course of construction by Messrs. Jones & Evans, of Oswestry. It consists of a lecture-room capable of accommodating forty pupils, and a laboratory large enough to occupy thirty-six in practical work at a lesson, besides store-room, dark-room, balance-room, and basement for heating apparatus.

**Fire Brigade Station, Swansea.**—The new Swansea Fire Brigade Station has been erected on a site between Alexandra-road and High-street, with frontages in Pleasant and Orchard streets. The accommodation of the new station includes:—On the ground floor—engine-room, hose tower, stables, shed for fire escape, eight cells, lavatories, etc.; on the first floor—dining, recreation, reading, sitting, bed, and bath rooms; and on the second floor more bedrooms. On the basement is a heating chamber. Mr. John Williams was the contractor, and Mr. Bell (the Borough Surveyor) the architect.

**Workmen's Dwellings, Southwold.**—New working men's dwellings have been erected at Southwold. The dwellings number sixteen. On the ground floor are a living-room, kitchen, and scullery, and on the first floor one large and two small bedrooms. Mr. Key, of Aldeburgh, is the architect, and Mr. Wales the contractor.

**Workhouse Buildings, Ecclesall, Sheffield.**—The weekly meeting of the Ecclesall Bierlow Board of Guardians was held at the Union Offices, The Edge, on the 19th ult., when the Building Committee recommended that plans prepared by Mr. W. C. Fenton (Messrs. Hall & Fenton, architects, St. James's-row) for the provision of extra accommodation at the Workhouse, be adopted by the Board, and afterwards forwarded to the Local Government Board for approval. Mr. Fenton had intimated to the committee that the cost of the entire scheme to provide accommodation for 204 beds would be approximately 9,670l.; 6,110l. would be the approximate cost of a large block to accommodate 120 beds, and 3,560l. for a small block to accommodate eighty-four beds.

**District Baths, Bradford.**—On the 19th ult. two of the series of district baths which are in course of erection in various parts of the city of Bradford were opened to the public. The baths are to serve the township of Howling, and are situated in Leeds-road and Wakefield-road. They have been erected from designs by the City Architect (Mr. F. E. P. Edwards). The main feature of the establishment is a swimming-bath, 60 ft. in length by 20 ft. wide, and constructed in a wide, light, and airy hall 74 ft. 6 in. in length by 33 ft. 9 in. About the bath are fifty-two dressing-boxes. Access is gained to this hall by a corridor from the front. A series of slipper baths and douche baths for men and another similar series with a separate entrance for women are also provided, and there are also separate waiting-rooms for men and women. The total cost of the land acquired for the bath was 1,123l., and the cost of the building itself was 6,811l. The bath in Wakefield-road contains almost exactly the same accommodation as that in Leeds-road.

**Naval Training Barracks at Shotley.**—About eighteen months ago Shotley was selected as the site for the naval training barracks, and shortly after that the Admiralty placed in the hands of Mr. Fred Bennett, of Ipswich, the contract for constructing it. The ground owned by the Government amounts to 65 acres, and slopes down to the confluence of the Orwell and Stour from tolerably high land. The whole scheme has been designed under the superintendence of the Director of Works of the Admiralty (Col. Raban, C.B., R.E.), and the civil engineer in charge of the work is Mr. T. C. Agutter. The lighting of the establishment, indoors and outdoors, will be by means of electricity, and a power-house has been erected and equipped under the advice of Messrs. Prece & Cardew, consulting electrical engineers to the Admiralty. The generating station has been fitted up by the Westminster Engineering Company, under the supervision of Mr. Girdlestone, managing director of the firm, and the electric mains have been laid by Messrs. Callender, Limited, of London and Erit.

**Lansdown-Grove Home, Bath.**—At the Lansdown-grove Home, in connexion with the Bath Homoeopathic Hospital, recently, the foundation-stone of an extension to the building was laid. This is at the western or Lansdown-road end of the institution, and will provide eight additional private wards, nurses-room, kitchen



and dining-room, with servants' accommodation. It will be in the same style as the rest of the building. The architects are Messrs. Wilde & Fry, of Weston-super-Mare, and the contractors Messrs. Erwood & Morris. The cost is about 2,500.

**BURLEY-IN-WHAERFALE COUNCIL'S NEW OFFICES.**—The new council offices at Burley-in-Waerfaledale were opened on Saturday last week by Sir F. W. Fison, Bart., M.P. A house known as "The Grange" has been altered and made into offices and committee-rooms under the superintendence of Mr. H. S. Chorley (the hon. architect).

**PREMISES, ALBEMARLE-STREET, PICCADILLY.**—The site of St. George's Chapel, lately pulled down, has been taken for the erection of premises after plans and designs by Messrs. Gale, Durlacher, & Emmett.

#### SANITARY AND ENGINEERING NEWS.

**PROMENADE, BLACKPOOL.**—The new promenade at Blackpool, by means of which 22 acres have been reclaimed from the shore, has just been opened. The sea defence works and new marine promenade comprise extensive sections of municipal coast defence and promenade construction enterprise, and have cost together nearly 450,000. The north shore works and promenade were commenced in August, 1895, and completed in July, 1900, at an outlay of 150,000. They cover about 10 acres, and comprise an easterly footway, carriage-drive and tramway, westerly footway, broad middle walk (50 ft. wide), and a lower footway 24 ft. above the level of the seashore. The central and southern sea defence works and promenades were commenced in May, 1902, and completed as far as the North Pier in June, the amount expended being 300,000. The area reclaimed from the seashore is 22 acres, while the entire works cover 354 acres. The concrete and sand-filling, in the sea-wall and surface works, occupy 610,000 cubic yds., and 275,000 tons of cement gravel and shingle have been utilised. Between the sea and the buildings fronting a footway on the land side, 15 ft. to 30 ft. wide; a new carriage-drive, 40 ft. wide; an island footway, 10 ft. wide; and a tramway track, 17 ft. 6 in. to 20 ft. 6 in. The average width of the broad westerly footway or parade is 80 ft. There are also thirty-five flights of steps 15 ft. wide, and six roadways 30 ft. wide leading to the sands. Mr. J. Wolstenholme, the then Corporation Surveyor, was responsible for the North Shore undertaking, and Mr. J. S. Brodie, the present surveyor, for the remainder.

**PROPOSED BRIDGE, MONYMUSK, N.B.**—Four designs have been prepared by Messrs. Walker & Duncan, C.E., of Aberdeen, for a new bridge which it is proposed to erect over the River Don near Monymusk. The estimates of cost vary from over 4,000 to down to 3,000.

**SEWERAGE WORKS, ELY, WALES.**—The foundation-stone of the new pumping-station at Ely in connexion with the sewerage works which are being carried out by the Llandaff and Dinas Powis District Council was recently laid. Mr. Baldwin Latham is the engineer to the Council. Mr. A. Start engineer to the contractors, and Mr. S. Southey resident engineer.

#### FOREIGN.

**SOUTH AFRICA.**—The foundation-stone of the municipal power-house was recently laid at Port Elizabeth by the Mayor. The contractors are Messrs. Wills & Davey. Mr. Mario da Veiga, a well-known local architect, has received a commission to draw up plans for the erection of a new theatre at Lourenco Marques (Delagoa Bay). At a meeting of the Johannesburg Master Builders' Association the chairman stated that the Association was quite ready to meet the men on the subject of compensation for and insurance against accidents. The Cape Government invites architects residing in and practising in South Africa to compete in the design for a building to be erected in Cape Town for the accommodation of a Supreme Court of the Colony. Premiums of 500*l.*, 300*l.*, and 200*l.* respectively will be awarded to the authors of the designs adjudged to be first, second, and third in order of merit. At Livingstone, Rhodesia, contracts have been let for the erection of the first group of Government buildings on the site of the new township, Mr. Dark being the successful tenderer. Messrs. McDonald & Thorpe, of Pretoria, have secured the contract for the erection of the new gaol at Pietersburg, their tender being 10,553*l.* The work is being carried out under the supervision of Mr. J. C. Edwards, of the P.W.D., and has to be completed within six months.

**GERMANY.**—The new hospital at Bayreuth, designed by the architect, Herr Schlegel, was opened on May 8; the building cost 700,000 marks. The new Church of St. Matthias, at Frankfurt, designed by Professor Pützer, was consecrated on May 21. The foundation-stone of the church at Karlsruhe, designed by the architects, Curjel and Moser, was laid on May 31.

**AUSTRIA.**—The new French Embassy at Vienna is being built under the direction of the French architect, M. Chédanne; the building will cost two million francs.

#### MISCELLANEOUS.

**ST. MARGARET'S CHURCH, WESTMINSTER.**—On July 10 a faculty was granted for, with other things, the lengthening eastwards of the chancel by about 6 ft., the rereading of the east window and its replacement 4 ft. higher in the wall as read, and the removal of the reredos, the central panel excepted, for a new reredos to embody the panel of the rector for the extension of the chancel at the price of 50*l.* The east end of the chancel was reconstructed by S. P. Cookerell, who restored the fabric and the interior in 1788. The relief of the supper at Emmaus, in the middle of the reredos, was carved in woodwork in 1753 by Sefinn Alken, of Soho. It is copied from Titian's picture in the Louvre, the figures being portraits of King Ferdinand V., his grandson Charles V., and Cardinal Ximenes. The five-light east window of the Crucifixion was, it is said, executed at Gouda, in Holland, and given by the Synod of Dort to Henry VII. By another account it was made for Ferdinand and Isabella in honour of their daughter Katharine's betrothal to Arthur Prince of Wales; it contains supposed portraits of the Prince and his bride. The window has seen many vicissitudes. Henry VIII. gave it to Waltham Abbey, whence at the Dissolution it was removed to New Hall, Essex, and having passed to various owners, including Oliver Cromwell, the two Dukes of Buckingham (Villiers), and General Monk, at New Hall, was sold by John Conyers, of Court Hall, Essex, to the parishioners for 420*l.* part of a sum voted in 1758 by the House of Commons for rebuilding the church of St. Margaret. The new work will be entrusted to Mr. C. E. Kempe.

**LONDON BUILDING ACTS (AMENDMENT).**—In the House of Commons, on the motion for the third reading of the London Building Acts (Amendment) Bill, Sir A. Rolfe said that the Bill caused his constituents, who were among the smallest and largest tradesmen in the city, much concern, because they felt that their interests would be affected by the too drastic methods employed in the Bill for the purpose of preventing the consequences of fire. Owing to the very strong feeling expressed by the London Chamber of Commerce, the Committee had made very material modifications in the measure, which modifications had gone far to remove the objectionable features. Those who promoted the Bill would recognise the duty of doing no more than was absolutely necessary for the protection of life and property. The substitution of the appeal tribunal to the London Building Act of 1894 was a distinct improvement in the Bill as it originally stood, and which returned the differences to arbitration. Considerable objection might still be felt to the prevention of appeal in the case of new buildings as not physically and not technically new, but technically new buildings, owing to the reconstruction of a large portion of them. In that instance the committee, after careful consideration, did not see their way to make those modifications asked for by the London County Council, but he was glad to see that the representative of the County Council in that House (Mr. Burns) had intimated his intention of seeking for opportunities in another place to have those objections met. He would be glad if the County Council in the meantime could give some indications that the objections to which he had referred would receive consideration, and, personally, he should be glad if some solution could be effected by amicable arrangement rather than resorting to the expensive and not always efficacious process of lodging a further petition and giving further evidence in another place. He would not put the House to the trouble of a division, but would leave the matter in the hope that whatever was still regarded as objectionable in the Bill would be favourably considered, and that it would be unnecessary to resort to an appeal to another place. The Bill was then read a third time. The Hackney Borough Council at its last meeting adopted the following resolution:—"That as the London Building Act of 1894 is already complicated by the amendments of the Act of 1898, this committee is of opinion that a new law with such amendments as may be deemed desirable therein should be formulated, but before any such Bill is drafted, the whole question should be reported upon by a Royal Commission in order that the views of the London County Council, the Corporation of the City of London, the several Metropolitan boroughs, also the various professional associations connected with building work, may be ascertained and considered."

**BASMENTS.**—The Medical Officer of Health of Islington (Dr. A. E. Harris), in a report to the Borough Council, attributes the fact of 1,300

houses in Islington of the better class and high rentals being unoccupied, to increased trouble and facilities for living in the country, to the cost to dwell in flats, and to the servant difficulty of objection to basements. There is little doubt, he says, that if these empty houses had been built without basements, none, or very few, would be empty to-day. Living underground, in houses with the teachings of modern sanitation, are consequently people, especially educated, who will not live in houses so built. A non-basement house in good condition is secured as soon as it is announced to be let.

**ARCHITECTS AND MIDDLESEX COUNTY COUNCIL.**—At the meeting of the Middlesex County Council on July 27, the Education Committee brought up the following report: "The Council at its meeting on June 25, 1903, adopted a resolution in the following terms: 'That as regards new schools and other educational buildings, a limited number of architects be invited to send in competitive designs from time to time when new schools, etc., are required.' The Council are no doubt aware that they have two exceptions only the plans for the new schools which the County Council has, since the 'appointed day' decided to erect, have been prepared by Mr. Crothall, the County Council's surveyor. Your Committee are of opinion that the time has now arrived when the foregoing resolution of the County Council should be rescinded, so that where it is thought desirable plans for new schools may be prepared by Mr. Crothall, and they therefore recommend that the resolution passed on June 25, 1903, be rescinded." The report and recommendations were adopted without discussion or dissent.

**BRIISTOL MASTER BUILDERS' ASSOCIATION.**—The members of the Bristol Master Builders' Association had their summer excursion on the 25th ult. Oxford and Blenheim Palace were the places selected for visiting, and a train from Temple Meads conveyed a large party. When the University city was reached, breakfast was conveyed the party to Bristol's Restaurant, which the Association made their headquarters. A number of visits to the colleges followed. Luncheon was held at Burr's Restaurant. Mr. E. L. Neale (President of the Association) presiding. After luncheon vehicles conveyed the party to Blenheim Palace, after which a return was made to Oxford, where dinner was partaken of. Mr. E. L. Neale presided. After dinner the loyal and cheerful toasts were honoured, and the party then went to the railway station, and arrived in Bristol soon after ten o'clock.

**NEW BUILDINGS, CHRIST'S COLLEGE, CAMBRIDGE.**—A fund has been opened, and to subscriptions now amount to about 2,500*l.* for commemorating in a permanent manner the four hundredth anniversary of the re-founding of God's House, as Christ's College, by the Lady Margaret, Countess of Richmond and Derby in 1505. At a recent meeting of the Master and Fellows it was resolved, and the subscribers have adopted the suggestion, that the fund could be most fittingly applied to the erection, at an estimated cost of 3,500*l.* of new buildings in the third, or further, court.

**MEMORIAL TO SIR HUMPHRY DRYAN MARIA EDGEWORTH.**—The Clifton Improvement Association have prepared an inscribed tablet which they will affix upon the front of No. 1 Rodney-place, Clifton, a house which was the home of Sir Humphry Dryan in 1788-1811, of Dr. Thomas Beddoes, and of Maria Edgeworth.

**EXHIBITION AT FLORENCE.**—A syndicate of members of the fine art academies in Italy has undertaken to open, on December 1, in Florence, an exhibition of modern Italian art.

**GREAT COATINGS EXHIBITION.**—In the Parliamentary papers published on the 28th ult. appears a question by Mr. Noel Buxton, who asked the President of the Local Government Board whether, in view of the favourable opinion held by competent authorities of the cheapness of new being exhibited at the Garden City, Leetchworth, he would take into consideration the question of further modifying the model by-laws issued for the guidance of district councils. The reply of Mr. Gerald Balfour is that it is desirable, in the first instance, that an officer of his department should visit the exhibition and report on the subject. Arrangements were being made for this purpose.

**EXTENSION OF ELECTRICITY PLANT, HULL.**—The Hull Electric Lighting Committee, at a meeting held on the 27th ult., adopted the recommendation for the substitution of the old high tension switchboard by one of more efficient design. The engineer reported that a new Ferranti switchboard, of a similar size to the old board, would cost 5,400*l.* In addition to this there would be the cost of a building in which a 400*l.*, making a total of 6,800*l.* The sub-committee recommended that the City Engineer be instructed to prepare plans for and to put in the work of the building. The committee accepted the tender of the H. & M. Boiler Company, Oldham, for six Lancashire boilers, at a



cost of 4,013l., and that of the Lahmeyer Electrical Company for high and low-tension steam dynamos the prices being—high tension, 4,066l. 3s.; low tension, 3,882l. 16s.

**MEMORIAL OF ARCHBISHOP TEMPLE, CANTERBURY CATHEDRAL.**—On the 29th ult., a bronze statue of the late Archbishop Temple, was unveiled by the Archbishop of Canterbury in Canterbury Cathedral. It is the work of Mr. F. W. Pomeroy.

**PUBLIC HEALTH AND HOUSING ADMINISTRATION.**—A deputation, representing several housing associations, was received by the President of the Local Government Board at the House of Commons on Thursday last week. Mr. Hay, having introduced the deputation, Alderman Thompson said he had been asked specially to draw Mr. Balfour's attention to the great need for securing fuller use and better administration by local authorities of their existing powers under the Public Health Act and the Housing Acts. He was also asked to say that it would be most helpful to the cause of housing reform if a circular were sent to all local authorities, not only stating their powers under the various Housing Acts, but urging them to make a fuller use of many of them. It was unquestionable that many towns with a terribly high death-rate neglected their duties in regard to the systematic inspection of their areas and the gradual improvement of them. The Housing Committees of the Corporation of Liverpool had recently made a house-to-house inspection, and had discovered that over 9,000 houses were structurally insanitary. Between 1898 and 1902 the Corporation of Hull "re-presented," under Part 2 of the Housing Acts, 1,421 houses in about fifty different streets as unfit for human habitation, and 322 of these houses were demolished. Liverpool and Hull, however, stood almost alone in this respect. In the great majority of cases the inspection simply meant a few cursory and unsystematic visits to certain dwellings. In hardly any case did the councils possess accurate and full knowledge of the extent to which remedial action was needed.—Mr. Gerald Balfour, in replying, agreed as to the desirability of securing more active administration of the health and housing powers of local authorities, but desired to point out to the deputation that it was not so easy as they imagined for the central body to put pressure on the local authorities. He promised to consider how far fuller and more systematic action could be taken on the reports of medical officers. He could not, however, promise the very full methods of inquiry suggested, as the staff was already hardly sufficient. Moreover, a good deal of work was done in this direction now. In the meantime, if the National Housing Reform Council sent him particulars as to cases of slum areas or large numbers of unhealthy dwellings neglected by the local authorities, he might promise that these particular cases should have attention.—The desirability of framing new by-laws to secure better planning of new housing was then dealt with by Mr. Aldridge, who pointed out that many of the worst slum areas need clearance not so much on account of the hopelessly bad planning permitted in the past by municipal authorities. The present model by-laws had remedied the worst features of this, and were still far too low. Whilst recognising that the General Minimum, the deputation desired to ask the President of the Board whether an alternative set of by-laws could not be prepared and issued, providing for greater width of streets, the setting back of cottages, and the provision of gardens in new suburban areas, and local authorities urged to adopt them. It was of great value that a minimum should be set, but there was no reason whatever why each council should look upon the model by-laws as unalterable. With encouragement from the Local Government Board, local authorities might be induced to plan garden suburbs like Bournville, and greatly reduce their death-rates by securing healthier conditions.—Mr. Balfour assured the deputation that any desire shown by the local authorities to improve upon their by-laws in the way suggested by the deputation in regard to the provision of wider roads and more open spaces would be cordially welcomed by the Local Government Board, though regard must of course be had to questions of reasonableness and cost.

## Legal.

### THE WIDENING OF PICCADILLY: ACTION AGAINST THE WESTMINSTER CORPORATION.

The hearing of the case of *Pescod v. the Mayor, &c., of the City of Westminster*, commenced before Mr. Justice Swinfen Eady, in the Chancery Division, on the 26th ult., an action by the plaintiff to restrain the defendants from proceeding with a notice to treat which they had given

under the provisions of Michael Angelo Taylor's Act, and under which the defendants claimed the right to acquire compulsorily the interest of the plaintiff in No. 30, Piccadilly.

Mr. Macmorran, K.C., and Mr. Chubb appeared for the plaintiff, and Mr. Eve, K.C., and Mr. Methold for the defendants.

Mr. Chubb, in opening the case, said plaintiff's premises were about to be pulled down in connexion with the widening of Piccadilly. The objection which the plaintiff took to the defendants' proceeding under the notice was, shortly, that defendants had purported to use their powers under this Act for the purpose of enabling them to acquire not only that which they required for the widening of Piccadilly, viz., a 22-ft. strip of the plaintiff's premises, but to acquire the whole of the plaintiff's premises. The land really required by the defendants from the plaintiff was not more than one-fourth of the whole, but the defendants proposed to acquire the whole of plaintiff's interest in order that they might carry out a contract which they had previously entered into with a private company, under which the company was to pay the costs to acquire the whole upon condition of having surrendered to it the plaintiff's interest in the back portion. His submission was that for a public body to attempt to acquire property in the manner he had indicated was not a legitimate exercise of its powers and not a *bona-fide* attempt to carry out powers conferred upon it by Statute, and was a proceeding which ought not to be allowed. To his mind, this case was peculiar in two particulars. This, he believed, was the first time a public body had attempted to acquire land for other purposes than the widening of a roadway, viz., for disposal to a private company under an agreement and for the specific interests of certain persons. The second point under which the action was unique was that it was the first time a corporation before giving notice to treat entered into a contract to re-sell a portion of the land. He should contend that this agreement on the face of it was not a *bona-fide* exercise of the defendants' rights at all, because it was an unjust act to attempt to exercise the rights under the Act for the benefit and at the instance of someone else who had to give the defendants a large consideration for obtaining the benefit. As to the facts, he thought there was very little dispute. Plaintiff was a tailor, and had got together a good business, and it was essential he should remain in his present premises, inasmuch as there was no other shop he could get in Piccadilly. What the plaintiff said was, that he could carry on his business perfectly well if the defendants would leave him the rest of his premises after taking the 22-ft. strip they required. The scheme for the widening of Piccadilly was being carried out jointly between the London County Council and the defendants. The County Council had no powers compulsorily to acquire land at all, whereas the defendants had, and an agreement was arrived at between the defendants and the County Council that the defendants should put those powers into force. The work would be carried out by the County Council and the defendants would contribute towards the cost. Proceeding, the learned counsel said that his evidence would go to prove that his client could carry on his business on the premises that were left after the strip required for the widening had been acquired, as a surveyor and builder would tell his lordship that the front portion of the premises could be pulled down, leaving the plaintiff the back premises, a shop and house 20 ft. deep. Defendants said it was necessary for their workmen to use the back part of the premises for the demolition of the buildings, and that they would have to be taken down for the purposes of rebuilding.

In reply to his lordship, Mr. Chubb said that the plaintiff was willing to put up with a little inconvenience, even to a suspension of business for a fortnight, in order that he might retain the back premises. His point was that the defendants were only empowered to take the portion they required for street widening, and therefore they could only take the front portion.

His lordship: Do I take it that the only point in dispute is, that you say they are only empowered to take what they require, whilst defendants say they are empowered and it is necessary for them to take the whole for the widening in question?

Mr. Chubb said that was so.

Plaintiff was called and gave evidence in support of his case.

Mr. A. H. Turner, of Messrs. Alexander Turner & Co., surveyors, gave evidence, and said it was his opinion that the portion of the plaintiff's premises that would remain after the 22-ft. strip had been taken for the Piccadilly widening would be sufficient for him to carry on his business. He thought the front of the premises could be taken away without injury to the plaintiff continuing his business.

Mr. A. J. Bywater, of Messrs. Bywater & Sons, builders, of King-street, Regent-street, gave evidence that he saw no difficulty in pulling down 22 ft. in front of the plaintiff's premises and the plaintiff retaining his shop. In his opinion it was not necessary to take the whole of the

plaintiff's premises for the pulling down of the front.

This was the plaintiff's case.

Mr. Eve, in opening the case on behalf of the defendants, said that nobody could suggest that the proposed improvement was not a great public improvement. He submitted that the defendants had the right to do what they sought to do, and there was nothing to lead the Court to come to the conclusion that the notice to take the whole of the premises in question was not *bona-fide*. The learned counsel, having cited a number of cases in support of the defendants' case, said that the plaintiff's interest in the premises was comparatively small having regard to the whole area of the premises. The plaintiff's tenancy came to an end in two and three-quarter years' time, and to give him the relief he claimed would put the defendant authority in an extremely hard position. He thought that when his lordship had heard the evidence which would be tendered on behalf of the defendants that he would agree that to do as the plaintiff asked would put an unnecessary burden on the local authority. Upon that evidence he should ask his lordship to come to the conclusion that this was a case in which the defendants had acted with perfect good faith, and in order to carry out effectively the improvement contemplated it was necessary that they should have the opportunity of acquiring the whole of the premises in question. Unless the plaintiff was able to show that the resolutions arrived at between the Council and the Hotel Company were *malæ fides* he was not entitled to the relief he asked for.

Mr. Andrew Young, valuer to the London County Council, examined, said he was the responsible officer to treat for the widening of Piccadilly. In his opinion it was impossible for the plaintiff to remain in possession of the back portion of his premises while the work of re-construction went on.

Mr. Howard Martin, a surveyor, said he had surveyed the property, and in his opinion it was not possible to take down the front of the plaintiff's premises without considerable interference with the property. In fact, it was not possible for the work to proceed whilst the plaintiff was in possession except at very great expense.

Mr. A. R. Stenning, surveyor, also gave evidence corroborating that of the two previous witnesses.

This was the defendants' case.

Mr. Methold and Mr. Macmorran then addressed his lordship on behalf of their respective clients.

At the conclusion of the arguments his lordship said he would give judgment one day next week. Judgment was accordingly reserved.

### CITY LIGHT AND AIR DISPUTE.

THE case of Woodman and Bailey v. Mathieson came before Mr. Justice Buckley in the Chancery Division on the 31st ult.,—an action by the plaintiffs to restrain the defendant from building in such a manner as to interfere with the light enjoyed by the plaintiffs in their premises, No. 43, London-wall, as the same had been enjoyed hitherto.

Mr. Buckmaster, K.C., and Mr. Geo. Lawrence appeared for the plaintiffs, and Mr. Astbury, K.C., and Mr. Martelli for the defendant.

Mr. Buckmaster, in opening the case, said the plaintiffs were Sir George Woodman and Mr. Thos. Bailey. Sir George Woodman was the lessee of the whole premises for a period of eighty years, from December 25, 1879, at a rental of 420l. per annum. The lease was granted to him under an agreement that he would rebuild the premises, which he did, and those were the premises that now stood. The plaintiff, Mr. Bailey, was the sub-lessee of the ground floor and basement for thirty-five years from June, 1889, under an agreement terminable at seven, fourteen, or twenty-one years, at a rental of £20l. per annum. He used this portion of the premises for the business of a tailor and cutter, and it was very important for the purpose of carrying out his business that he should have the light which the premises had enjoyed for twenty years past. Part of the premises ran over the Black Swan-alley, and it was the windows in the rear that they complained of. The defendant had not yet erected his premises, but it was in respect of the southern end of that proposed building that the main contest in the action arose. The old buildings stood at a height of 36 ft. Defendant now proposed to increase the height of the building to 54 ft., an increase of 18 ft. on the old building. Plaintiffs' light was received by means of reflectors from a wall and his lordship would see that the proposed raising of the defendant's building would interfere with the plaintiffs' light. Although there would be a substantial diminution of light to the first floor of plaintiffs' premises it was the ground floor that would be affected most.

After inspecting a model, his lordship asked if it was disputed that the defendant's new building would interfere with the plaintiffs' light?

Mr. Astbury pointed out to his lordship that



as a matter of fact defendant proposed to raise his building 8 ft., then go straight back 8 ft., and then rise another 10 ft. In that way they did not think the tower of their new building would in any way depreciate plaintiffs' light.

Mr. Buckmaster disagreed with that view. His lordship thought it would take a great deal to persuade him that this additional 8 ft. would not interfere with the plaintiffs' light. It was quite obvious from the model what would happen. As far as he could see the only thing was to decline the line of the defendant's building.

Mr. Astbury said he was assured by Mr. Grun- ing that their new building would not interfere with the plaintiffs' light.

At this stage a consultation took place between counsel, at the conclusion of which Mr. Buck- master stated he had consented to judgment for his client on the terms that the defendant's new building was sloped at the south as indi- cated by his lordship, defendant's tower to stand intact, and defendant to pay the plaintiffs 200l. and the costs of the action.

Mr. Astbury said that this was too much. The defendant would not consent to pay the 200l. Eventually the parties agreed to take his lordship's judgment on the matter.

His lordship said he would reduce the damages to 100l., defendant to pay the taxed costs of the action, and to slope the building as he had indi- cated. Defendant's tower was to stand intact.

#### ACTION BY ASPHALTER AGAINST BUILDERS.

THE case of Langston v. Lawrence & Sons came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justice Borne and Mathew, on the 28th ult., on the application of the defendants, Messrs. Lawrence & Sons, a firm of builders, for judgment or new trial on appeal from verdict and judgment at trial before Mr. Justice Phillimore and a common jury in the King's Bench Division.

Mr. McCall, K.C., and Mr. Crawford appeared for the appellants, and Mr. S. T. Evans, K.C., and Mr. Laddie for the respondents.

Mr. McCall, in opening the case, said the action was brought by the plaintiff against the defendants for damages for personal injuries alleged to be due to the negligence of the defendants, first in allowing or causing a steel joist to fall on the plaintiff, and secondly in allowing certain scaffolding to be in such a condition that the steel joist did fall on the plaintiff. The case arose in this way: The plaintiff was an asphalt worker employed by Claridge's Patent Asphalt Company, Limited, and the defendants were builders, who, in August, 1903, had entered into a contract with Messrs. Robinson & Co. to rebuild certain premises in Regent-street at the corner of Back-street. By the terms of the contract Messrs. Lawrence & Sons were to employ the co-defendants, the Asphalt Company, to do certain asphalt work, and Stewart's Granolithic Company, to do certain stone work. The contract was dated August, 1903. By July, 1904, the work had progressed beyond the fourth story, and on July 11, 1904, the accident in question happened. The case put forward for the plaintiff was that the scaffolding under which he was working was practically unworked, and that there were very few boards across the putlogs which constituted the cross pieces of the scaffolding. The case of the builders was that the scaffolding on the morning of July 11 was, and had always been, closely boarded, and that upon the morning of the 11th, immediately before the accident happened, one of the boards was taken up by one of the men who was doing the stone work, and that that was the cause of the accident. That was the only issue which remained to be dealt with, then, because the jury at the trial found that the defendants were entitled to succeed upon the first issue of negli- gence and that they were guilty on the second. The first question left to the jury was: Did Messrs. Lawrence & Sons' men cause the steel joist to fall, and the answer to that was in the negative. The second question was: Was the scaffolding so insufficiently boarded as to let the steel joist through, and the answer to that was in the affirmative. The steel joist, which was on the scaffolding, fell down and struck the plaintiff, who was at work in a hole below. The plaintiff's case was that the scaffolding had been for weeks before, and was on the morning of July 11, in such an unsafe condition to the knowledge of the defendants as to allow the joist to fall through. Messrs. Lawrence & Sons' case was that the scaffolding had been carefully boarded, and was perfectly safe up to a few minutes before the accident happened, and that the accident happened owing to the wrongful removal of one of the boards by Stewart's men. He (counsel) submitted that the jury had been misled by a model used on behalf of the plaintiff, and which showed the scaffolding in such a condition that an accident was almost certain to happen. A second thing which he thought had misled the jury was a reference to the fact that the defendants were insured, and that the real defendants were not the builders, but an insurance company. A third thing which affected the jury

was the putting in of a report, and this report could not have been admitted as evidence if the Asphalt Company had not been joined as co-defendants (the Company recovered judgment at the trial); and if the learned judge had stopped the case against the Company. The learned counsel contended that the verdict was against the weight of the evidence, and that the amount of the damages which the jury awarded, viz., 620s., was, having regard to the medical evidence given, grossly excessive.

Mr. Crawford having followed on the same side,

The Master of the Rolls, without calling upon counsel for the respondent, in giving judgment, after stating the facts, said that the learned judge at the trial left certain questions to the jury, at the trial of the verdict was that the Asphalt Company were exonerated from liability for the condition of the scaffolding. The learned judge then left certain questions to the jury in order to ascertain whether Messrs. Lawrence & Sons were answerable, and the jury answered the questions in such a way as to make Messrs. Lawrence & Sons responsible. It was not suggested that there was any misdirection on the part of the learned judge, but the contention on behalf of the appellants was that the verdict was against the weight of the evidence. He was against the weight of the evidence, called (the Master of the Rolls) was of opinion that there was evidence on the part of the day on the question when the accident happened, there was a gap in the scaffolding so large as to admit of the steel joist falling through it for which no person responsible for the scaffolding was answerable. He saw no adequate reason to disagree with the verdict that the jury had found on the question of negligence, nor did he think that the assessment of damages by the jury was so grossly extravagant that this court ought to interfere. In these circumstances he thought the appeal should be dismissed with costs.

The Lords Justices concurred.

#### ACTION AGAINST THE LONDON COUNTY COUNCIL.

THE case of Lavers v. the London County Council came before Mr. Justice Kekewich in the Chancery Division on the 28th ult., on a motion by A. H. Lavers and A. H. Lavers, Ltd., who were respectively the freeholder and lessees of property in Nine Elms-lane, Battersea, for an interim injunction to restrain the defendants until the trial of the action or further order from taking further proceedings to assess the amount of compensation payable to the plaintiffs under a notice to treat dated May 6, 1901, with regard to obtaining possession of part only of the property. The facts were as follows: By the London County Council (Improvements) Act, 1900, defendants were empowered to extend the Thames Embankment and also to make certain street improvements, including the widening of Nine Elms-lane. Mr. A. H. Lavers was the freeholder of property in Nine Elms-lane known as Lavers' Wharf, the Company being the leaseholders of the wharf for the residue of a term of twenty-one years from December 25, 1898, at an annual rental of 750l. The County Council served both Mr. Lavers and the Company with notice to treat in respect of so much of the property as was required for the widening of the lane. In November, 1901, Mr. Lavers, as the freeholder, sent in a claim for 6,000l., and the same month the Company, as leaseholders of the premises, sent in a claim for the rent, in respect of the premises comprised in the notice to treat, was to be apportioned at 200l. per annum. The London County Council, having raised an objection to this apportionment in March, 1904, served the plaintiffs with a summons, requiring them to appear before a stipendiary so as to have the question of apportionment determined. Subsequently this summons was abandoned on the plaintiffs agreeing to an apportionment of rent at 100l. Afterwards negotiations between the parties as to the price to be paid for the property having fallen through, the plaintiffs served the County Council with notice calling upon them to take the whole of the property under section 92 of the Lands Clauses Act, 1845. The County Council then took steps for the summoning of a special jury to assess the compensation to be paid to the plaintiffs in respect of the property comprised in the notice to treat of May, 1901. The plaintiffs then commenced the present action. The County Council, while admitting that they were not authorised by their special Act to take a part only of the property, alleged that the plaintiffs by acquiescence and delay were debarred from compelling the Council to take the whole of the property in question under section 92 of the Lands Clauses Act, 1845. The question for decision, therefore, was whether what had occurred prevented the plaintiffs from insisting on their rights under section 92 of the Act. At the conclusion of the arguments of counsel his lordship held that the plaintiffs had done nothing to forfeit their rights under section 92

of the Act of 1845, and granted the injunction as asked.

Mr. Stewart Smith, K.C., and Mr. Lawrence appeared in support of the motion, and Mr. P. Ogden Lawrence, K.C., Mr. Methell, and Mr. Morten for the London County Council.

#### VENTILATION OF BACK-TO-BACK HOUSES.

At Coventry, on the 27th ult., the Town Clerk (Mr. G. Sutton) appeared in support of an application taken out at the instance of Dr. E. Snell, the Medical Officer of Health, against Richard Thorneley, Stanton-street, for an alleged breach of the Housing of the Working Classes Act. Mr. Masser appeared for the defendant.

The Town Clerk said the case was brought in respect of a house in No. 1 Court, Thomas-street. This was said to be unfit for habitation, and a closing order was asked for. There were several alleged defects, but the principal ones were that there was no through ventilation and no back-to-back house accommodation. Something had been done to provide ventilation. The house was a back-to-back one, and Thorneley had put in the wall downstairs an iron ventilating pipe, which was connected by a metal tube with a grating on the side of the wall, and thence through into the other house. This, he believed, said by the defendant, provided through ventilation. The defendant replied that such means were altogether inadequate, and that if this kind of ventilation was to be allowed in Coventry, it would put an end to proceedings by the Corporation to get these back-to-back houses ventilated and fit for habitation. The defendant was owner of the house, and he (the Town Clerk) suggested that the two houses should be made into one.

Dr. Snell described the system of ventilation which had been attempted in the domestic portion of the house, and said it was insufficient. Cross-examined, the Medical Officer said he had not for his object the turning of houses into a garden-city, but to make the houses habitable. He was opposed to back-to-back houses altogether—the death-rate in such houses was generally higher than elsewhere.

The Bench, after a discussion (Mr. Clarke did not think what had been done rendered the houses habitable).

Mr. Masser sympathised with Dr. Snell's view to make Coventry an ideal city, but submitted he had not made out a case that this house was unfit for habitation. Dr. Snell would not be bound to consider the scheme adopted by the defendant provided through ventilation, and if requisite, defendant would provide a window for the premises.

Mr. W. H. Hattrell, architect, considered that the air-shaft 10 in. in diameter that had been put through this house to the other one provided sufficient ventilation.

Dr. G. W. Iliffe said that there was a fireplace in the house, and he considered that a fireplace of ventilation provided was, under the circumstances, satisfactory and efficient. Cross-examined, he admitted that there might be a slight improvement made, and that the inlet of the air should be made to the outside.

The Bench, after retirement, ordered that they had decided to visit the premises in question.—Birmingham Post.

#### PATENTS OF THE WEEK.

##### APPLICATIONS PUBLISHED.

14,993 of 1904.—S. H. ADAMS: *Flushing and Discharge Siphons.*

This consists in the use of a siphon with an inlet above inlet level, said outlet having a below inlet level by means of which water escaping therefrom shall unseat a pipe or fitting, so allow air to enter to break siphonic action, an air-escape pipe in combination with an auxiliary water seal, into which it dips, and means for blowing out or removing the water from it; later, said siphon formed as a U-tube, with trap giving a deep seal, but not deep below the ground.

15,129 of 1904.—A. F. BURDE: *Cooling, Heating, and Similar Apparatus.*

Apparatus for cooling, heating, and the like, consisting in the combination with a metal sheet bent or folded upon itself in opposite directions, alternately or with separate sheets of diamond pieces or frames, having inlet and outlet openings, and disposed between the successive folds of the sheet or between the separate sheets, an enclosing casing having inlet and outlet openings extending across the side walls, so that inlet and outlet opening communicates through the corresponding openings in the distance plates with one series of chambers only.

17,175 of 1904.—J. A. CROSS: *Glass Houses, Structures for Propagating and Forcing Plants, Bulbs, and the like.*

This relates to glass houses or structures for

\* All these applications are in the stage of opposition to the grant of Patents upon them, and may be made.



propagating seeds, plants, bulbs, or the like, consisting of a frame made with longitudinal ground rails arranged in pairs, of cross rails, and removable pins or stacks so arranged as to join the cross rails and longitudinal rails together, uprights supported midway between the longitudinal ground rails, and horizontal ridge pieces or rafters supported in grooves in the said uprights but adjustable to any suitable height from the ground, grooves or abutments on the ground rails to form rests, and glass panes resting at one end against these abutments, and at the other at opposite sides of the ridge pieces, in combination with pins or ridge pieces, so arranged to press against the glass and hold it in place.

18,494 of 1904.—H. L. DOULTON: *Means for the Support of Trough Water-closets.*

This invention relates to closets fitted in ranges, and is intended to provide means for supporting same by brackets fastened to a wall in order that the floor beneath the closet may be left as clear as possible. Any usual trough closet may be employed, but it is preferable to adopt those formed by a series of pans discharging into a common pipe, which is periodically cleared by siphonic action. Such pipe is quite or nearly horizontal, and at suitable intervals along its length is fitted with a bracket, which extends to a wall with which it engages, either by being screwed or otherwise attached, or by being built in. The brackets are of sufficient strength to support the closets, and may be in one piece with the pipe or separate. In the case of an open or continuous trough closet the brackets are attached to the troughs in the same manner as to the pipe described.

19,359 of 1904.—G. JENNINGS and J. MORLEY: *Urinals and the like and the Manner of Fixing the same.*

This invention relates to the method of fixing urinals and like basins to walls or slabs. For this purpose the back, which is dished as usual, has two lugs, one on each side. Each of these lugs extends upwards from the flange of the back, being formed in one piece with it and the back, thus giving great strength to the lug. The surface of the lugs is flush with the edge of the flange, so that when the urinal is placed against a wall or slab the flanges bear against it. Pockets are formed in the underside of the lugs to receive hooks fixed to the wall, and in order that the urinal shall come on the strongest part of the lugs, the hooks are bevelled, being thickest at their tops. The hooks have screw stems, which engage with nuts let into the wall or slab, and secured with lead.

19,330 of 1904.—G. JENNINGS and J. MORLEY: *Pails or Receptacles Suitable for Night Soil and the like.*

The pails forming the subject of this invention are tightly closed and readily stacked. The upper edge of the body of the pail is formed perfectly level, and has fixed round it a number of inclines, each slot or space between them. The inner face of the lid is made truly plane to form a tight joint when pressed down upon the top of the body, and the flange of the lid has inside it lugs which pass through the slots or spaces, and engage with the inclines when the lid is turned, thus forming a bayonet joint. The top of the lid has a pair of rods or handles projecting from it, whereby the lid can be turned. The bottom of the body is raised above the lower edge of the sides, leaving a space beneath it, so that when one pail is put upon another the handles of the lower pail are received into the space beneath the bottom of the upper pail, and fitting against the inside of the projecting portion of the sides of the upper pail, centre the latter and prevent it from being moved sideways.

21,943 of 1904.—N. L. LOCKE: *Skip Bolt for Doors and the like.*

This invention relates to locking bolts for doors, and, according to the invention, the bolt is made in two parts, which are fitted together within a box or casing formed on or secured to the back of a face-plate screwed or otherwise fastened to the door. A loose thumb-piece is fastened to the casing in a recess in one end of the part (the action of which is to retain or lock the bolt either in its shot or drawn position), is contained within the said box or casing. The thumb piece may be of various forms or shapes. In one convenient form it is L-shaped, having at its lower end a flange, which extends upwards, the said flange entering into a recess in the upper part of the box. In shooting or withdrawing the bolt and from the recess, the thumb-piece releases the forward motion of the bolt, and moves the bolt forward, until the rear end of the thumb-piece is, by the action of the spring, forced into the recesses, thereby locking the bolt in position.

23,112 of 1904.—J. RUTLE: *Slabs for Treads, Steps for Treads, Risers and Return Ends of Steps or the like.*

The like, made of marble, concrete, or other suitable material, and provided with patterns in mosaic work, said slabs being suitably shaped to

fit against or bear upon each other, and placed on or against new cores or bevelled old steps serving as cores.

25,763 of 1904.—J. G. REED and A. E. REED: *Window Opening and Closing Apparatus.*

This relates to a device whereby the ordinary method of weights and cords may be abolished. It is intended to suspend sashes, frames, or panels by a suitable sliding and opening arrangement, which is actuated by force of cramping springs. This is effected by graduating pressure upon the running edges of the sash, frame, or panel, and is caused by the increasing force upon the springs, as the movable object descends lower in its runners. This device can be made in wood, iron, or other material. The idea is that the sliding sash or other object shall be sustained from falling, and assisted in the raising by reason of the resisting upward pressure produced by the springs endeavouring to regain their normal size, which can only be partly attained in the larger space of the wedge-like aperture at the top.

418 of 1905.—J. BANBURY (A. J. PARK): *Window Sashes, and the like.*

This invention relates to window sashes, and the like, and to the method in which the sashes are suspended. It consists in the combination with upper and lower window sashes of a single line for moving each sash independently, or both sashes simultaneously, in opposite directions, a detent pivoted at one end, and provided with an orifice, through which the line is passed, pulleys being provided on the upper face of the top of the frame, and side pulleys situated in a groove in the top of the sash.

1,773 of 1905.—J. MONKS: *Lead Clips for Roofing and Glazing.*

According to the invention a lead strip is provided, holding at its base lead ears, a movable lead nib shaped so that weights such as snow, will not turn it back, and a brass nut and bolt to form a screw for said lead nib. When being fixed the lead strip is nailed to the slate lath, and the movable lead nib is turned back, which allows slate or glass to be put in. The movable lead nib is then turned to its original position.

19,217 of 1904.—J. W. METCALF: *Device for Detecting Unauthorised Use of Hydrants and Other Valves or Cocks.*

A device for detecting unauthorised use of hydrants and other valves or cocks, said device comprising an attachment made fast to the spindle and adapted to be sealed by wax or other substance to a fixed plate or other stationary part, either directly or indirectly, so that when once sealed the spindle cannot be actuated without breaking the seal.

19,306 of 1904.—W. BERRYMAN: *Pipe Coupling.*

A pipe coupling admitting of rotation of one of the coupled parts without similar movement of the other, in which one of the parts to be coupled is secured in a ferrule screwed into a coupling sleeve while the other part is secured in a pipe free to rotate within the sleeve, the joint being effected by means of a stuffing box and gland at one end of the sleeve, and the two coupled parts being yieldingly held against a longitudinal extension by means of a spring which is compressed between abutments on the sleeve and the pipe respectively.

20,316A of 1904.—S. H. ADAMS: *Penstocks and Sluices.*

According to the invention, the door is slung or suspended from the worm or screw which raises it, and for this purpose two racks are formed upon the door, one on either side of the worm—i.e., the worm works between two racks—the result being that the door hangs free from the penstock body. Further, it is preferably arranged that the spindle which carries the worm or screw shall be held in bearings at a greater height upon the frame. By this means greater play to the door is given, which enables it to swing into the position in which it works most freely. It is preferable to use a worm of larger size also, and such wedges, levers, screws, and fittings are used as is necessary. The penstock door when closed is usually held fast to the penstock body by means of wedges upon the frame in which it slides.

2,470 of 1905.—A. K. SEBESTÉNY and R. PÓKA: *Method of Making Walls, Pipes, and the like.*

This relates to a method of making walls, pipes, channels, and the like of ferro-concrete, according to which scaffolding columns or uprights, ribs or frames of ferro-concrete are erected at suitable distances apart and formed to correspond to the actual object of construction, such frames or the like being previously finished and perforated in the longitudinal direction of the object of construction, to which frames the scaffolding is fixed and the cross connections of which serve as supports for the horizontal iron insertions of the object of construction, whilst, by a suitable arrangement of the iron framework, the perforations of the columns, ribs, or frames may be filled up with beton.

6,289 of 1905.—P. P. CHMELEFF: *Apparatus for Screening and Washing Sand and Gravel.*

This consists in the combination of a series of receptacles piled one above another, with one projecting over the rear end of the one below it, means for feeding material to the highest receptacle, an outlet for permitting material to pass from the front end of each receptacle to the receptacle below, and a series of troughs arranged below said receptacles, each adapted to receive material from the receptacle above and discharge it into the receptacle and trough below, and a screening in the rear end of each receptacle.

7,203 of 1905.—A. R. BENNETT and E. W. TWINTING: *A System of Lining Railway and other Tubular Tunnels.*

A system for lining railway and other tubular tunnels built up of metal segments by means of hollow bricks moulded to fit the flanges and radius of such segments and to abut upon one another. The said hollow bricks being locked in position by means of locking bricks secured by means of wood, mortar, bitumen, or other suitable material.

7,384 of 1905.—S. MINGAZZI: *Scaffolding.*

According to the invention, the poles are constituted of two section bars, preferably of iron, connected together by means of crossbars, these latter being at such a distance one from another as to serve as rungs of a ladder and as supports for the hinge hooks of the brackets supporting the scaffolding; the crossbars are of angle iron and the ends are split and bent and riveted to the two bars of the pole. The pole or upright is constituted of several pieces of different length, according to requirement.

8,630 of 1905.—A. SWINNING and G. H. HEBBLETHWAITE: *Fire-resisting Door and Frame.*

A fire-resisting door, consisting in the combination of a series of porous and partially hollow blocks having grooves formed on their sides and edges, in combination with a frame capable of supporting said blocks so as to be partially enclosed thereby, and a layer of fire-resisting plaster for setting and covering the blocks, means for fitting the fireproof enclosure of an opening in a partition consisting in the use with said door of a casing formed of a series of partially hollow blocks either uncovered or enclosed by fire-resisting plaster, and means for supporting same to form an enclosure both for the complete door when open and for the margins thereof and the supporting mechanism when closed.

9,221 of 1905.—T. M. THOM: *Manufacture of Artificial Marble and the like.*

The manufacture of artificial marble and the like, consisting in the employment of a solution containing 25 parts by weight of sodium chloride, 1 part potassium chloride, 5 parts magnesium chloride, 2½ parts magnesium sulphate, and 1 part of calcium sulphate and 7 oz. of mixed salts to every one gallon of water.

## SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.		
July 20.—By J. HARRIS & SON (at Ropley).		
Ropley, Hants.—Four freehold fields, 17 a.		
12 1 p., 10 1 p., 10 1 p., 10 1 p.	2202	
A freehold building site, 8 a. 0 r. 38 p.	300	
Three freehold plots, 3 a. 8 r. 35 p.	150	
Five freehold building plots, 2 a. 3 r. 4 p.	119	
Six freehold building plots	129	
By H. J. BURT (at Brighton).		
Shermanbury, etc., Sussex.—Freehold farms, lands, etc. (Wisden Estate), area 728 a.	13,781	
f. (in numerous lots)		
July 21.—By J. HANFORD & SON (at Exeter).		
Burrington, etc., Devon.—Freehold farms, lands, etc. (Earl Portsmouth's Estate), area 2771 a. f. (in numerous lots)	40,847	
July 22.—By W. BROW & CO. (at Aylesbury).		
Tetchwick, Bucks.—"Rookery Farm," 87 a.		
0 r. 11 p. f. y.r. 145l.	2,750	
Enclosure of pasture, 17 a. 2 r. 10 p. f. y.r. 24l.	405	
By HARRY BALL (at Bedford).		
Bedford.—De Parys-av., freehold land, area 7,250 ft.	800	
Kempston, Beds.—54, High-st., and 0 a. 2 r. 1 p. f. p.	350	
Freehold cottage and 1 a. 1 r. 20 p. f. y.r. 184l.	155	
Enclosure of land, 3 a. 0 r. 29 p. f.	150	
July 24.—By CHANCELLOR & SONS.		
Sunningdale, Berks.—Station-rd., "St. Ann's Cottages" (seven), f. w.r. 100l. 2s.	1,700	
By H. & R. L. COPE.		
Kentish Town.—Savoy-st.-rd., etc. f.g.r., 125l. 15s. n.t. 62s. y.r., f.r. 40l. 10s.	1,800	
Notting-hill.—Portobello-rd., f.g.r. 51l. reversion in 61 yrs.	1,875	
Limousin.—0 10 12 14, and 16, Beccles-st., f. w.r. 178l. 2s.	1,870	
18, Beccles-st., and 2 and 4, Gill-pl., f. w.r. 58l. 10s.	620	
7, 11 to 21 (odd), and 13A, Gill-st., f. w.r. 239l. 10s.	2,430	
Gill-st., f.g.r. 11l. 5s. reversion in 53 yrs.	340	
20 to 26, 30 to 38 (even), 42, 44, 50, and 52, Gill-st., f. w.r. 361l. 15s.	3,210	



By C. RAWLEY CROSS & Co. Hammersmith—47, Ashchurch-gt., u.t. 84 yrs., g.r. 74, y.r. 461.	4,225	By H. & R. L. COBB (at Rochester). Gillingham, Kent—"The Eight Acres," 9 a. 1 r. 25 p. f., u.t. 122 10s.	2,375	Putney—14 and 18, Wymond-st., u.t. 69 yrs., g.r. 124, y.r. 641.	4,035
By MORGAN, BAILEY, & CLARK Sutton, Surrey—Brunswick-rd., "Kenwood" part freehold and part u.t. 61 yrs., g.r. 102, e.r. 1002.	850	Grange, Kent—"Tithe rent," 122 10s. Frindsbury, Kent—"Rochell Cottage" and 3 s. 1 r. 7 p. f., y.r. 261.	150	By TRAFFORD & CARTER. Brixton—28, Kellett-rd., u.t. 69 yrs., g.r. 64 17s., y.r. 354.	4,015
By NIGHTINGALE, PHILLIPS, & PAGE Thames Ditton, Surrey—Fornalund-rd., "Pembroke Lodge," f. p.	650	Hoo, Kent—Freehold house, kennels, two cottages and 48 a. 1 r. 33 p. f., y.r. 261.	4,100	Willenden—40 and 42, May-rd., u.t. 76 1/2 yrs., g.r. 101, y.r. 821 8s.	4,015
By NOKES & NOKES. South Lambeth—68 to 69 (odd), 73 and 75, Tradesac-rd., u.t. 65 1/2 yrs., g.r. 464, w.r. 800s. 8s.	2,340	By J. C. PLATT (at Hammersmith). Hammersmith—"King-st. West, f.g. rents 28s., reversion in 12 1/2 yrs., g.r. 471.	1,920	Kensal Green—10, Berens-rd., u.t. 80 yrs., g.r. 54 10s., y.r. 341.	4,015
Fulham—56, 56, and 57, Victoria-rd., u.t. 48 yrs., g.r. 164, w.r. 804 12s.	300	By S. WALKER & SON (at Dunmow). Dunmow, Essex—Chelmsford-rd., "Chelms- ford House," and 2 s. 1 r. 33 p. f., y.r. 294, 6s. 8d.	480	By SIMMONS & SONS. St. Luke's—10 and 12, Norman's-building (factory), u.t. 43 1/2 yrs., g.r. 471, y.r. 1004.	4,015
By WATERBURY & GREEN. Barnsbury—Upper Park-st., two peppercorn freehold ground rents, reversion in 3 1/2 yrs. Pimlico—Banelsgr-gt., etc., i.g.r. 924 10s., reversion in 17 1/2 yrs., g.r. 41 10s.	1,025	By DRIVER, JONES, & CO. (at Selby). Selby, Yorks.—Portholme-rd., freehold house and 2 a. 0 r. 12 p. f., y.r. 731.	1,700	Islington—129, Fackington-st. (s.), u.t. 31 yrs., g.r. 64, y.r. 481.	4,015
Strand—Clare Market, f.g.r. 63s., reversion in 8 yrs.	1,800	14 and 15, Water-lane, f. y.r. 521.	1,600	Clerkenwell—9, 14, and 16, Wilton-lane, u.t. 8 1/2 and 10 1/2 yrs., g.r. 921 10s., y.r. 1734.	4,015
Clare Market, f.g.r. 92s., u.t. 6 yrs., g.r. 681. Clerkenwell—11, 12, 13, and 14, St. Bath-st., f. y.r. 1601.	104	Osageate Iron Works, f. y.r. 521.	1,675	Stoke Newington—2 to 12 (even), Lancet-st., f. y.r. 901.	4,015
Clerkenwell-green, f.g.r. 1004, reversion in 60 yrs.	2,700	5 and 7, The Cres., f. y.r. 671.	6,250	44, Church-st. (s.), u.t. 65 1/2 yrs., g.r. 71 16s., y.r. 821.	4,015
Clerkenwell-green, f.g.r. 46s., reversion in 41 yrs.	1,000	8, 10, 11, 12, 14, and 16, The Cres. (s.), f. y.r. 171.	1,800	Bow—Tredegar-rd., f.g.r. 147 10s., u.t. 48 yrs., g.r. 14 10s.	4,015
By VERTON, BULL, & COOPER. Mile End—Cambridge-rd., "The Royal Foresters' Music Hall," also "The Ardi- choke Tavern," and shop adjoining, u.t. 61 1/2 and 178 yrs., g.r. 1354, p.	20,000	The Market-pl. freehold bank premises and residence, y.r. 701.	6,140	Barnsbury—12, Barnsbury-rd. (s.), f. y.r. 481.	4,015
Hamstead—Bim Row, "Embley," p. Hampstead, Hertfordshire—"Clovelly" and "Laugton," f. y.r. 1601.	1,375	11 to 15, The Market-pl. (s.), y.r. 2681.	481	43 and 45, Rhodes-st. (s.), u.t. 52 1/2 yrs., g.r. 61, y.r. 381.	4,015
Upton-rd., "Ythan," f. p.	2,045	81 and 83, Gouthorpe, also three cottages, f. y.r. 221.	115	48, Church-st. (s.), u.t. 65 1/2 yrs., g.r. 71 16s., y.r. 821.	4,015
Roslyn-rd., a freehold plot of land.	500	6, Finkelst. (s.), f. y.r. 221.	975	Islington—276, Essex-rd., u.t. 12 1/2 yrs., g.r. nil, w.r. 84 12s.	4,015
July 23—DRENNAN, TAYLOR, & CO. City—4, Corbett-st. (office), area 1,170 ft., u.t. 80 yrs., g.r. 1254, y.r. 5504.	6,500	James-st., etc., twenty freehold cottages and 3 a. 1 r. 33 p. f., y.r. 1551.	1,340	Caledonia-rd.—No. 102 (s.), u.t. 20 yrs., g.r. 107, y.r. 401.	4,015
Hyde Park—Oxford-rd., etc., f.g. 1044 10s., u.t. 15 1/2 yrs., g.r. 21 (with reversion).	1,310	7, 8, 11, and 12, Park-st., f. y.r. 1551.	3,350	Highbury—187, Riversdale-rd. (s.), f. y.r. 481.	4,015
Cambridge-rd., etc., i.g.r. rents 127s., u.t. 27 1/2 yrs., g.r. nil.	1,450	July 26—By BAXTER, Beckenham-rd. (s.), Penge—67 to 81 (odd), f. y.r. 4151.	4,020	Higginate—29, Archway-rd. (s.), u.t. 59 1/2 yrs., g.r. 127, y.r. 621.	4,015
Camden Town—Rochester-gt., etc., f.g.r. 84s., u.t. 41 yrs., g.r. nil.	600	Bromley, Kent—36, Palace-gt., u.t. 950 yrs. g.r. 64, e.r. 621 10s.	500	Holloway—84, Kingsdown-rd., u.t. 32 1/2 yrs., g.r. 61, y.r. 361.	4,015
St. Paul's-rd., etc., i.g.r. 90s., u.t. 39 yrs., g.r. nil.	1,460	197, 199, and 201, Hammersmith-rd., f. w.r. 804 12s.	850	81, Bickerton-rd., f. y.r. 461.	4,015
Norwood—197, 199, and 201, Knight's Hill- rd., f. y.r. 74s., also f.g.r. 10s., reversion in 42 1/2 yrs.	1,800	By ALAN BOOTH. Camden Town—5, Rochester-ter., u.t. 38 1/2 yrs., g.r. 61 10s., y.r. 521.	400	By EMMY HARRIS (at Rushington). Sparkhill, Worcester—Oakwood-rd., f.g. 24s., reversion in 92 yrs.	4,015
Chesham—Hera, Haversham, and Roundcroft, with farm and 5 a. 1 r. 10 p. f.	2,000	23, Rochester-ter. (with studio), u.t. 39 1/2 yrs., g.r. 61, y.r. 501.	455	King's Heath, Worcester—Station-rd., etc., f.g. rents 70s. 12s., reversion in 61 and 92 yrs.	4,015
Park-lane, freehold building land, 5 a. 0 r. 33 p.	950	By BOWEN, BRINS, & BOWMAN. Weybridge, Surrey—"The Willows" and 1 a. f. y.r. 1201.	2,145	Smethwilt, Staffs.—Montague-rd., f.g. 27s., reversion in 91 yrs.	4,015
Longfield-lane, freehold building land, 0 a. 2 r. 10 p.	1,525	Belgrave—51, Chester-ter., u.t. 15 1/2 yrs., g.r. 51, e.r. 601.	320	Birmingham—Harolds—Buckley-rd., f.g. 61s., u.t. 61 1/2 yrs., g.r. 10s., reversion in 47 yrs.	4,015
Bishopsgate, Devon—"The Lodge Farm," 68 a. 0 r. 31 p. f., y.r. 1101.	2,875	By OAKLEY, FRISBY, & CO. Regent's Park—4, St. George's-ter., f. e.r. 384s.	1,050	July 23—By DAVID BURNETT & Co. Crouch Hill—Mount View-rd., f.g. rents 102s. 10s., reversion in 75 1/2 yrs.	4,015
Handover, Sussex—1, 2, and 3, Highbury- cottages, f. y.r. 44s.	650	By J. S. RICHARDSON. City—33 and 35, Moor-lane (business premises), area 3,000 ft., u.t. 90 yrs., g.r. 3501, y.r. 7401.	1,600	Shepherd's Bush—12, Shepherd's-rd., f.g. rents 20s., reversion in 60 yrs.	4,015
"Archbold House" and two houses and shops adjoining, f. y.r. 2 r. 28 p. f., y.r. 401.	1,400	Brondebury—35, 39 to 51, 55 to 61 (odd), Loweridge-rd., u.t. 72 1/2 yrs., g.r. 901, y.r. 124 10s., y.r. 701.	3,270	Bassett Park-rd., f.g. rents 201s., reversion in 60, 64, and 66 yrs.	4,015
Three freehold cottages and shop, y.r. 49s., Eldersfield, etc., Worcester—"Cromer Farm," 177 a. 2 r. 53 p. f., y.r. 8001.	8,700	By RUSHWORTH & STEVENS. Regent's-ter., 40, Conduit-st. (business premises), Corporation lease, g.r. 61 1/2s., fine 48s. 15s., y.r. 4501.	2,100	By A. & A. FIELD. North Woolwich—28 and 30, Albert-rd. (s.), f. y.r. 701 2s.	4,015
Tottenham—Ferdale-rd., f.g. rents 126s., reversion in 7 1/2 yrs.	3,020	By R. TIDY & SON. Caledonia-rd.—65, North-street, u.t. 39 yrs., g.r. 91, y.r. 321.	255	Canning Town—39 and 41, Garvey-l., w.r. 361s. 8s.	4,015
Fairview-rd., f.g. rents 250s., reversion in 64 to 94 yrs.	6,000	By DOUGLAS YOUNG & CO. Enfield (Bush Hill-pk.)—21 to 24, Main-st., u.t. 31 yrs., g.r. 124, y.r. 97 10s.	480	13 to 19, 37 to 53 (odd), 55, 61, 70, 76, 82 (even), Leyer-rd., u.t. 74 1/2 yrs., g.r. 81s., w.r. 5384 4s.	4,015
Richmond, Surrey—and 10, Onslow-av., u.t. 89 1/2 yrs., g.r. 181, y.r. 1054.	700	By ESCRITT & BARRELL (at Rushington). Great Hale, etc., Lines, 26, the Abbey Parks Farm, 563 a. 0 r. 19 p. f.	20,125	By J. H. LYNCH. Soho—32 and 33, New Compton-st., u.t. 39 1/2 yrs., g.r. 801, w.r. 2051.	4,015
By C. W. DAVIES & SON. Clerkenwell—23, Goswell-rd. (Turk baths), u.t. 2 1/2 yrs., g.r. 501, with goodwill, fixtures, etc.	340	By ALFRED RICHARDS (at Walthamstow). Walthamstow—1 and 3, Silverdale-rd., f. w.r. 654.	640	63, New Compton-st. (s.), u.t. 28 yrs., g.r. 604, y.r. 121 1/2s.	4,015
City-road—5, Alfred-st., u.t. 21 yrs., g.r. 41 4s., e.r. 421.	270	By WYATT & SON (at Chichester). Felpham, Sussex—Part of Thompson's Hospi- tal Farm, 24 a. 2 r. 2 p. f.	1,025	By MARK LEBEL & SON. Manor Park—Romford-rd., f.g. rents 46s., reversion in 87 and 93 yrs.	4,015
Barnsbury—28, Huntingdon-st., u.t. 46 yrs., De Beauvoir Town—16, Southgate-gt., u.t. 144 yrs., g.r. 14, y.r. 401.	520	July 27—By BARCHELLET & BARNARD, f. e.r. 301.	345	Upton Park—St. George's-rd., f.g. rents 74s., reversion in 86 and 87 yrs.	4,015
Haggerston—18 to 23 (odd), Ilva-pl., w.r. 1682 10s.	350	By C. C. & T. MOORE. Stepney—15, 16, 23, and 24, Walker-st., u.t. 11 1/2 yrs., g.r. 41, y.r. 1201 16s.	255	Leyton—Belmont Park-rd., f.g. 174 10s., reversion in 99 yrs.	4,015
Clerkenwell—24, Lloyd-st., u.t. 36 yrs., g.r. 81, y.r. 461.	925	Victoria Park—9 and 10, St. James-rd., u.t. 26 yrs., g.r. 91 10s., y.r. 721.	400	By MARTIN & CARMAY. Dalwich—111, Thurlow Park-rd., u.t. 50 yrs., g.r. 162 7s. 6d., e.r. 1254.	4,015
Islington—Cloudeley-rd., f.g.r. 44, reversion in 18 yrs.	220	Lincolns—23 and 35, Adlam-st., u.t. 68 yrs., g.r. 64, w.r. 751 8s.	600	Harringay—140 and 142, Harringay-rd., f. y.r. 521.	4,015
Canonbury—10, Quadrant-rd., u.t. 40 yrs., g.r. 81, e.r. 561.	465	By Bethnal Green—1w, Cranbrook-st., f. w.r. 814 4s.	315	Wood Green—93, 97, 99, and 101, High-rd. (s.), f. y.r. 2001.	4,015
By FULLER, HOBSEY, SONS, & CASSIDY. Frambridge, Essex—Freehold electrical engi- neering works, area 35 a. 2 r. 10 p. f. (as a going concern).	9,000	By NEWBORN, EDWARDS, & SHEPHERD. Hackney—4, 6, 8, and 10, Crickethall-rd., f. y.r. 1601.	2,455	New Southgate—20, Park-lane-rd., f. y.r. 241.	4,015
"Frambridge Hall Farm," 575 a. 1 r. 8 p. f.	7,000	Clapton—11, Clapton-rd., f. y.r. 801.	680	Tottenham—32 and 34, Avenue-rd., f. y.r. 661 2s.	4,015
By HAMPSON & SONS. Chieveley, Berks—"Arlington Manor Estate," 695 a. 2 r. 26 p. f.	30,100	Hoxton—111, Hoxton-st. (s.), f. y.r. 821.	805	Edmonton—Hertford-rd., f.g. 10s., u.t. 39 yrs., g.r. 121 10s., y.r. 1201.	4,015
By KEMSEY'S. St. George's East—18, Ellen-st., f. y.r. 261.	350	Battersea—Culver-rd., f.g.r. 174 10s., reversion in 60 1/2 yrs.	370	Watford, Herts.—Aldenham-rd., two freehold building plots.	4,015
By PROTHORP & MORRIS. Carshalton—Denmark-rd.,	680	Chatham-st., f.g.r. 81, reversion in 60 1/2 yrs.	205	Bermonsey—56, Barkworth-rd., u.t. 71 1/2 yrs., g.r. 61.	4,015
By RANDALL, COX, & BAKER. Crouch-hill—27, Sparsholt-rd., u.t. 40 1/2 yrs., g.r. 61 10s., e.r. 384.	200	Peckham—Gordon-rd., f.g. rents 270 10s., reversion in 61 yrs.	760	Maynard-rd., f.g. 15s., u.t. 46 yrs., g.r. 61s. Depton-rd.—182 and 184, Lower-rd. (s.), u.t. 48 yrs., g.r. 601, y.r. 901.	4,015
By WALTER SIMMONS. Southwark—2 and 4, Lat-st., f. y.r. 801.	700	Hackney—72, King Edward-rd., u.t. 81 yrs., g.r. 152, e.r. 701.	400	Brookley—11, Montague-av., u.t. 60 yrs., g.r. 91, y.r. 501.	4,015
Peckham—1, 2, and 3, Senate-st., u.t. 64 1/2 yrs., g.r. 121, w.r. 754 16s.	450	Islington—23, Dun-st. (with stable), u.t. 31 yrs., g.r. 114, e.r. 804.	295	By WOODS & SELLING. Wimbleton—20, Haydon-rd. (s.), u.t. 74 1/2 yrs., g.r. 54 10s., y.r. 841.	4,015
By F. WALKER. Oakley Park—Oakley and nearly 1 a., f. y.r. 1201.	1,920	Wood Green—Winkfield-rd., f.g.r. 18s., reversion in 99 yrs.	1,000	Contractions used in these lists—f.g. for freehold ground-rent; l.g. for leasehold ground-rent; r. for improved ground-rent; g. for ground-rent; s. for possession; e. for estimated; w. for weekly rental; q. for quarterly rental; y. for yearly rental; u. for unexpired term; p. a. for per annum; l. a. for lane; s. for street; rd. for road; l. a. t. square; for pleasure; ter. for terrace; c. for close; g. for avenue; g. d. for gardens; y. for yard; p. a. grove; b. h. for beerhouse; p. h. for public house; o. for offices; s. for shops; e. for court.	4,015
By THOMAS WRIGHT. Brixton—22, Winterwell-rd., u.t. 68 yrs., g.r. 81 2s. 6d., y.r. 441.	830	By RAMSAY, WALKER, & CO. (at Twickenham). Stamford Hill—93 to 150 (even), Twickenham- rd., u.t. 71 yrs., g.r. 571, w.r. 2804 16s.	1,000	Blackmore, Essex—"Springfield" enclosure, 4 1/2 a., f. y.r. 1201.	150
		By A. W. PAVLOV & CO. Fulham—21, Lillie-rd., with yard and stabling, u.t. 23 yrs., g.r. 81, p. d.	1,000	Enfield—Byculla-rd., "Sherwood" and 1 an acre, f. y.r. 961.	410
		17, Lillie-rd., with farther's shop, stabling, etc., also 1 a. 1 r. 33 p. f., y.r. 1551.	1,900	By THOMAS WRIGHT. Brixton—22, Winterwell-rd., u.t. 68 yrs., g.r. 81 2s. 6d., y.r. 441.	830

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\* Our aim in this list is to give, as far as possible, the current prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

## BRICKS, &amp;c.

Hard Stocks, .....	£ s. d.	
Rough Stocks and Grizzles .....	1 4 0	" "
Facing Stocks .....	2 0 0	" "
Shippers .....	2 0 0	" "
Victims .....	1 7 0	" at railway depôt.
Red Wire Cuts .....	1 14 0	" "
Best Paving Red .....	3 12 0	" "
Best Red Pressed .....	5 0 0	" "
Best Blue Pressed .....	5 0 0	" "
Best Blue Pressed .....	4 2 6	" "
Do. Bulwicks .....	4 7 6	" "
Best Staffordshire .....	4 0 0	" "
Fire Bricks .....	4 0 0	" "
Glazed Bricks .....	12 0 0	" "
Best White and Ivory Glazed .....	11 0 0	" "
Stretchers .....	16 0 0	" "
Double Stretchers .....	16 0 0	" "
Double Headers .....	16 0 0	" "
One Side and two .....	16 0 0	" "
Two Sides and one End .....	20 0 0	" "
Spalls, Chamfered, Squints .....	20 0 0	" "
Best Dipped Salt .....	20 0 0	" "
Glazed Stretchers and Headers .....	12 0 0	" "
Quoins, Bulwicks, and Flats .....	14 0 0	" "
Double Stretchers .....	14 0 0	" "
Double Headers .....	14 0 0	" "
One Side and two .....	15 0 0	" "
Two Sides and one End .....	15 0 0	" "
Spalls, Chamfered, Squints .....	14 0 0	" "
Second Quality White and Dipped Salt .....	2 0 0	" less than best.

Thames and Pit Sand .....	£ s. d.	
Thames Ballast .....	5 0	" per yard, delivered.
Best Portland Cement .....	27 0	" per ton, ..
Best Ground Blue Lime .....	20 0	" ..

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime .....	12s. 0d.	" per yard, delivered.
Northbridge Fireclay in sacks .....	27s. 6d.	" per ton at rly. depôt.

## STONE.

Barn Stone—delivered on road waggon, Paddington Depot .....	£ s. d.	
Do. do. delivered on road waggons, Nine Elms Depot .....	1 6 2	" per ft. cube.
Forward Stone (20 ft. average)—Brown Whitened, delivered on road waggons, Paddington depot, Nine Elms depot, or Fulham Wharf .....	2 1	" ..
White Bashed, delivered on road waggons, Paddington depot, Nine Elms depot, or Fulham Wharf .....	2 2 2	" ..

Ancestor in blocks .....	£ s. d.	
Beet .....	1 11	" per ft. cube, deld. rly. depôt.
Greenhill .....	1 6	" ..
Darley Dale in blocks .....	2 4	" ..
Bel Corshill .....	2 5	" ..
Chertsey Red Freestone .....	2 0	" ..
Red Mansfield .....	2 4	" ..

York Stone—Robin Hood Quality, Scaped random blocks 2 10 .....	£ s. d.	
6 in. sawn two sides .....	2 3	" per ft. super.
handings to sizes (under 40 ft. super.) .....	2 3	" ..
ditto, ditto .....	2 6	" ..
8 in. sawn two sides .....	0 11 3	" (random sizes)
2 in. to 3 in. sawn one side slabs (random sizes) .....	0 7 2	" ..
1 in. to 2 in. ditto, ditto .....	0 6	" ..

Harp Yarn—Scaped random blocks 3 0 per ft. cube .....	£ s. d.	
6 in. sawn two sides .....	2 3	" per ft. super.
handings to sizes (under 40 ft. super.) .....	2 3	" ..
ditto .....	3 0	" ..
8 in. sawn two sides (slabs random sizes) .....	1 2	" ..
2 in. self-faced random sizes .....	0 5	" ..

## STONE (continued).

Hoyton Wood (Hard Bed) in blocks 2 0 per ft. cube, deld. rly. depôt. .....	£ s. d.	
" " " 6 in. sawn both sides landings 2 7 per ft. super., deld. rly. depôt. .....	1 0	" ..
" " " 3 in. sawn both sides random slabs .....	0 8 2	" ..
" " " 2 in. do. .....	0 8 2	" ..

## SLATES.

20 x 10 best blue Bangor .....	£ s. d.	
20 x 12 .....	13 17 6	" per 1000 of 1200 at r. d.
20 x 10 first quality .....	13 0 0	" ..
20 x 12 .....	13 15 0	" ..
16 x 8 .....	7 5 0	" ..
20 x 10 best blue Portmadoc .....	12 19 6	" ..
16 x 8 .....	6 12 6	" ..
20 x 10 best Eureka unfading green .....	15 17 6	" ..
20 x 12 .....	15 7 6	" ..
18 x 10 .....	13 5 0	" ..
16 x 8 .....	10 5 0	" ..
20 x 10 permanent green .....	11 12 6	" ..
18 x 10 .....	9 12 6	" ..
16 x 8 .....	6 12 6	" ..

## TILES.

Best plain red roofing tiles .....	£ s. d.	
Hip and Valley tiles .....	0 7 per doz.	" at rly. depôt.
Best Brocely tiles .....	50 0 per 1000	" ..
Do. Ornamental tiles .....	52 6	" ..
Hip and Valley tiles .....	4 0 per doz.	" ..
Best Eureka red, brown, or brindled do. (Edwards) .....	57 8 per 1000	" ..
Do. Ornamental do. .....	60 0	" ..
Hip tiles .....	0 per doz.	" ..
Valley tiles .....	3 0	" ..
Best Red or Mottled Staffordshire do. (Peakes) .....	51 8 per 1000	" ..
Do. Ornamental do. .....	54 6	" ..
Hip tiles .....	4 1 per doz.	" ..
Valley tiles .....	3 8	" ..
Best "Rosemary" brand plain tiles .....	48 0 per 1000	" ..
Best Ornamental tiles .....	50 0	" ..
Hip tiles .....	4 0 per doz.	" ..
Valley tiles .....	3 8	" ..
Best "Hartshill" brand plain tiles, sand faced .....	50 0 per 1000	" ..
Do. pressed .....	47 6	" ..
Do. Ornamental do. .....	50 0	" ..
Hip tiles .....	4 0 per doz.	" ..
Valley tiles .....	3 6	" ..

## WOOD.

Deals: best 3 in. by 11 in. and 4 in. .....	£ s. d.	
by 9 in. and 11 in. .....	13 10 0	" 15 0 0
Deals: best 3 by 9 .....	13 0 0	" 14 0 0
Battens: best 2 1/2 in. by 7 in. and 3 in. .....	11 0 0	" 12 0 0
Battens: best 2 1/2 by 6 and 3 by 6 .....	0 10 0	" less than 7 in. and 8 in.
Deals: seconds .....	1 0	" less than best.
Battens: seconds .....	0 10 0	" ..
2 in. by 4 in. and 2 in. by 6 in. .....	9 0 0	" 10 0 0
3 in. by 4 in. and 3 in. by 5 in. .....	8 10 0	" 9 10 0
Foreign Saw Boards .....	0 10 0	" more than 1 in. and 1 1/2 in.
3 in. .....	1 0 0	" At per load of 50 ft.

Fir timber: best middling Dantz or Memel (average specification) .....	4 10 0	" 5 0 0
Seconds .....	4 0 0	" 4 10 0
Small timber (8 in. to 10 in.) .....	3 12 6	" ..
Small timber (6 in. to 8 in.) .....	3 0 0	" 3 10 0
Swedish balks .....	2 10 0	" 3 0 0
Pitch-pine timber (30 ft. average) .....	3 5 0	" 3 15 0

## JOINERS' WOOD.

White Sea: first yellow deals .....	£ s. d.	
3 in. by 11 in. .....	24 0 0	" 25 0 0
3 in. by 9 in. .....	22 0 0	" 23 0 0
Battens, 2 1/2 in. and 3 in. by 7 in. .....	16 10 0	" 18 0 0
Second yellow deals, 3 in. by 11 in. .....	18 10 0	" 20 0 0
Battens, 2 1/2 in. and 3 in. by 7 in. .....	17 10 0	" 19 0 0
Third yellow deals, 3 in. by 11 in. .....	13 10 0	" 15 0 0
Battens, 2 1/2 in. and 3 in. by 7 in. .....	11 0 0	" 12 0 0
Petersburg: first yellow deals .....	21 0 0	" 22 10 0
Do. 3 in. by 11 in. .....	18 0 0	" 19 10 0
Battens .....	13 10 0	" 15 0 0
Do. 3 in. by 9 in. .....	16 0 0	" 17 0 0
Do. 3 in. by 11 in. .....	14 0 0	" 15 0 0
Battens .....	11 0 0	" 12 10 0
Third yellow deals, 3 in. by 11 in. .....	13 0 0	" 14 0 0
Do. 3 in. by 9 in. .....	12 0 0	" 13 0 0
Battens .....	10 0 0	" 11 0 0

White Sea and Petersburg: First white deals, 3 in. by 11 in. .....	14 10 0	" 15 10 0
Battens .....	11 0 0	" 12 0 0
Second white deals, 3 in. by 11 in. .....	13 10 0	" 14 10 0
Battens .....	12 10 0	" 13 10 0
Do. 3 in. by 9 in. .....	11 0 0	" 12 0 0
Pitch-pine: deals, Under 2 in. thick extra .....	0 10 0	" upwards.
Yellow Pine—First, regular sizes .....	44 0 0	" ..
Oddments .....	33 0 0	" ..
Seconds, regular sizes .....	28 0 0	" ..
Yellow Pine oddments .....	0 8 0	" 0 5 0
Kauri Pine—Planks, per ft. cube .....	0 3 0	" 0 3 6
Danzig and Skettin Oak Logs .....	0 3 0	" 0 3 6
Large, per ft. cube .....	0 2 6	" 0 2 9
Small .....	0 5 0	" 0 5 6
Wainscot Oak Logs, per ft. cube .....	0 5 0	" ..
Dry Wainscot Oak, per ft. sup. as .....	0 8 0	" ..
inch do. do. .....	0 7 0	" 0 9

## WOOD (continued).

JOINERS' WOOD (continued)—At per standard.	£ s. d.	
Dry Mahogany—Honduras, Tassaco, per ft. super. as inch .....	0 0 8	" 0 1 0
Selected, Figury, per ft. sup. as inch .....	0 1 6	" 0 2 6
Dry Walnut American, per ft. sup. as inch .....	0 0 10	" 0 1 0
Teak, per load .....	17 0 0	" 22 0 0
American White Wood Planks, per ft. cube .....	0 4 0	" 0 5 0
Prepared Flooring, etc.—		
1 in. by 7 in. yellow, planed and shot .....	0 13 6	" 0 17 6
1 in. by 7 in. yellow, planed and matched .....	0 14 0	" 0 18 0
1 1/2 in. by 7 in. yellow, planed and matched .....	0 16 0	" 0 1 0 0
1 in. by 7 in. white, planed and shot .....	0 12 0	" 0 14 6
1 in. by 7 in. white, planed and matched .....	0 12 6	" 0 15 0
1 1/2 in. by 7 in. white, planed and matched .....	0 15 0	" 0 16 6
3 in. by 7 in. yellow, matched and beaded or V-jointed brds. .....	0 11 0	" 0 13 6
1 in. by 7 in. do. do. .....	0 14 0	" 0 18 0
3 in. by 7 in. white do. do. .....	0 10 0	" 0 11 6
1 in. by 7 in. do. do. .....	0 12 9	" 0 15 0
6 in. at 6d. to 9d. per square less than 7 in.		

## JOISTS, GIRDERS, &amp;c.

In London, or delivered	£ s. d.	
Bolled Steel Joists, ordinary sections .....	6 0 0	" 6 15 0
Compound Girders, ordinary sections .....	7 10 0	" 8 10 0
Steel Compound Stanchions .....	9 2 6	" 10 12 6
Angles, Tees and Channels, ordinary sections .....	7 10 0	" 8 10 0
Fitch Plates .....	7 15 0	" 8 5 0
Cast Iron Columns and Stanchions including ordinary patterns .....	6 12 6	" 7 15 0

## METALS.

Per ton, in London.	£ s. d.	
Common Bars .....	7 0 0	" 7 10 0
Staffordshire Crown Bars, good merchant quality .....	7 10 0	" 8 0 0
Staffordshire "Marked Bars" .....	9 10 0	" ..
Mild Steel Bars .....	8 5 0	" 9 0 0
Hoop Iron, basis price .....	8 15 0	" 9 0 0
" Galvanized .....	16 10 0	" ..
(And upwards, according to size and gauge.)		
Sheet Iron, Black—		
Ordinary sizes to 20 g. .....	9 0 0	" ..
" 24 g. .....	20 0 0	" ..
" 26 g. .....	11 15 0	" ..
Sheet Iron, Galvanized, flat, ordinary quality—		
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g. .....	13 10 0	" ..
Ordinary sizes—6 ft. to 8 ft. 20 g. .....	13 0 0	" ..
" 26 g. .....	14 0 0	" ..
Sheet Iron, Galvanized, flat, best quality—		
Ordinary sizes to 20 g. .....	15 10 0	" ..
" 22 g. and 24 g. .....	16 0 0	" ..
" 26 g. .....	17 10 0	" ..
Galvanized Corrugated Sheets—		
Ordinary sizes—6 ft. to 8 ft. 20 g. .....	13 10 0	" ..
" 22 g. and 24 g. .....	13 0 0	" ..
" 26 g. .....	13 15 0	" ..
Best Soft Steel Sheets, 6 ft. by 24 ft. to 3 ft. by 20 g. and thicker .....	11 0 0	" ..
Best Soft Steel Sheets, 22 g. & 24 g. 12 ft. .....	13 10 0	" ..
" 26 g. .....	13 10 0	" ..
Cut nails, 3 in. to 6 in. .....	9 0 0	" 9 10 0
(Under 3 in. usual trade extra.)		

## LEAD, &amp;c.

Per ton, in London.	£ s. d.	
Leap—Sheet, English, 3 lb. and up to 16 lb. 7 6 .....	17 6	" ..
Pipe in coils .....	17 6	" ..
Soil pipe .....	19 17 6	" ..
Compo pipe .....	19 17 6	" ..
Zinc—Sheet .....	29 15 0	" ..
Vicille Montagne .....	29 10 0	" ..
Silesian .....	29 10 0	" ..
Copper—		
Strong Sheet .....	0 0 11	" ..
Thin .....	0 1 0	" ..
Copper nails .....	0 0 11	" ..
BRASS—		
Strong Sheet .....	0 0 10	" ..
Thin .....	0 0 11	" ..
Tin—English Ingots .....	0 1 5 3	" ..
Solder—Plumbers' .....	0 0 8 3	" ..
" Tinners' .....	0 0 9	" ..
Blowpipe .....	0 0 9	" ..

## ENGLISH SHEET GLASS IN CRATES.

24d. per ft. delivered.	£ s. d.	
15 oz. thirds .....	24d.	" ..
" fourths .....	24d.	" ..
21 oz. thirds .....	34d.	" ..
" fourths .....	24d.	" ..
26 oz. thirds .....	44d.	" ..
" fourths .....	54d.	" ..
32 oz. thirds .....	44d.	" ..
" fourths .....	54d.	" ..
Fluted Sheet, 15 oz. .....	34d.	" ..
" 21 oz. .....	24d.	" ..
Harley's Bolled Plate .....	24d.	" ..
" 24d. .....	24d.	" ..

## OILS, &amp;c.

per gallon.	£ s. d.	
Raw Linseed Oil in pipes .....	0 1 10	" ..
" in barrels .....	0 2 0	" ..
" in drums .....	0 1 11	" ..
Bolled .....	0 2 0	" ..
" in pipes .....	0 2 0	" ..
" in barrels .....	0 2 0	" ..
Turpentine, in barrels .....	0 3 9	" ..
" in drums .....	0 15 0	" ..
Genuine Ground English White Lead .....	19 5 0	" ..
Red Lead, Dry ft. ft. sup. as .....	0 6 6	" ..
Best Linseed Oil Faty .....	0 12 0	" ..
Stockholm Tar .....	1 12 0	" ..



## VARNISHES, &amp;c.

	Per gallon.
Fine Pale Oak Varnish .....	0 8 0
Pale Copal Oak .....	0 8 0
Superfine Pale Elastic Oak .....	0 12 6
Superfine Hard-drying Oak, for seats of Churches .....	0 14 0
Fine Elastic Carriage .....	0 12 6
Superfine Pale Elastic Carriage .....	0 16 0
Fine Pale Maple .....	0 18 0
Finest Pale Durable Copal .....	0 18 0
Extra Pale French Oil .....	0 13 0
Eggshell Flattening Varnish .....	1 4 0
White Copal Enamel .....	0 13 0
Extra Pale Paper .....	0 12 0
Best Black Japan .....	0 10 6
Oak and Mahogany Stain .....	0 9 0
Brunswick Black .....	0 8 0
Berlin Black .....	0 9 0
Knitting .....	0 10 0
French and Brush Polish .....	0 10 0

## TO CORRESPONDENTS.

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## TENDERS.

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\* Denotes accepted. † Denotes provisionally accepted.

ARNOLD (Notts).—For surface-water drains, St. Alban's-road, Furlong-street, Gelling-lane, etc., and Mansfield-road, Daybrook, for the Urban District Council. Mr. R. E. Clarke, Surveyor, Public Offices, Arnold, Notts. Quantities by Surveyor:—  
A. Wrayte & Son, Nottingham-rd., Arnold, Notts\* £472 [sixteen tenders sent in.]

BEDFORD (Middlesex).—For erecting a new Council school for 160 pupils, for the Middlesex County Council. Mr. H. G. Crotthall, Architect, The Guildhall, Westminster, S.W.:—  
F. Gough & Co. £2,274 0 0 Kingdries & Co. £1,900 0 0  
W. Blackburn & Sons 2,079 0 0 F. G. Keasley 1,955 0 0  
Treasure & Son 2,065 0 0 Son 1,986 0 0  
J. Ward & Son 2,040 2 ½ A. & B. Han 1,955 0 0  
H. Knight & Son 1,908 0 0 F. G. Minter 1,986 0 0  
W. Lawrence & Son 1,997 0 0 W. Dorey & Co. 1,813 0 0  
W. J. Renshaw & Son 1,997 0 0 J. Barker & Co. 1,813 0 0  
P. Atman & Fotheringham 1,997 0 0 Co. 83, High-street, Kensington\* 1,740 0 0

BROOKWOOD.—For new Council school, Brookwood, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects, 36, Victoria-street, London, S.W.:—  
Bessons Bros. £3,296 0 0 Martin Wells & Co. £4,625 0 0  
F. G. Minter 5,242 0 0 E. C. Hughes 4,624 9 8  
Bycamore Works, Ltd. 5,158 0 0 J. J. Shopland 4,618 0 0  
W. Beauchamp 4,391 12 7 T. R. Elvy 4,593 0 0  
Hudson & Co. 4,980 0 0 Robinson 4,441 0 0  
East & Hyde 4,772 0 0 Fryer & Co. 4,376 11 10  
J. Faggetter 4,758 0 0 Moss & Co. 4,326 17 7  
W. J. Renshaw 4,740 0 0 Drowley & Co. 4,319 18 4  
Cropley & Son 4,739 0 0 W. W. Gale 4,289 10 2  
W. Watson 4,736 2 4 G. Kany 4,157 0 0  
Oak Building Co. 4,697 6 2 J. H. Hawkins\* 3,932 9 8  
W. H. Hyde 4,658 0 0

BURNHAM (Bucks).—For erecting new room and offices at Burnham mixed school, for the Managers. Messrs. Sargeant & Son, architects, Slough:—  
F. W. Edwards £1,245 0 0 I. T. Harris 820 9 0  
C. W. Cox & Sons 1,070 0 0 Ward & Son 827 18 0  
Burfoot & Son 910 0 0 Burfoot & Butler, Slough\* 798 0 0  
F. Halsey 873 0 0  
H. D. Bowyer 821 0 0  
[Tenders marked \* include playground.]

CARDIFF.—For stands on the Cardiff Arms Park for the Welsh Football Union and Cardiff Football Club. Messrs. Ivor Jones & T. G. Richards, architects and surveyors, 18, St. Mary-street, Cardiff. Quantities by the architects:—  
G. Hallett £1,667 11 6 Gibbon £1,094 9 6  
I. J. Chorley 1,278 11 6 Gibson Bros. 956 0 0  
J. H. Venning 1,180 0 0  
[All of Cardiff.]

CHIPPENHAM.—For erecting a new school at Ivy-Jane, for the Wilts County Council Education Committee. Messrs. Silcock & Reay, architects, 47, Milcom-street, Bath:—  
G. Moore £3,280 0 0 Jacob, Long. £4,243 0 0  
A. Willis & Sons 4,679 0 0 & Sons 4,178 0 0  
A. W. Long. 4,684 18 0 E. Lidgey 4,178 0 0  
Hayward & Sons 4,562 0 0 & Sons 4,170 0 0  
W. Wooster 4,557 0 0 R. & C. Spackman 4,095 0 0  
Sons 4,493 0 0 A. J. Colborne 3,899 10 0  
Erwood & Morris 4,493 0 0 J. G. Norman, 62, Victoria-street, Swindon\* 3,726 13 4  
Dowling & Rudman 4,364 0 0

DERBY.—For alterations and additions to the aged and infirm building at the Union Workhouse, for the Guardians. Mr. F. C. Coulthurst, architect, 4, Albert-street, Derby. Quantities by architect:—  
A. Brown & Son, Great Northern-road, Derby\* £188

DEVONPORT.—For levelling, paving, and completing lane north of Keyham Barracks (section 1), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport:—  
Gefford & Sons £336 19 7 ½ T. Doney £411 10 5  
Pethick Bros. 817 12 6 F. D. Dorey 307 10 5  
E. L. P. Duke 817 4 1 Devonport\* 307 10 5

DEVONPORT.—For levelling, paving, and completing lane between Florence and Kathleen-avenues and rear of the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport:—  
Jefford & Sons £321 12 1 ½ T. Doney £226 12 2  
E. L. P. Duke 226 8 11 F. Dorey 221 1 0  
Pethick Bros. 225 19 8 Devonport\* 221 1 0

DEVONPORT.—For levelling, paving, and completing lane rear of south side of Whitington-street, for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport:—  
A. C. Jones £390 0 0 Pethick Bros. £626 18 2  
Jefford & Sons 685 16 4 F. Dorey 608 15 1  
E. L. P. Duke 642 18 8 Devonport\* 608 15 1  
T. Dorey 636 12 9

DEVONPORT.—For levelling, paving, and completing lane between St. George's-terrace, St. George's-road, and Paley-street (section 2), for the Corporation. Mr. J. F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport:—  
F. Dorey £247 4 9 Pethick Bros. £394 19 0  
Jefford & Sons 410 11 0 T. Doney, Plymouth\* 391 3 6  
E. L. P. Duke 399 1 4

EAST BARNET.—For making-up road and tarpaving footways, Long-street, for the East Barnet Local Board. Mr. H. York, Surveyor, Council Offices, Station-road, New Barnet:—  
T. Adams, Wood Green, N. £770

EMYVALE (Monaghan).—For erecting a dispensary and dispensary residence, etc. (stone-work), for the Guardians of Monaghan Union. Mr. W. A. Scott, architect, 74, Hollybank-road, Drumcondra, Dublin:—  
McCarthy & Co. £1,325 0 0 H. McGeough, 924 19 9  
J. Callan 1,220 0 0 Monaghan\* 924 19 9  
H. McGeough 1,220 0 0  
Sons 1,040 0 0

FARNHAM.—For alterations and additions, etc., to Badeshot Lea Council School, Farnham, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects, 36, Victoria-street, London, S.W.:—  
A. Mardon £1,461 2 2 E. C. Hughes £1,158 12 5  
East & Hyde 1,290 5 0 Tompsett & Co. 1,118 0 0  
McC. B. Pitt 1,213 0 0 Co. 1,118 0 0  
Croby & Co. 1,177 0 0 Martin Wells, 1,174 17 10  
Drowley & Co. 1,174 17 10 G. Kemp\* 942 0 0  
P. Caesar 1,174 0 0

GREENWICH.—For paving margins of roadway, Blackwall-lane and Tunnel-avenue, for the Greenwich Borough Council:—

Approximate Quantities.	Schedule.	Harvey B. & Co., Ltd.	G. J. Anderson, 90, North-street, Finsbury.	Dick, Kerr, & Co., Ltd.	J. Mowlem & Co., Ltd.	W. Griffiths & Co., Ltd.	J. Shebbear & Co.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
0,000 yds. super.	Taking up, cleaning, redressing where required, and relaying 12-in. by 6-in. granite channel kerb on concrete feeding, at per ft. lineal .....	0 5 ½	0 0	0 10	0 6	0 8	0 0 4
	Supplying and laying concrete and all necessary works complete, new 3-in. by 6-in. Aberdeen granite setts, at per yd. super. ....	16 6	16 0	15 4 ½	18 8	19 6	1 0 0
9,000 yds. super.	Supplying and delivering all as before, on works, new 3-in. by 6-in. Inverkeithing setts only, at per yd. super. ....	10 8	13 6	14 9 ½	16 1	17 0	0 18 3
	Supplying and laying concrete and all works complete, hardwood paving blocks, 3-in. by 9 in. by 6 in. at per yd. super. (Jarrah) .....	17 5	16 6	17 11 ½	16 6	16 10	0 13 3

FARNHAM.—For alterations and additions, etc., to Hale Council School, Farnham, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects, 36, Victoria-street, London, S.W.:—  
Moss & Co. £1,117 16 0 Tompsett & Co. £770 0 0  
Drowley & Co. 942 18 11 McC. B. Pitt 732 1 0  
East & Hyde 905 17 0 Crosby & Co. 680 0 0  
Higgs & Outliffe 891 0 0 P. Caesar 670 0 0  
A. Mardon 819 19 0 Martin Wells 687 0 0  
-timson & Sons 792 3 6 & Co. 680 0 0  
E. C. Hughes 779 5 9

FELTHAM.—For alterations at the Town Hall, for the Middlesex County Council. Mr. H. T. W. Jackson, County Architect, Middlesex Guildhall, S.W. Quantities by Messrs. Young & Brown, Holborn:—  
W. Stark £2,106 11 6 J. H. Baker & Co. 1,875 Ltd. 1,875  
G. Parker 1,875 Ltd. 1,875  
W. B. & A. Hildes, 1,853 G. Godson & Sons 1,853  
Pattman & Fotheringham, Ltd. 1,853 Dorey & Co., Ltd. 1,853  
Spiers & Son 1,830 A. Emmett 1,830  
D. D. Heath 1,830 T. J. Messon & Sons 1,830  
T. Hiscok 1,739 J. Hobbins 1,739  
C. Ansell 1,731 W. H. Hyde 1,731  
T. W. Soole & Son 1,750 Wood Junction\* 1,744  
J. C. Mather 1,745

GORSKINOW.—For erecting an institute in Lime-street, for the Gorseston and District Trades and Labour Council. Mr. C. Butler, architect, Bank-chambers, Heathfield-street, Swansea:—  
T. D. Jones £1,995 H. Billings £1,700  
D. Jenkins 1,779 G. Mercer, Llanelli\* 1,700

HENDREDA.—For new Council school, Hendreda, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects, 36, Victoria-street, London, S.W.:—  
Whitlock & Co. £4,375 11 0 H. Kent 4,324 0 0  
Crosby & Co. 4,150 0 0 Norman 4,118 0 0  
Johnson & Co. 4,118 0 0 Burt 3,939 0 0  
Jenkins & Sons 4,077 0 0 W. J. Renshaw 3,781 0 0  
F. Milton 4,022 0 0 Hawkins & Co. 3,768 4 4  
Martin Wells & Co. 4,000 0 0 East & Hyde 3,721 0 0  
Lowry 3,381 0 0 Moss & Co. 3,702 0 0  
G. Kemp 3,875 0 0 J. J. Shopland 3,668 0 0  
Hastings, Ltd. 3,857 3 0 W. H. Hyde 3,646 10 0  
Builder, Ltd. 3,857 3 0 W. H. Flint\* 3,542 0 0  
E. Elvy 3,833 12 0

KENAPHILL.—For alterations and additions to infant school, new infant school, manual instruction and cookery room, Kenaphill Council School, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects, 36, Victoria-street, London, S.W.:—  
Aylott £3,169 2 1 W. H. Hyde 2,708 2 1  
Cheney & Co. 2,711 15 5 E. Streather 2,672 18 0  
Sveamore Works, Ltd. 7,647 18 10 F. Deacon 2,669 0 0  
J. Sheppard 7,511 0 0 Drowley & Co. 6,951 0 0  
Bunning 7,505 15 9 Banard 6,901 0 0  
Higgs & Co. 7,236 0 0 East & Hyde 6,901 0 0  
Martin Wells & Co. 7,233 0 0 Cropley & Son 6,786 0 0  
Gammson & Co. 7,185 14 10 Appleton 6,580 0 0  
Mitchell Bros. 7,169 0 0 J. N. Pat- 6,464 0 0  
Ennes Bros. 7,121 9 0 W. Watson 6,427 0 0  
F. J. Shopland 7,116 0 0 W. H. Gale 6,396 0 0  
Land 7,116 0 0 W. W. Gale 6,396 12 7

LEICESTER.—For Balgrave sewerage (No. 1) contract, 1,271 yds. of brick and pipe sewers, for the Corporation. Mr. E. G. Mawbey, Borough Surveyor, Town Hall, Leicester:—  
Co. Wright & Co. £6,958 9 0 Bentley & Lock £4,247 2 6  
W. Moss & Sons, Ltd. 6,042 6 0 Philbrick Bros. 4,776 2 6  
Co. Macken 4,938 4 0 Smith & Co. 4,444 10 0  
Langley & Hardy 4,301 12 0 John Langley, Leicester\* 4,120 11 0  
Johnson 4,301 12 0



**IBERWICK.**—For 160 9-ft. lengths of 4-in. cast-iron water pipes and 40 lengths spigot and faucet, etc., for the Town Council. Mr. G. Crulshank, Borough Surveyor, Lerpeth. **Canon & Robertson, Kirkcaldy**... £99 7 1

**LEYTON.**—For erecting 1,000 lineal yds. of fencing on marsh lands adjoining Lea Bridge, for the Urban District Council. Mr. W. Dawson, Surveyor, Town Hall, Leyton. **E. & A. Russell**, 223 6 8 J. Ruggles... £187 10 0  
**J. Barnes & Sons**, 225 0 0 Horton & Son 183 6 8  
**M. Frost**, 225 0 0 W. Manders... 183 6 8  
**R. N. Marshall**, 225 0 0 M. Marshall... 175 0 0  
**A. Stevens**, 216 13 4 Rowland Bros. 165 12 6  
**T. Torode**, 216 0 0 A. Turner & Sons... 164 11 8  
**E. C. White**, 212 10 0 P. H. Allin & Sons, Cambridge bridge... 185 0 0  
**G. Heburn**, 203 6 8  
**J. Jackson**, 200 0 0  
**W. Thomas**, 191 13 4

**LEYTON.**—For paving, channelling, etc., certain public streets, for the Urban District Council. Mr. W. Dawson, Surveyor, Town Hall, Leyton. **E. & A. Russell**, 216 9 2 J. E. Hanson... £1,521 17 1  
**W. Griffiths**, 216 9 2  
**C. Ltd.**, 1,660 2 7 W. Manders... 1,474 17 6  
**T. Frost & Sons**, 1,656 0 0 G. J. Anderson... 1,470 9 2  
**J. Jackson**, 1,558 17 8 O. T. Gibbins... 1,441 0 0  
**Leightonstone**, 1,441 0 0

**LONDON.**—For making-up the carriageway of Chisland-street, Fulham, for the Fulham Borough Council. Mr. P. Wood, Borough Surveyor, Town Hall, Fulham, S.W. **Roadway.** **Footway.**  
**Harvey Bros.**, 1,264 0 0  
**H. J. Greenham**, 979 0 0  
**J. Moore**, 970 0 0  
**G. W. Wimpey & Co.**, 944 0 0  
**F. Fowler**, 500 0 0  
**Borough Surveyor**, 280

## LONDON BOARD OF EDUCATION TENDERS.

The exterior of the undermentioned schools are due, and tenders for the work have been received as follows:—

**Battersea, "Letchmere" (J.M.).**  
**E. & A. Tucker**, 47 0 R. S. Ronald... £42 0  
**L. Whitehead & Co., Ltd.**, 45 0 Stockwell-road\*... 41 0

**Barnsbury, Monmouth-road (old portion).**  
**O. Sharplington**, 273 7 W. H. King... £293 8  
**H. Line**, 291 J. Garrett & Son... 170  
**W. H. Lascelles & Co.**, 215 H. Groves... 135  
**Rice & Son**, 203 W. Sayer & Son, 56, New Kent-road\*... 165

**Bethnal Green, N.E., Monmouth-street.**  
**A. E. Symes**, £220 0 0 H. Bouneau... £238 12 6  
**Vigor & Co.**, 283 0 0 W. Silk & Son... 232 10 0  
**W. Williams**, 265 0 0 Barrett & Power... 215 0 0  
**W. Shummur & Sons, Ltd.**, 264 0 0 R. Woollaston & Sons, 22, Lacey-street, Bow\*... 197 0 0  
**S. Ingham**, 240 0 0

**Bow and Bromley, "Old Palace."**  
**W. Derby**, £181 0 Langdon & Clark... £93 0  
**E. Symes**, 123 0 J. Dolman & Co., 511, Northampton-street, Poplar\*... 93 0  
**Co.**, 99 10

**Brixton, Stockwell-road.**  
**W. Leonard**, £225 17 4 Holliday & Greenwood, Ltd., 174... £149  
**Whitehead & Co., Ltd.**, 145 Maxwell Bros., Ltd., 145... 145  
**J. Coleman & Co.**, 162 J. J. Richards... 138  
**Rice & Son**, 159 Triggs, 92, The Chase, Clapham\*... 134

**Deptford, Clifton-road.**  
**I. Holloway**, £273 0 S. Musgrove... £183 3  
**H. Bowie**, 228 0 W. Young... 183 3  
**H. Foster & Son**, 212 10 Apsey-road, North Norwood\*... 183 0  
**V. Good**, 200 0

**Dulwich, "Friars."**  
**H. Line**, £177 0 C. G. Jones... £119 18  
**G. Sharplington**, 163 0 Maxwell Bros., Ltd., 145... 145  
**Rice & Son**, 154 0  
**J. & C. Boyer**, 148 0  
**Co.**, 123 0

**Dulwich, "Green-road."**  
**Leary & Son**, £225 0 0 J. C. Bowyer... £212 10 0  
**O. Sharplington**, 275 0 0  
**W. Leonard**, 245 17 8 W. V. Good, 24, Cambridge-well-road\*... 179 0 0  
**Maxwell Bros., Ltd.**, 179 0 0

**Finsbury, C., Compton-street.**  
**T. Howard**, £225 15 10 Langdon & Clark... £169 0  
**Beeson**, 210 10 J. Grover & Son, Wilton Works, Islington\*... 147 0  
**H. Lascelles & Co.**, 169 0  
**W. Williams**, 189 0  
**Co.**, 125 10  
**J. & P. Power**, 110 10

**Finsbury, C., "Hugh Middleton" (Junior).**  
**H. Lascelles & Co.**, £189 0  
**Beeson**, 189 0  
**Co.**, 125 10  
**J. & P. Power**, 110 10

**Finsbury, C., St. John's Lane.**  
**Langdon & Clark**, £174 0  
**J. Cheesum & Sons**, 139 0  
**Mattock & Parsons**, 115 0  
**W. Williams**, 111 10

**Fulham, Ackmar-road.**  
**W. Leonard**, £277 0  
**W. & Estwell**, 317 0  
**H. J. & Co.**, 297 0  
**Co.**, 292 10

**Greenwich, Blackheath-road.**  
**H. L. Holloway**, £207 0  
**F. S. Howard**, 206 0  
**W. Hayter & Son**, 170 0  
**H. Groves**, 170 0  
**C. G. Jones**, 165 11

**Greenwich, Fosse-road.**  
**H. Groves**, £165 0  
**R. Woollaston & Co.**, 164 17 6  
**W. H. Lascelles & Co.**, 156 0 0  
**W. H. Bowie**, 156 0 0  
**E. Proctor & Son**, 149 0 0

**Greenwich, Glanister-road.**  
**P. S. Howard**, £210 0 0  
**W. Banks**, 174 19 6  
**R. Woollaston & Co.**, 146 10 0  
**W. H. Bowie**, 144 0 0

**Hackney, N., Bailey's-lane.**  
**H. Willmott**, £155  
**J. Stewart**, 137  
**W. Silk & Son**, 129  
**R. Woollaston & Co.**, 121

**Hackney, N., Benthall-road.**  
**Patman & Fotheringham, Ltd.**, £213 0  
**J. Cheesum & Sons**, 160 0  
**J. Stewart**, 160 0  
**C. E. Price**, 155 10

**Islington, E., Gillespie-road.**  
**A. Porter**, £194 0  
**McCorrick**, 188 0  
**Patman & Fotheringham, Ltd.**, 176 0  
**G. Kirby**, 169 0  
**J. Stewart**, 167 0

**Islington, E., Shapton-road.**  
**F. W. Harris & Co., Ltd.**, £165 0  
**Kilby & Gifford**, 169 10  
**J. Cheesum & Sons**, 157 0  
**A. Porter**, 153 0  
**W. King & Son**, 140 0

**Islington, N., Montem-street (S.M.).**  
**McCorrick & Sons**, £28 0  
**G. Kirby**, 81 0  
**Stevens Bros.**, 74 0

**Islington, S., Queen's Head-street.**  
**J. Barton & Co.**, £260 0  
**J. Cheesum & Sons**, 159 0  
**A. Porter**, 144 0  
**McCorrick & Sons**, 141 0  
**W. Silk & Son**, 138 10

**Islington, W., Hungerford-road.**  
**G. Kirby**, £151 0  
**J. Peattie**, 145 0  
**Stevens Bros.**, 136 0  
**Marchant & Hirst**, 138 0 0

**Kennington, N., Middle-road.**  
**G. H. Sealy**, £290 0  
**W. & Estwell**, 183 10  
**J. M. French & Co.**, 146 5  
**General Builders, Ltd.**, 144 0

**Kennington, N., Wornington-road.**  
**G. H. Sealy**, £287 10  
**General Builders, Ltd.**, 298 0  
**Cowley & Drake**, 280 0  
**Aldridge & Son**, 280 0  
**G. Neal**, 242 0  
**Chinchen & Co.**, 220 10 0

**Kennington, S., Gloucester-grove East.**  
**E. Flood**, £238 0 0  
**Spencer, Santo, & Co., Ltd.**, 183 0  
**W. Brown & Sons**, 171 15 8

**Kennington, S., Broad-street.**  
**H. Bouneau**, £275 0  
**Barrett & Power**, 268 0  
**J. Haydon & Son**, 240 12  
**W. Sayer & Son**, 134 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Kennington, S., "Southwark-park."**  
**H. Line**, £255 0  
**W. H. King**, 172 0  
**W. H. King**, 172 0  
**Staines & Son**, 164 0  
**J. Greenwood, Ltd.**, 158 0

**Southwark, W., Westminster Bridge-road.**  
**W. Klop & Son**, £219 0  
**L. Whitehead & Co., Ltd.**, 166 0  
**G. Brittain**, 167 0  
**J. Appleby & Sons**, 153 0  
**W. Sayer & Son**, 142 10

**Wandsworth, Firecroft-road.**  
**W. Johnson & Co.**, £159  
**R. S. Ronald**, 159  
**Martin, Wells, & Co., Ltd.**, 150

**Wandsworth, Merton-road.**  
**R. A. Jewell**, £184  
**J. Carmichael**, 181  
**B. S. Ronald**, 170  
**Hudson Bros.**, 165

**Whitechapel, Buck's-row.**  
**A. W. Derby**, £141  
**W. H. Lascelles & Co.**, 140  
**J. F. Holliday**, 138  
**J. Dolman & Co.**, 127  
**W. Hornett**, 122

**Whitechapel, Deal-street.**  
**A. E. Symes**, £184 0  
**A. W. Derby**, 106 0  
**D. Dolman & Co.**, 138 0  
**Vigor & Co.**, 134 0  
**Stevens Bros.**, 134 0

**Whitechapel, "Marian-park."**  
**W. Banks**, £127 0  
**H. Groves**, 125 0  
**W. Hayter & Son**, 124 10  
**E. Proctor & Son**, 114 0  
**P. S. Howard**, 114 0

**Chelsea, The "Ashburnham" (Reconstructing Portion of Drains).**  
**R. P. Beattie**, £220  
**Durbin & Katesmark**, 595  
**G. Neal**, 581  
**J. Peattie**, 555  
**F. Bull**, 545

**Wandsworth, Mitcham-site (Iron Buildings).**  
**Croogon & Co., Ltd.**, £1,230  
**Milson & Harrison**, 1,200  
**Humphreys, Ltd.**, 1,200  
**T. J. Hawkins & Co.**, 1,149  
**W. Harbrow**, 1,120  
**J. McManus**, 1,094

**Bethnal Green, N.E., Dover-road (Covered Playground).**  
**W. Martin**, £109 0  
**Vigor & Co.**, 105 0  
**W. H. Lascelles & Co.**, 96 10  
**W. Shummur & Sons, Ltd.**, 94 5

**Hackney, S., Daubney-road (Division of Rooms).**  
**G. S. S. Williams & Son**, £212 0  
**W. H. Lascelles & Co.**, 207 0  
**L. E. & R. Roberts**, 205 0  
**H. Bouneau**, 198 10

**Hackney, S., Morning-lane (Provision of Porch).**  
**H. Willmott**, £116 10  
**W. H. Lascelles & Co.**, 101 10  
**J. Grover & Son**, 98 0  
**Stevens Bros.**, 97 10

**Hoxton, Shorelitch Technical Institute.**  
**G. S. S. Williams & Son**, £444 0  
**L. E. & R. Roberts**, 399 0  
**E. Lawrence & Sons**, 380 0  
**T. L. Green**, 327 0  
**W. H. Lascelles & Co.**, 299 0

**Limchous, Thomas-street (Additional Room for Teachers).**  
**Vigor & Co.**, £110  
**Langdon & Clark**, 97  
**Barrett & Power**, 97  
**Rotherhith, Midway-place (Relaying Floor and Removing Gables Gallery).**

**Acme Flooring and Paving Co. (1904).**  
**Ltd.**, £232  
**Lathley Bros.**, 169  
**E. Trigg**, 163  
**J. Garrett & Son**, 161  
**Barrett & Power**, 162  
**J. Marsland & Sons**, 149

**Brightside Foundry & Engineering Co., Ltd.**  
**Co., Ltd.**, 45 10  
**Islington, S., Richard-street (New Boilers and Heating Apparatus).**

**C. Kite & Co.**, £346 0  
**G. Davis**, 340 0  
**Brightside Foundry & Engineering Company, Ltd.**, 327 15  
**J. Grundy**, 306 0  
**W. G. Cannon & Sons**, 290 0

**Kennington, N., Portobello-road (Improvements).**  
**[That the cloakroom and the teachers' room of the girls' department of the Portobello-road school (Kennington, N.) be enlarged, and that a cloak cupboard be provided; that expenditure not exceeding £200, be sanctioned for this purpose; that the work be executed by Messrs. J. & M. Patrick, the contractors for improvements at the school; and that the actual cost be calculated, on completion, on their contract schedule of prices.]**

**Anley Residential School (Extension of Playing Field).**  
**W. Taylor (two)**, £147 0  
**J. Power**, 124 0  
**Estimates**, 124 0  
**A. Thoburn**, 75 0

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**A. Thoburn**, 75 0



# CONTRACTS AND PUBLIC APPOINTMENT.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tender to be Delivered
Langbank Sewage Works.....	Renfrew Lower District Committee	J. Murray, C.E., County Buildings, Paisley	Aug. 7
Paving and Flagging Streets.....	Leeds Corporation	City Engineer's Office, Municipal Buildings, Leeds	Aug. 7
Tar Macadam Carriageways.....	do.	do.	do.
Masons' and Painters' Work at Scattered Homes.....	Plymouth Guardians	W. Adams, 19, Princess-square, Plymouth	do.
New Street at Parc Mala, Carmarthen.....	Carmarthen Corporation	Borough Surveyor's Office, John-street, Carmarthen	do.
Laying 1,800 yds. of 4-in. cast-iron Mains.....	Craneleigh Water Co., Ltd.	F. S. Courtney, Engineer, 25, Victoria-street, Westminster, S.W.	do.
Removal of 1,250 yds. of 4-in. and 3-in. Mains.....	Edinburgh City Council	do.	do.
Macadam and Concrete Paving.....	Newhaven U.D.C.	Mr. Proudfoot, City Road Surveyor, City-chambers, Edinburgh	do.
Sanatorium Water Supply, Barraford.....	Chiswick U.D.C.	E. Knightley, Clerk, Council Office, Newhaven, Sussex	do.
Granite.....	Plymouth Education Authority	J. Barclay, Surveyor, Town Hall, Chiswick	do.
Sewers.....	do.	E. Chandler Cook, 18, Princess-square, Plymouth	Aug. 7
Cupboards, Desks, Lockers, etc., at Technical School	do.	H. Thompson, Architect, Post Office-chambers, Eiland	do.
Single and Dual Desks.....	Larne R.D.C.	County Surveyor, County Courthouse, Belfast	do.
4 Hses. & Shop, Spring-gate, Burnley-rd., Sowerby Bdg.	do.	P. Turner, Architect, 12, Midland-buildings, Bradford	do.
Road, Drumcower.....	Woolcombers, Ltd.	W. Bell, Architect, Central Station, Newcastle-on-Tyne	do.
Cutting Hills.....	North-Eastern Railway Co.	Director-General of Stores, India Office, Whitehall	do.
Works, Boiler House, etc., Wapping, Bradford	Secretary of State for India	do.	do.
Three Shops, New Bridge-street, Newcastle	do.	Morgan W. Davies, Mining Engineer, Swansea	do.
Rolls Material for Waggon.....	Dulais Anthracite Collieries Co.	G. Eedes Eadus, Engineer, Town Hall, Edmonston	do.
Electric Travelling Cranes.....	Edmonston U.D.C.	do.	do.
Sinking and Walling Shafts.....	Assoc. of Tooting Horse Owners, Ltd.	Ross & Macbeth, Architects, Queensgate-chambers, Inverness	do.
Granite Kerb.....	Caerphilly U.D.C.	Pound Farm, Escher, Surrey	Aug. 12
Stone Paving for Footways.....	West Riding Education Committee	A. O. Harpur, Surveyor, Council Office, Caerphilly	do.
Caledonian Bank Buildings.....	Messrs. Buchan & Co.	H. & France, Architects, 99, Swan-arcade, Bradford	do.
*STABLING AT THE LAMPS DIETON	do.	J. Vickers-Edwards, County Architect, County Hall, Wakefield	Aug. 11
Cemetery, Penryn.....	The Governors	T. Roderick, Architect, Aberystwyth	do.
Two Houses, Burley-in-Wharfedale.....	Milporth U.D.C.	H. Channon, Architect, Malton	Aug. 11
Painting & Decorating South End Prov. Sch., Eiland	Luddenden Foot U.D.C.	The Headmaster	do.
Additions, etc., to Royal Hotel, Rhymney	Newtown-in-Makerfield U.D.C.	Niven & Hadden, Surveyor, Council Office, Luddenden Foot	do.
Iron Sur. Wa. Drn. Pps., etc. "The Rest," Porthcawl	Surrey Education Committee	J. S. Boltonley, C.E., 131, West Row-street, Glasgow	do.
Restoration of St. Leonard's Church, Malton	Mr. N. B. Thompson	A. Bowes, Gas Engineer, Town Hall, Harncliffe	do.
Alterations, etc., Town Grammar School	Finchley U.D.C.	J. Cook Rees, Architect, Treaharris	Aug. 11
Millport Waterworks.....	Lewis-Marthy Colliery Co.	W. Dowdell, Architect, Church-st.-chambers, Pontypriid	do.
Nonship Granite Setts.....	Chester Sub-Com. for Winsford, etc.	A. Adams, 14, Market-place, Morpeth	do.
Laying-out Burial Ground at Holmer.....	Oxford Education Committee	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
Steam-tipping Lorry.....	do.	Armstrong, Architect, 24, Bank-street, Carlisle	do.
Alterations, etc., of Addoldy Chapel, Glyn-Neath	West Suffolk Education Committee	W. Lloyd Thomas, Esqr. and Archt., Church-st.-chambers, Pontypriid	do.
Eleven Houses at Lock-street, Aberystwyth	Clare R.D.C.	A. Adams, 14, Market-place, Morpeth	do.
Library, Church Village, Llantriffrid	Blackpool Corporation	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
Sewage Disposal Works, Red-row, near Chevington	Metropolitan Borough of Fulham	Armstrong, Architect, 24, Bank-street, Carlisle	do.
*SCHOOL AT MAYBURY	Hammersmith Borough Council	W. Cook Rees, Architect, Treaharris	do.
Alterations to Farm Buildings, Lifford	Barnet U.D.C.	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
Stabling at Depot, Leam-street, Lifford	West Riding Education Committee	Armstrong, Architect, 24, Bank-street, Carlisle	do.
*ELECTRICITY WORKS-SUB-STATION	Pembroke Borough Council	A. Adams, 14, Market-place, Morpeth	do.
Seven or Eight Cottages at Senghenydd	Skipton U.D.C.	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
Nine Houses, Blagnoy, Newcastle	Kent Education Committee	W. Lloyd Thomas, Esqr. and Archt., Church-st.-chambers, Pontypriid	do.
School, King Edward-street, Middleswich	Herts C.C.	A. Adams, 14, Market-place, Morpeth	do.
Alterations to Premises, Luther-street	Chadderton U.D.C.	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
Alter. & Repairs & Bldg. Classroom, Sudbury Schl.	Univ. Coll. of South Wales and Mon.	Armstrong, Architect, 24, Bank-street, Carlisle	do.
Schools, etc., Westminster-road, Handsworth	Pontypriid U.D.C.	W. Lloyd Thomas, Esqr. and Archt., Church-st.-chambers, Pontypriid	do.
Heating and Ventilating Schools, Westminster-road	Parish of Lambeth	A. Adams, 14, Market-place, Morpeth	do.
Sinking a Borehole.....	Shilley U.D.C.	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
*NEW BOILER HOUSE, ETC.	Riebridge Guard-house	W. Lloyd Thomas, Esqr. and Archt., Church-st.-chambers, Pontypriid	do.
*CLINKER RIDDLING PREMISES	Borough of Horsey	A. Adams, 14, Market-place, Morpeth	do.
*PAINTING, ETC., WORK AT TOWN HALL	Selby U.D.C.	J. & S. Richards, Architects, 36, Victoria-street, Westminster, S.W.	do.
*STREET WORKS, FITZJOHN'S AVENUE	Finchley U.D.C.	W. G. Wilson, Architect, 5, Bloomsbury-mansions, W.C.	do.
Works at Glass Houghton Cuttyke School	Bristol Dock Company	W. W. Squire, Engineer, Cumberland-road, Bristol	do.
Works at Denby Dale School	Humber Com. Ry. & Dock Co. Dem.	Sir J. Wolfe Barry & Partners, 21, Delany-st., Westminster, S.W.	do.
New Engines and Others for Existing Ones	Bucks Education Committee	T. B. Thompson, Architect, 15, Parliament-street, Hull	do.
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*NEW SCHOOL AT EYNSFORD, GROCKENHILL	Wortley R.D.C.	F. Crawshaw, Surveyor, Loxley	do.
*RECON. BOOTS HILL BIDGE, RICKMANSWORTH	do.	H. Leaver, Architect, 22, Donegal-place, Belfast	do.
*FOUNDATIONS, NEW UNIV. COLL. BLDGS., CARDIFF	do.	The Managers, Barkland	do.
*HOME FOR AGED POOR	do.	The Vicar, Frocton	do.
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Works at Redington Workhouse, Suffolk	do.	A. E. Brathwaite, 21, Victoria-road, Hyde Park, Leeds	do.
WARD BLOCK, MUSWELL-HILL BOUL. ROS	do.	Mrs. Mellor, Gorpwydd, Old Colwyn	do.
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*CONSTRUCT. NEW DOCK, ETC., DUMFRIES	do.		
*NEW ELEMENTARY SCHOOLS, AYLESBURY	do.		
Residence at Cottingham	do.		
Primitive Methodist Church, Sunnybrow, Wellingborough	do.		
Primitive Methodist Ch., Dene Bridge, near Ferryhill	do.		
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beter, .....	2,448 0 0	& Co., New-	
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**STANLEY (Durham).**—For street works and improvements on South Moor-lane, and also street crossings at Stanley, Oxhill, and South Moor, for the Urban District Council. Mr. J. Routledge, surveyor, Stanley, R.S.O.:—

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A. Routledge	740 15 3	Son. Gosforth* ....	619 7 9
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**SWANSEA.**—For culverting a portion of the Rials Brook and widening Cwm-road, for the Corporation:—

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**SWANSEA.**—For repairs and alterations of the Swansea Market, for the Town Council. Mr. Glendinning Moxham, architect, 39, Castle-street, Swansea:—

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W. Manders	3,687 11 8	Co. ....	2,899 7 2
T. Adams. ....	3,281 4 10	G. J. Anderson, Poplar* ....	Incomplete
Parsons & Parsons. ....	3,085 3 3	Hewett & Sons. ....	
J. Jackson. ....	3,059 6 10		

**WETHERSFIELD (Essex).**—For erecting a dwelling-house, for Mr. F. Wenden. Mr. J. W. Clark, architect, Coggeshall:—

J. T. Deeks. ....	£556 10 1	T. Wicks. ....	£410 0
C. E. Runnacles. ....	516 0	H. Gooch. ....	395 0
G. Sharp. ....	425 0		

**WITTON.**—For storage tanks in Hennebique's patent ferro-concrete, Holdford-road, for the Handsworth Urban District Council. Mr. H. Richardson, Engineer and Surveyor, Council House, Handsworth, Birmingham:—

W. Cunliffe. ....	£5,383 10 3	Yorkshire Hennebique Contracting Co. ....	5,147 10 8
Cruys & Holrough. ....	4,047 11 0	J. Hove & Co., West Hartlepool* ....	3,411 0 0

[Engineer's estimate, £5,220 13s. 9d.]

**WITTON.**—For sewers, manholes, and cast-iron rising main, Holdford-road, for the Handsworth Urban District Council. Mr. H. Richardson, Engineer and Surveyor, Council House, Handsworth, Birmingham:—

E. Boore. ....	£2,067 2 11	Sutherland & Thorpe. ....	£1,569 17 9
Curral, Lewis, & Martin. ....	1,618 0 0	W. Canfield, Birmingham* ....	1,518 2 0

[Engineer's estimate, £2,050 7s. 7d.]  
Contract No. 4 (Machinery, Motors, etc.).  
Tangye's, Ltd., Birmingham\* .... £890  
[Engineer's estimate, £890.]

**WITTON.**—For engine house, engineer's cottage, and boundary wall, Holdford-road, for the Urban District Council of Handsworth. Mr. H. Richardson, Engineer and Surveyor, Council House, Handsworth, Birmingham:—

E. Boore. ....	£1,972 16 8	T. A. Cole & Son. ....	£1,589 5 3
Curral, Lewis, & Martin. ....	1,918 5 4	G. E. Jackson, Oldbury* ....	1,498 12 3
W. Cunliffe	1,807 1 3		
W. Hopkins	1,820 0 0		
T. Johnson	1,666 2 11		

[Engineer's estimate, £2,008 18s. 8d.]  
**WORKING.**—For alterations and additions, etc., manual instruction and cookery room, Westfield Council School, Working, for the Surrey Education Committee. Messrs. Jarvis & Richards, architects, 38, Victoria-street, London, S.W.:—

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Turtill & Appleton. ....	5,686 0 0		

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Ingram & Son. ....	£1,124 10 3	Drowley & Co. ....	£890 0 0
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McC. E. Fitt	887 0 0		
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J. H. Leilott. ....	676 5 0	W. J. West, Worthing* ....	613 4 2
W. D. Thomas. ....	640 0	Co. ....	£629 0
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E. Price. ....	638 5	J. Lloyd, 'Strad-mynach' ....	650 0

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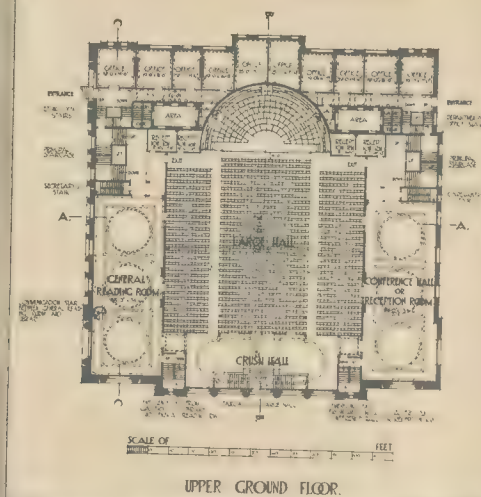
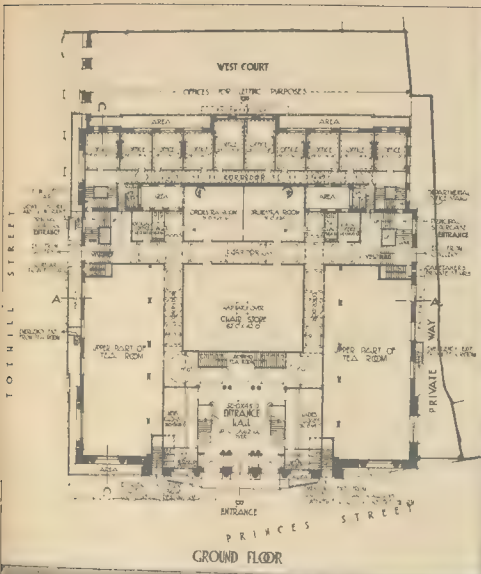
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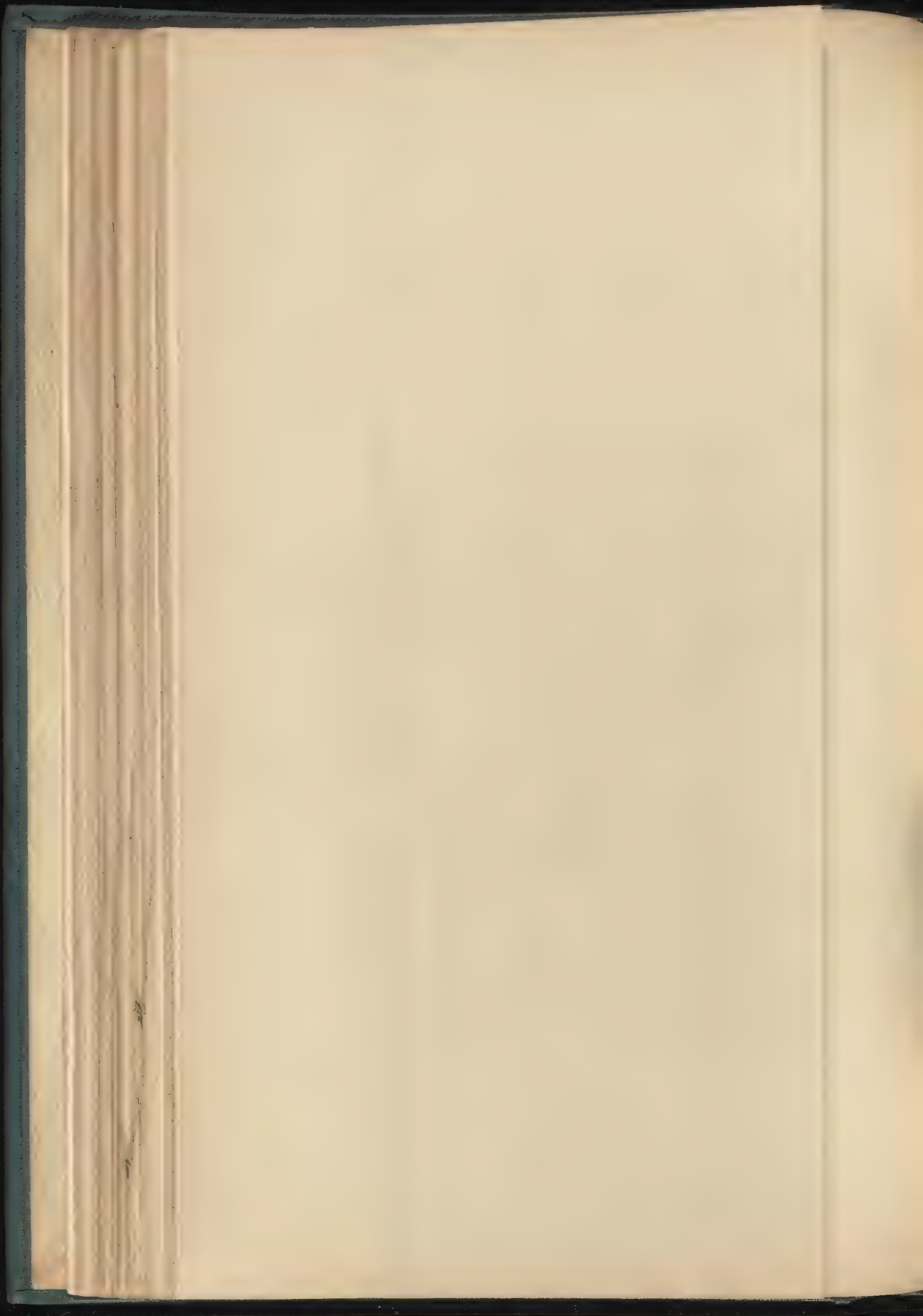
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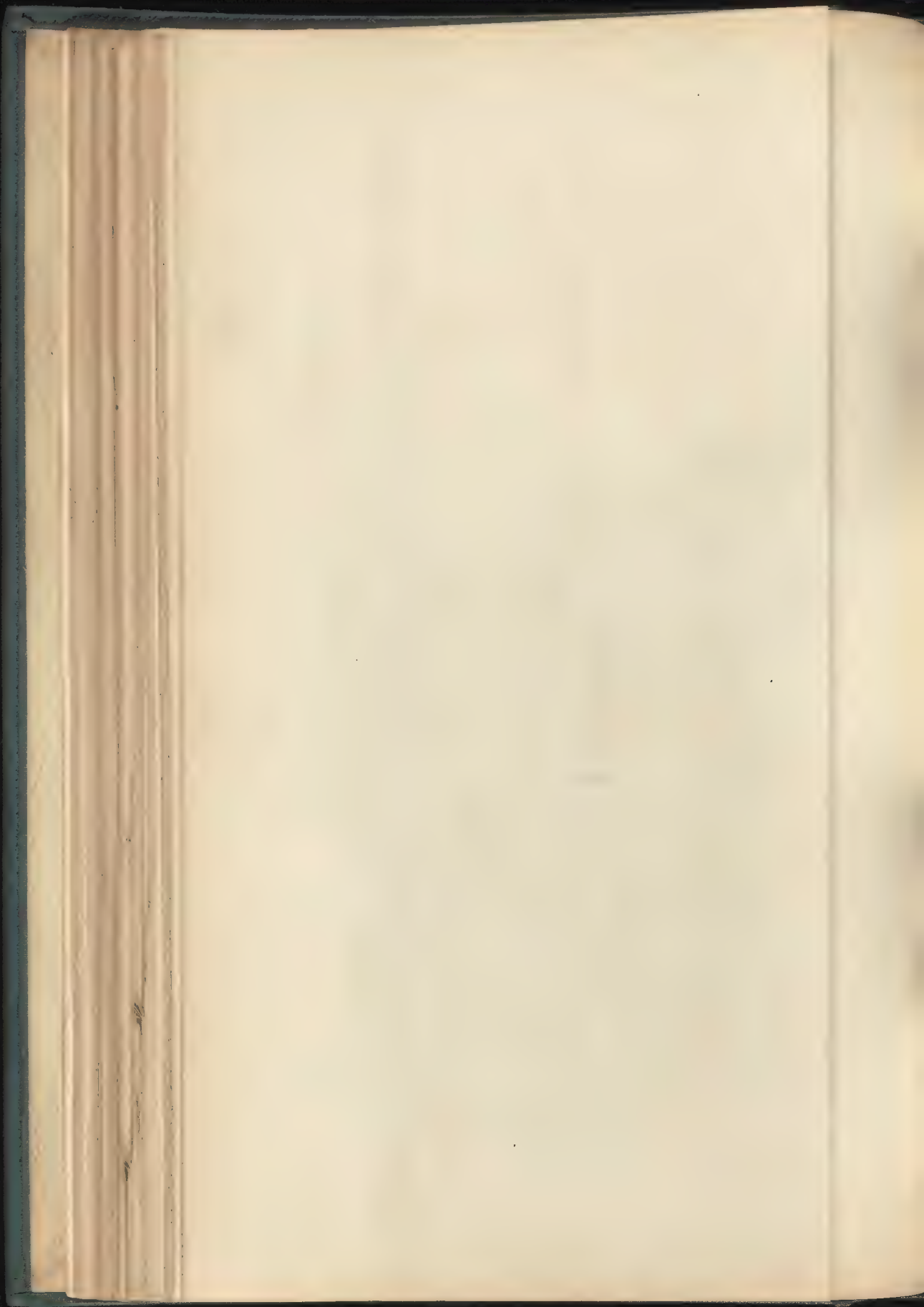
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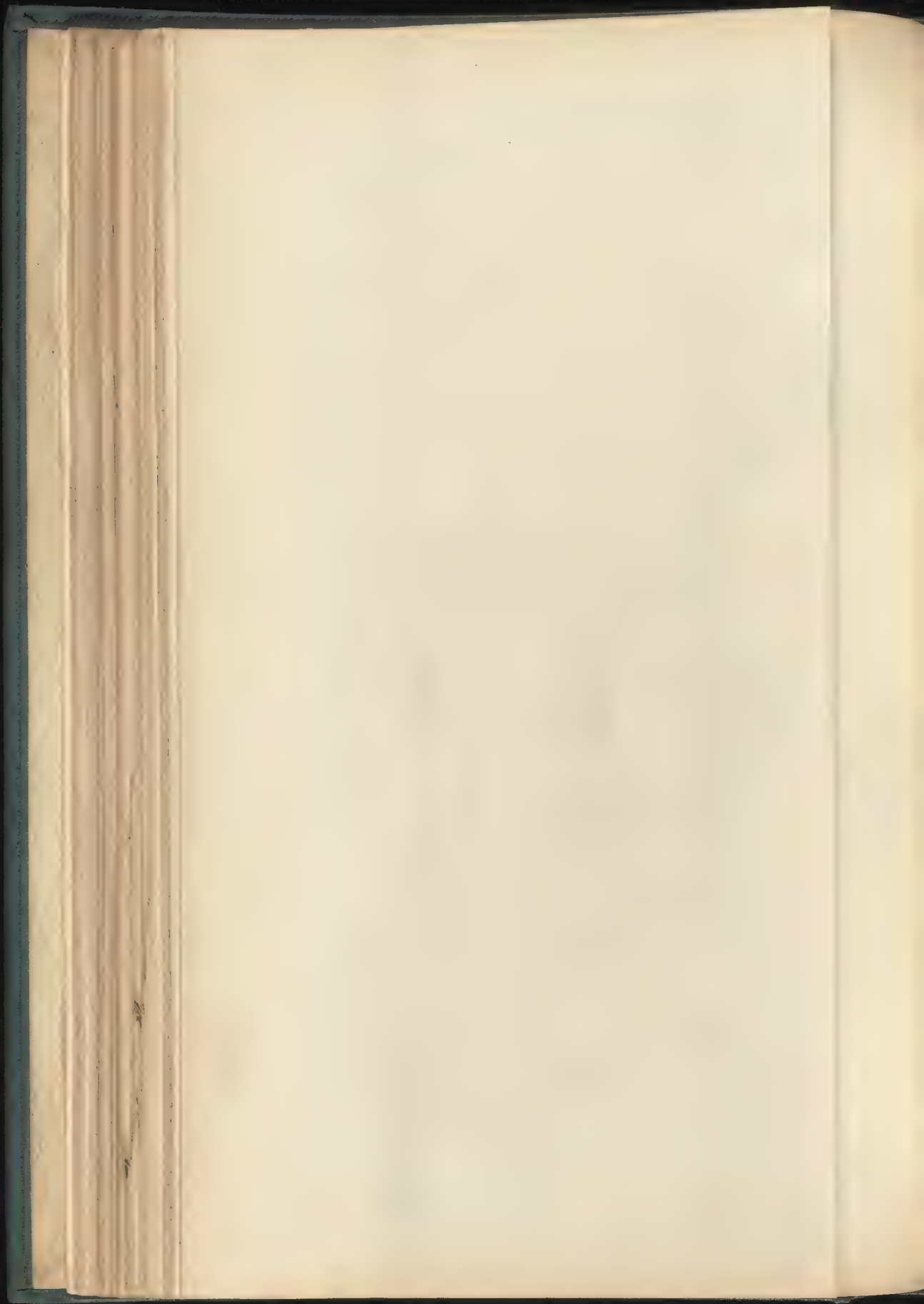
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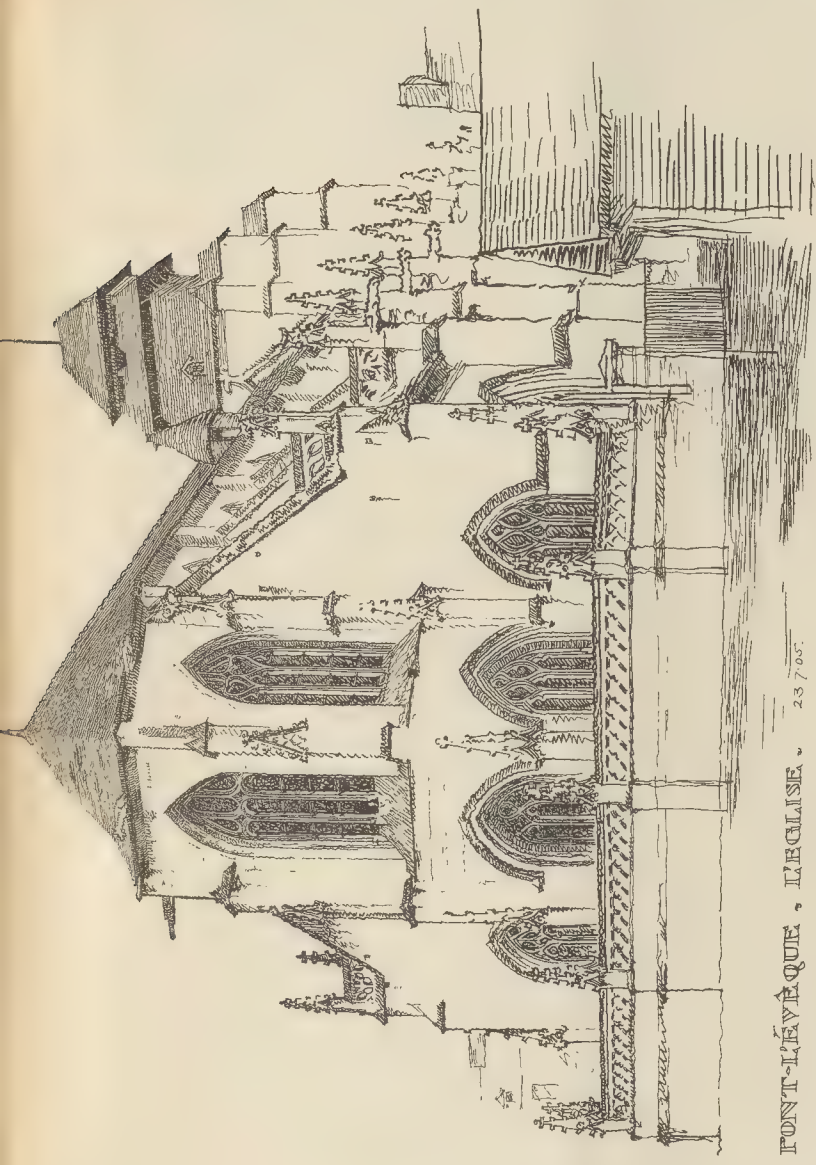




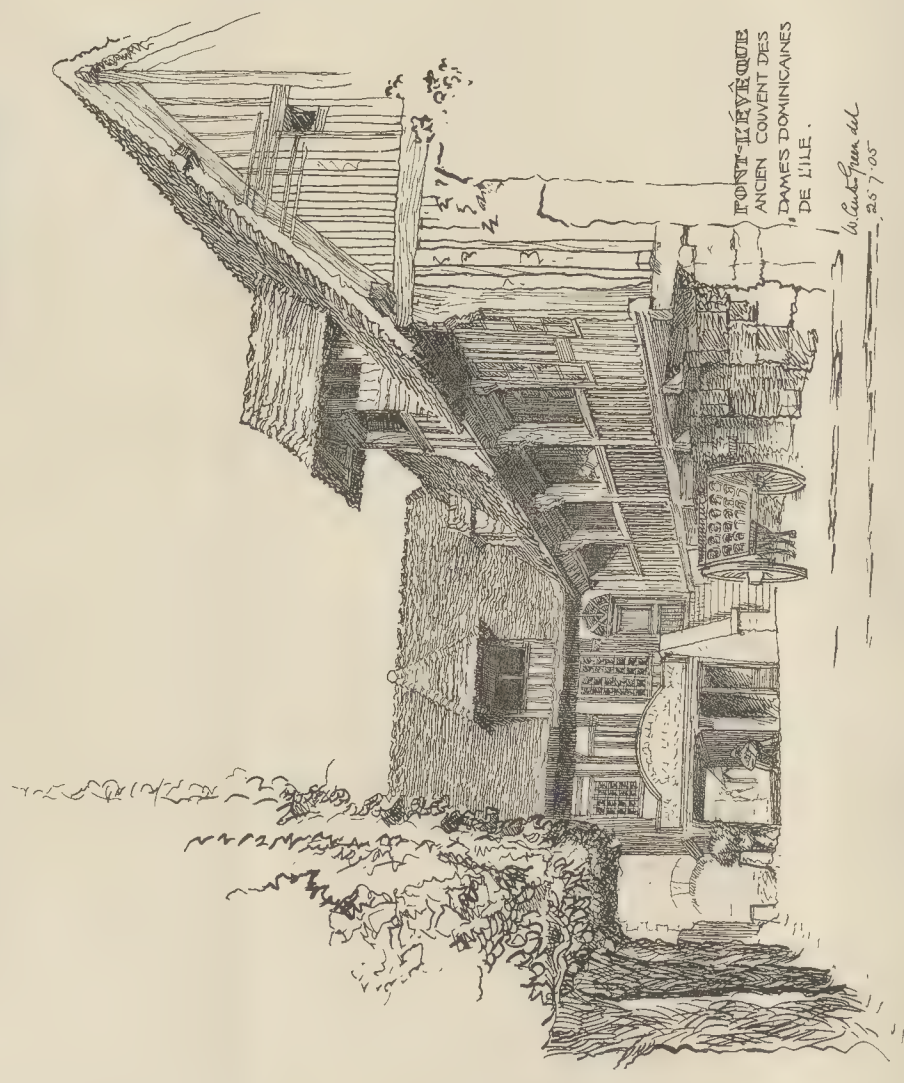








FONT-L'ÉVÊQUE, ÉGLISE. 23 7'05"

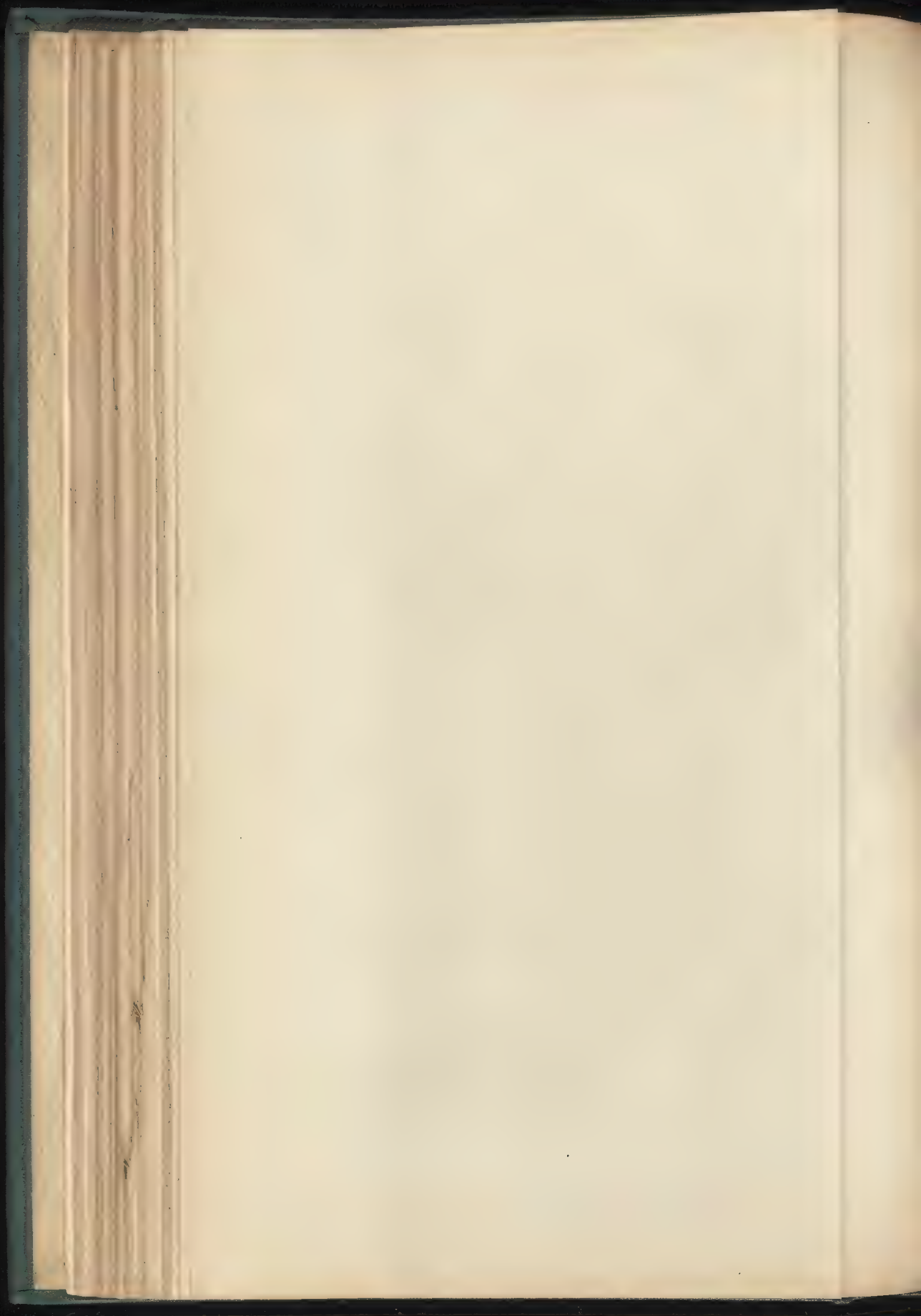


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W. L. G. 25 7'05"

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# The Builder.

VOL. LXXXIX.—No. 3262.

AUGUST 12, 1905.

## ILLUSTRATIONS.

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Sketches with the Architectural Association in Normandy:—	
Lisieux Cathedral	
Victor Pontfol Château; Hotot Farm, etc. }	Drawn by Mr. W. Curtis Green.
Sheet of Details	

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## Constructional Steelwork.

LOWLY but surely steel is continuing to make its way as a material of construction in building work. Except in residential houses, there are very few build-

structural steel, and architects will find it more and more necessary to increase their stock of knowledge with regard to this valuable material and to the manner in which it may be applied with the greatest advantage.

At the same time, the advocates of concrete-steel will witness a great development in the use of that combination, but the popularity of steel applied in the form of substantial members is not likely to suffer serious diminution for many years to come.

Doubtless many will choose to erect buildings with walls of concrete reinforced by thin rods of steel, but walls of brick or stone with a background of solid steel will live long and die hard. It is not our present object to discuss the relative merits of the two systems, but rather to draw attention to some essential points connected with the design and erection of buildings in which steel is represented by familiar structural sections.

The subject is a large one, and although its primary essentials were fairly covered by a series of articles which appeared in our pages four or five years ago,\* other aspects are equally deserving of attention. It is not sufficient for the designer to be familiar with the mathematical and theoretical side of structural design. He may readily acquire sufficient knowledge of the physical properties of steel and of methods of calculation, to enable him to design a structure on correct lines and to provide for strength and stability. But, to qualify himself for economical design, practical knowledge is essential.

The best way of acquiring such knowledge is in the workshop, where most of our leading civil engineers received a large part of their training. But architects have necessarily to deal with so many branches of technical work that a lifetime might easily be devoted to practical training if an apprenticeship had to be served in every department. Hence, so far as outlying departments of architectural practice are concerned, effort is concentrated chiefly upon the development of a capacity for dealing broadly with the main principles of design and a facility for grasping the essential details of construction. Those of our readers who desire some further insight into the methods followed in the workshop and erecting yard of the structural engineer may be recommended to read a recent work by Mr. A. W. Farnsworth, which deals particularly with the practical aspect of constructional steelwork.\* The book to which we refer is intended to afford to designers generally an indication of what should be embodied in their creations. If the author succeeds in making clear to the designer the methods of the practical engineer, he will have performed an excellent service to both parties, for nothing is more conducive to waste of time and money than the drawings and specifications of those who have imperfect knowledge of the processes by which their requirements must be fulfilled.

Mr. Farnsworth has divided his subject-

\* "Constructional Steelwork: Being Notes on the Practical Aspect and the Principles of Design, together with an Account of the Present Methods and Tools of Manufacture." By A. W. Farnsworth. London: Charles Griffin & Co., Ltd. 1905.

\* The Builder, vol. lxxviii.



matter into two parts:—(1) Practical Designing and (2) Practical Shop Work. We shall now refer in proper order to some of the more important points in each of these main divisions.

"Ideal Designing" is the text of the first chapter, and in this the author does well to call attention to the common fault of putting blind faith in mathematics. The growth of this defect is probably due, as suggested, to the division of work in such manner that the craftsman has ceased to be a designer; while the designer has drifted away from craftsmanship to the regions of pure theory. We have in our midst too many mathematicians, posing as engineers, who fancy the calculus will solve all difficulties and who evolve wonderful theories which they vainly believe will upset or override practical experience. On the other hand, we have those who attach too much importance to their own interpretations of observed results. The great need of the present day is to bring together the designer and the man who has to realise designs in concrete form.

Workshop training in engineering laboratories cannot do much for the young engineer, and students turned out from universities and colleges have always to unlearn a great deal when they get into a shop where the cost of production is an essential factor. On the other hand, pure science cannot be of material value to the journeyman or master mechanic, except so far as it may enable him to perfect his methods of work. Of course, in large engineering establishments, where designing is an important branch of daily practice, the case is quite different. There machinery and structures are designed in a manner that puts to shame the efforts of men with a semi-technical training, but it too often happens that the chiefs of such organisations are compelled to carry out defective or extravagant designs prepared by consulting engineers, or the draughtsmen of consulting engineers having nothing more than office experience.

A hypothetical case put by Mr. Farnsworth shows that he realises the correctness of the views expressed above. He assumes that an engineer has to design a bridge involving the employment of thousands of tons of steel. Being aware that so many pounds must be paid for every ton of material used, he carries figures to their finest point, and works in materials, shapes, and sections upon the same basis. Yet the resulting design may be a wasteful one, because the forms of material and methods of construction specified may add so seriously to the cost of manufacture as to make the price per ton of finished work altogether excessive. Hence, as the author remarks, the designer has "economised his material and wasted his labour."

Work is too often designed in this way, sometimes through the ignorance of engineers, but more often by reason of the lack of knowledge on the part of their draughtsmen.

We readily admit that architects rarely offend in this direction, but the reason is the most unsatisfactory one that, as a general rule, they leave the question of design to commercial engineers. Among the few architects who understand the

theoretical design of constructional steelwork, one or two may really possess the requisite practical knowledge, but this is very doubtful. Almost anyone can design a structure so that it shall be safe—the problem is to achieve the result with the minimum expenditure of material and labour.

This brings us to the second chapter, which is a homily on the supreme importance of economy. The author justly deprecates the ignorant attempts of some engineers whom the "cult of the beautiful" has led "to rosettes and stars and ogee sections, to elaborate piercings and geometrical patterns." He admits that the cry for beauty is not altogether responsible for these outrages on good taste, and attributes the blame rather to the engineer who attempts to pander to a taste he does not understand, and to aim at beauty of detail when he should have studied beauty of form.

Such beauty is consistent with true economy. Some of the finest stone bridges that have ever been built are embodiments alike of beauty and of economy. In fact, it may be said that they were economical for the same reason that they are beautiful. But the day of beauty for steel structures of architectural character has not yet dawned. So far as engineers are concerned, the attributes of beauty and economy are best attained when the work performed has been designed simply in accordance with mechanical and utilitarian principles, and without any attempt at decorative treatment. Architects, in whose province lies artistic design, may find it possible to carry matters a point beyond, but nothing can be done in this direction without a sound knowledge of first principles and adequate familiarity with the routine of the fitting and erecting shop.

In discoursing on "The Duty of the Designer," the author emphasises several points which we need scarcely indicate, preferring to refer our readers to the chapter where they are to be found. One argument, however, deserves special mention—namely, that the client's interest can only be properly safeguarded by men who possess, in addition to theoretical training, adequate personal knowledge of current working practice. The latter is the more essential inasmuch as methods of manufacture are advancing from year to year, and we quite concur with the opinion expressed by the author, that "the man who to-day bases his designs on his knowledge of workshop conditions a decade ago is woefully out of the race."

Only those who have been engaged in the commercial department of structural engineering can adequately realise how largely the price of work is influenced by the specification. As the author points out in Chapter V., "Every clause, every phrase, and word are carefully considered before a price is finally arrived at. Given the same drawings and details, the same identical design in every respect, and two specifications drawn up for it by two different engineers acting independently, and it is not too much to say that the prices under open tender by the same firm will in some cases vary as much as 5% per ton."

We cannot go quite so far as Mr.

Farnsworth in this estimate of monetary difference, but the view generally expressed in this passage is substantially correct. Of course, the specification is a very necessary document, for without the various firms submitting tenders for a given work would not be able to state their prices upon a common standard. Some might allow for the highest cost of work and others for very inferior work at minimum cost. The true function of the specification is to make clear precisely what is wanted in the way of materials and workmanship, and to define the conditions under which a contract is to be executed. When essentials are embodied in a reasonable manner the specification is welcomed as a valuable aid by the maker. Unfortunately, many engineers have habits which are introduced into all their specifications, with the result that contracting firms are needlessly harried, and the client has to pay an increased price without any corresponding advantage.

Mr. Farnsworth advocates the adoption of a standardised form for the most important items in every specification for structural steelwork, so that manufacturers may be enabled to lay out their works and machinery to fulfil regular requirements with the smallest possible expenditure, and without disturbing the regular routine of operations. Standardisation of the kind has been adopted with much advantage in the United States, and, to illustrate this point, the author gives at the end of his book, a copy of the Manufacturers' Standard Specification, which is universally accepted in the United States as a satisfactory basis for structural engineering contracts. The details of this document are not precisely those to which we are accustomed in Great Britain, but it would be easy to prepare a similar standard conforming to British engineering practice. However stringent the requirements of such a specification might be, they would be far preferable to the varying demands of irresponsible designers. Several other fruitful causes of excessive cost directly traceable to existing methods of specification are fully discussed by the author, and it may be hoped that his advocacy may have some influence in helping to convince consulting engineers of the necessity for uniformity of practice in the direction indicated.

According to the system generally prevailing in this country, commercial engineers are not supposed to prepare working drawings, the theory being that these are invariably made by consulting engineers or the professional advisers of public authorities and private corporations. Yet those who are familiar with actual practice are well aware that thousands of draughtsmen all over the country are employed in the works of structural engineers to correct and execute drawings received, so as to make them suitable for their intended purpose. The reason why so many defective drawings are sent out is that engineers with purely office training in structural design have very little idea of what is actually necessary for the guidance of workmen, who, it must be remembered, are allowed no initiative, and are expected to do nothing more than to follow the



tracings handed to them. Foremost among the errors made in drawings are those relative to riveting. The theoretical designer seems to be quite ignorant of the fact that structural sections and plates can only be put together in a certain way, which at the same time governs the arrangement of the rivets.

Recognising the supreme importance of riveting in all built-up work, Mr. Farnsworth devotes Chapter VI. to an enumeration of the more essential points that should receive the attention of draughtsmen. He shows that in the design of plate girders the whole question of the riveting should be thoroughly threshed out before the drawing has advanced very far, and directs attention to the loss of time caused by the placing of stiffeners so as to interfere with the regular spacing of rivets. Still worse is the too frequent practice of leaving all thought of the riveting until the drawing is practically complete, the result generally being that rivets are shown in places where they cannot possibly be inserted. With imperfect drawings of the kind only two courses are open:—(1) To follow the drawings as far as practicable, which sometimes means bad work; and (2) to make new drawings for approval by the engineer, which means delay.

Chapter VII. deals with the choice of steel sections by the designer, and is intended to show how much the sizes of rolled bars and plates may affect the delivery and finish of the projected work. The author is quite correct in saying that "with average work the least difficult thing is to determine the stresses on members." This can be done by anyone possessing moderate knowledge of mechanical principles, but intimate acquaintance with the practice of the workshop is necessary for really economical design.

It is shown in this chapter that certain sections can be bought more cheaply and delivered more quickly than others. The reason is that the "rolling programme" at the works is invariably based upon sizes in greatest demand. Orders for other sizes have to accumulate until the quantity is sufficient to justify the expense of changing the rolls in the mill, or, if imperatively demanded, the customer will have to pay the extra expense involved. Hence it is often cheaper to waste a little metal by adopting regular stock sections than to pay for the rolling of special sections. Considerations such as these show that the designer must be in close touch with the manufacturer if his position is to be justified. Reduction of the number of different sizes in a given member, and the choice of the most convenient lengths of bars and plates are among the remaining matters dealt with in this chapter, which is thoroughly worthy of close study by architectural and engineering draughtsmen.

In Chapter VIII. Mr. Farnsworth discusses the question of finish—a most important factor in the determination of cost. If a designer has not been through the shops, it is extremely difficult for him to know which may be the cheaper of two classes of work, even if he happens to realise the fact that any difference of finish actually exists. Several stereotyped statements are mentioned by way of

illustration. For instance, certain standard drawings show the diagonals of lattice girders fitted carefully into the root and along the flanges of the main girder angles—a method of treatment probably costing about one shilling for each bar, and adding nothing to the strength of the construction. Similarly, it is often required that the ends of knee stiffeners shall be carefully dressed and filed up to remove the marks of the cold saw, the only result being that cost is largely increased. Some draughtsmen delight in curved connecting plates, forgetting that all curved lines are very expensive, and it is quite common to find two joggles demanded in one bar where one joggle would answer the same purpose. These and many other traditional fads inevitably tend to increase the cost of steelwork.

We can scarcely agree with Mr. Farnsworth in his advocacy of punching for rivet and other holes. It is not a sufficient argument to say that no controversy on the subject has arisen in the United States, where it is said by the author "the whole question the designer sets himself to settle is how to 'get there' in the quickest and cheapest way." There is no doubt that drilled holes are far superior to "punched and reamed" holes, and still more superior to simple punched holes. Which of the three varieties should be adopted is a matter for the discretion of the designer. In many cases punching is quite good enough, especially when accurately performed by the aid of the most modern tools.

Perhaps the most flagrant waste of money in the way of finish is caused by the requirement that the edges of steel members which are to be buried in masonry shall be planed, chipped, dressed, and filed up as carefully as if they were to be exposed to view. Finish of the kind does not in the least add to the strength and permanence of the structure, and is of no use whatever. The same pedantry is often exercised in connexion with the design of roofs and railway bridges high above the heads of spectators, and even in bridges intended for remote Colonial territories. Extravagant folly of the kind to which we now refer is not to be found in the work of really competent engineers, who rely for effect upon broad outlines and make no attempt to embody what Mr. Farnsworth terms "engine work fitting" in small details. Those of our readers who have inspected the Forth Bridge from the water, and examined it closely from the footway of the platform, are in a position to confirm the opinion that the absence of minute finish in trivial details in no way detracts from the general appearance of that work when viewed from the nearest possible point on land or water.

Part I. concludes with two chapters on "Inspection" and one on "Estimating," the last-mentioned being addressed more particularly to commercial readers. At the same time it contains suggestions that ought to be of service to the architectural and engineering designer.

Part II. has the generic heading of "Practical Shop Work." It comprises seven chapters, wherein fully-detailed accounts are given of the operations

conducted in the office, the template shop, the girder shop, and the smithy, and two chapters, one of which describes painting, marking, packing, and other final processes and the other embodies the chief points for consideration in connexion with the design and equipment of workshops for the fitting and erecting of constructional steelwork.

While heartily recommending this part of Mr. Farnsworth's book to the attention of our readers, we do not think it necessary to refer at length to its contents. Chapter XII., on "Office Routine," shows how the drawings of consulting engineers have to be examined, corrected, and extended before the actual working drawings can be made for use in the workshop, and we hope it may have the effect of bringing offenders to a sense of their shortcomings.

The remaining chapters describe methods of work and illustrate the types of modern machinery used for rolling, straightening, bending, sawing, shearing, planing, pressing, forging, welding, drilling, punching, and riveting structural steel sections. They also deal with marking for erection, painting, inspection, testing, packing, and various processes incidental to the execution of structural contracts.

The information collected in these chapters shows that the author possesses personal experience of the subject, and we feel confident that its publication will serve the useful purpose of making many designers acquainted with the details of workshop practice, thus enabling them to follow the progress of their ideas through the different manufacturing processes to final realisation.

The work should be a valuable help to architects and engineers alike, being calculated to make up in great measure for the lack of practical knowledge, which in its way is quite as important as familiarity with the theoretical principles of structural design.

#### EXTRAORDINARY TRAFFIC ON HIGHWAYS.

THE increase of building and what is termed in popular language the "development" of rural and suburban districts is making the question of the so-called "extraordinary" traffic on highways daily more important. This fact is clearly reflected in the official Law Reports, in which during the last few years quite a number of new cases on this point are to be found.

The law on this subject is in its basis statutory, though, like nearly all law in England, judicial decisions on the original statutory law have enlarged the original legal elements, and so in combination have laid down—for the present—something in the nature of a fairly clear body of rules. By the Highways and Locomotives Amendment Act, 1878, s. 23, it is enacted that "where . . . it appears to the authority which is liable . . . to repair any highway . . . extraordinary expenses have been incurred by such authority in repairing such highway by reason of the damage caused by excessive weight passing along the same or extraordinary traffic thereon such authority may recover . . ."



from any person by whose order such weight or traffic has been conducted the amount of such expenses." This statute was followed after a lapse of twenty years by the Locomotives Act, 1898, which amended the section set out above by substituting for the words "by whose order" the words "by or in consequence of whose order." The result of this legislation has been to engraft on our highway law exceptional liabilities in the case of certain persons who use the highways. It is questionable whether this liability can be regarded as properly imposed. The taking of extraordinary or unusual traffic along a road is not an improper or illegal act in itself: it is a legitimate use of a public highway. In the year 1893, in the case of *Hill v. Thomas*, the Court of Appeal laid down this rule:—"Extraordinary traffic is really a carriage of articles over the road at either one or more times which is so exceptional in the quality or quantity of articles carried or in the mode or time of user of the road as substantially to alter and increase the burden imposed by ordinary traffic on the road and to cause damage and expense thereby beyond what is common." But, as already pointed out, there is no improper use of the road made, and it comes to this, that a man who for a time uses a road to an abnormal extent or, indeed, as we shall presently show, who permanently uses a road to a greater degree than before was customary has to pay for its upkeep. But though he may be thus using a highway apparently abnormally, he may not in the long run do more damage to a highway than two or three persons who use it more than their neighbours all the year round and reduce it by wear and tear and yet pay no more rates. As we all know, A, who has no horses, carriages, or carts, is rated for the support of the highways as much as B, whose business is carried on by means of carts and horses. Yet B pays no more highway rates than A; if, however, A proceeds to build a house and have his bricks and other materials carted over a section of a highway, he may be made liable to pay a sum for extraordinary traffic, which, as the schoolboy's Euclid says, "is absurd." The case of the *Etherby Grange Coal Company v. the Auckland District Highway Board*, which was decided by the Court of Appeal in 1893, illustrates this assertion, and also the point referred to above as to a permanence of such liability. It was admitted that the coal trade was the staple industry of the district in which the dispute arose and that the roads in the district other than the road the subject of litigation were used by coal owners for the cartage of their coals. This road, owing to new coal workings, was suddenly turned from a purely agricultural highway into a commercial highway. From 1887 to 1890 the cost for upkeep per mile of the road had been 10% a year. In consequence of the extra traffic the cost went up between 1890 and 1892 to 25% a mile. The question arose whether the comparison of expenditure, which is the chief test as to whether traffic is extraordinary or not, should be between the cost of the particular road before and at the time of the extra traffic or between the particular road and other roads in the district. It was held that

only the road in question could be considered. Therefore, as already pointed out, a person or company may apparently become permanently liable for extraordinary traffic though it is only such as is found on other roads in the district.

This, then, is the first point—one of principle—which has to be considered, namely, should there be any special liability at all for extraordinary but quite legitimate traffic? Secondly, if there should, should the comparison be between the particular road only before and at the time of such traffic? The liability which at first sight seems reasonable is, when analysed, very doubtful, and seems to be contrary to the modern principle that the cost of the upkeep of highways should be borne by all the ratepayers of a locality. The point might be developed and discussed at much greater length than our space will permit, but it is obviously one which in any consideration or amendment of the Highway Act is of much importance.

There is yet another branch of the subject of considerable interest to many of our readers, since it primarily affects the liability of contractors. It arises on the meaning of the words "by or in consequence of whose order." It cannot, we may say at once, be considered as a point on which the law is quite settled, and it is pretty clear that liability may turn—if there is litigation—on findings of fact by judges or juries. The emendation of the law in 1898 by the substitution of the above words for those which were in the earlier Act "by whose order" was in consequence of the decision in the case of the *Kent County Council v. Lord Gerard*, which went up to the House of Lords, where it was decided that a building owner was not responsible for extraordinary traffic in the case of the cartage of materials for a house, which materials he had bought delivered on the spot, but that the contractor, on the contrary, was liable, because the building owner was not the person "by whose order" the extraordinary traffic had been carried on. In 1900 came the case of the *Epsom Urban Council v. the London County Council*, and in it the facts were that the County Council had contracted with Messrs. Kirk & Randall to carry out alterations and additions to an asylum, and for the purpose of carrying out this contract extraordinary traffic on a highway ensued. Mr. Justice Bigham held the London County Council to be liable because the traffic resulted in consequence of their order. We confess that the decision appears to be based on a sensible construction not only of the new words, but of their obvious intention. It is difficult, however, to reconcile this decision with that of a Divisional Court in 1902 in the case of the *Egham Rural Council v. Gordon*. Here the facts were that the defendant was about to build a house, and gave an order to a brick company for bricks to be delivered on the land where the house was to stand. This company, without his knowledge, arranged with a contractor to deliver the bricks by means of a traction engine and trucks, and it was admitted that the roads had been damaged by them. The County Court judge before whom the case was first tried held that the damage had not been caused in consequence of the

order of the building owner, and his judgment was upheld by the High Court. The gist of the decision was that the words "in consequence of" must be interpreted "as a necessary consequence of." But Mr. Justice Bigham said the previous case nothing about necessity but "the consequence of the orders contracts was that the traffic was conducted along the road," and therefore that the building owner was liable. The moment the word necessity is imported the object of the amendment of the Act of 1878 is gone, because unless a building owner gives a direct order to a contractor as to the manner in which material is to be carted the direct link is missing. On the whole, therefore, the law on this point seems to be in favour of the contractor, though it is also clear that it cannot be said to be without doubt.

There is another point to which a short reference may be made, namely, that the wear and tear of the road must be shown to result from the extraordinary traffic and not from a failure of the highway authority to maintain the road in proper condition. In other words, if the extra cost of the road can be shown to arise from a combination of causes, such as weather, bad management, and heavy traffic, the person who places this traffic on the road is not responsible. This appears to be the result of the very recent case, the *Monmouthshire County Council v. Scott*. This case did not, it should be said, arise on the question of liability for extraordinary expenses, but was a question of granting an injunction to prevent the defendant from committing a public nuisance by using the road at all. But the reasoning in the case is applicable to such cases as have already been mentioned in this article. One conclusion most people will, we think, come to: that the legislation and decisions on the question of extraordinary traffic show very clearly the need for a modern code of highway law.

#### NOTES.

**Dock Amalgamation in the Thames.** THE recent authoritative announcement at the annual meeting of the London and India Docks Company that an amalgamation has been arranged between that company and the Millwall Docks Company is a practical step towards a more systematic management of the Port of London. In consequence of this arrangement the two sets of rival docks will be physically united, and the management will also be unified. Though, as we have said, this is a step, it is, however, only a step towards a better state of things. Unquestionably, the ideal to be aimed at is a port trust similar to the Mersey Dock and Harbour Board. The alternative to this is the transfer of the Thames as a port to a Government department—which would probably be considered undesirable by shipowners. It is, however, a ridiculous anomaly in these days that the docks and the river should be managed by separate authorities, and as to the river, a more unsatisfactory body in its composition than the Thames Conservancy cannot be imagined. But nothing definite or complete will be done until a new and vigorous Government



takes up the matter, determined to make London an up-to-date port.

It is most satisfactory to find it stated in the annual report of the Board of Trade relating to strikes and lockouts that 1904 was a record year for the small number of industrial stoppages, the workpeople affected being under 1 per cent. of the industrial population (exclusive of agricultural labourers and seamen) and the working time lost representing about one-seventh of a day per head. The disputes occasioned by refusal to work with non-union men and arising out of trades unions' principles also showed a considerable decrease. The working people are to be congratulated on the facts disclosed in this report. The year has not been one of commercial prosperity, and credit must be given for the spirit of conciliation shown in far from favourable conditions of trade. On former occasions we have pointed out that the number of trades disputes has shown a steady decrease, since the decision by the House of Lords in the Taff Vale case; the influence of the irresponsible agitator has been lessened, and the spirit of conciliation has been fostered. It must also be remembered that the absence of strikes indirectly benefits the working classes, since the trades unions' funds have not to be frittered away in strike pay, but the unions are able to apply their funds to their sick pay and benevolent schemes, the organisation of which they so ably carry out.

It would be difficult to find a more dangerous section of tramway track than that along the Madeira-road, Ramsgate. Not only is the gradient very steep, but the road has one or two particularly sharp curves. Under the most favourable conditions the safety of passengers hangs on the efficiency of the car brakes; but in rainy weather even the brakes are no safeguard, as the recent mishap shows. Considering that there is a far more practicable route towards Broadstairs, we wonder the line was ever sanctioned in its present position. This was by no means the first serious tramway accident in Ramsgate, and we are glad to find that the Board of Trade have decided to hold an inquiry on the subject.

THE case of Hargreaves v. Baldwin affords a testimonial to the ingenuity of solicitors or their legal advisers, but it has been decided by the Divisional Court in a manner satisfactory to the public. The appellant was charged under section 1 sub-section (1) of the Motor-Car Act with driving "on a public highway recklessly or negligently in a manner dangerous to the public, having regard to all the circumstances of the case, including the nature, use, and condition of the highway and the amount of the traffic which might reasonably be expected to be, on the highway." For some reason, the words "or at a speed" were omitted from the charge, and the appellant's contention was that, since it had been decided that this section dealt with two separate offences, on the charge as laid no evidence

could be given as to the speed. The Court negatived this contention, and it is difficult to see how the element of speed could be eliminated from the charge of reckless or negligent driving. In this case the car was attempting to pass another vehicle and several cyclists at a speed of not less than twenty miles an hour, and in avoiding it one of the cyclists was injured. It appears that the neglect to slow up was the negligence for which the defendant was convicted on the charge as laid.

Motor Vehicle Exhaust Gases. USERS of London streets ought to be grateful to the Automobile Club for the efforts they are now making to discourage the emission of smoke and vapour from motor-cars. Most vehicles of this type are designed so as to discharge exhaust gases in the wrong direction. There is no reason why human beings and animals passing behind or following a car moving slowly along a crowded street should have offensive exhalations blown in their faces. The evil is much exaggerated when an excessive amount of oil is used for cylinder lubrication and when combustion is incompletely effected. Let us suppose, however, that all these matters were perfectly regulated. There would still remain the manufacture and distribution of carbon dioxide, an essentially unwholesome product, inseparable from the employment of internal combustion motors and every other form of heat engine. People talk about the insanitary horse, but the motor-car is just as bad in another direction, and, if mechanical traction is ever to become universal in London, it will be necessary to insist upon the use of electricity or some other innocuous source of motive power.

The Roads. At a recent meeting of the Cheshire County Council attention was drawn to the serious effect the dust nuisance as created by motor traffic was having upon house property adjoining main roads, and amongst the remedies suggested was a treatment of the roads with salt. The damage to house property is by no means confined to Cheshire, as throughout the country it has become practically impossible to let or sell houses fronting on main roads, but in the suggested treatment of the roads the general public will have to be considered and their interests protected. The treatment of the roads with salt would be injurious to health and very bad indeed for horses' hoofs. Londoners in winter have had bitter experience of this in time of snow, when salt has been used and a freezing mixture has been the result. The salt in damp weather keeps the roads moist, and may thus lay the dust, but the result is equally unpleasant to pedestrians and horse traffic, and the use of salt would become a serious nuisance.

Magnetic Separators. WERNER VON SIEMENS suggested many years ago that electro magnets might be usefully employed in iron mining to separate the rich from the poor ores. Since his time many engineers have considered the problem, but it is only recently that magnetic separators have

come into everyday use. In a very interesting paper in the *Engineering and Mining Journal* of New York Mr. Hamilton describes the revolution brought about in the Swedish iron industry by the recent developments of the electrical applications. The Grängesberg Mining Company, which possesses vast iron ranges in the northern parts of Sweden, has, owing to the proximity of unlimited water power, profited most by the use of electricity. The great bulk of the electrical horse-power transmitted from the waterfalls is utilised for the hoists, locomotives, air-compressors, power drills, etc., but some of it is now used for special ore-crushing machinery and magnetic separators. Most of the ore is taken from the depth of a thousand feet in trucks containing about four tons at a speed of 600 ft. per minute. After being crushed the ironstone falls into a Wenstrom magnetic separator, which separates the magnetic ore from the hematite and rock with absolute certainty and with the expenditure of very little power. The introduction of these separators, marks a great advance in the mining industry. The Grängesberg mines have been worked for several centuries, and hills of the poor ores which have been excavated have been dumped round the mines. With the aid of magnetic separators, it has now been found profitable to work the poor ores. They are put through a wet process of screening, and the magnetic ores are then picked out easily by the separator. The final ore when ready for shipment contains over 70 per cent. of iron. If the price of iron were ever to rise appreciably, it would be profitable to work through the hills of rejected ore a second time with more powerful separators.

Collapse of a Tall Building. ALMOST entirely without premonition, the Meyer's store building at Albany, U.S.A., fell to the ground at nine o'clock on Tuesday morning, burying some 100 of the employees beneath the debris. It is feared that the loss of life will prove to be very serious, and it would have been more so if the disaster had occurred later in the day. The immediate cause of the collapse is said to have been the incredible folly of workmen—engaged in constructing a new front to the building—who had removed some of the main columns without inserting temporary substitutes. We cannot understand why workmen were allowed to tamper with so important a structure except under expert direction. That sort of thing would certainly not be allowed in England, and we are reluctant to believe that it was permitted in the present instance. Without exact particulars of the construction and of the extent to which the supporting members were removed, it would be impossible to draw any reliable conclusions. We are inclined to believe, however, that the columns must have been of cast iron, for if of mild steel they would have given some warning of impending failure, and it is not impossible that the complete destruction of the building might not have occurred. The collapse of the Hotel Darlington, New York, during construction about a year ago was due to defective and badly-erected cast-iron columns, which failed owing to lack



of lateral support, and the whole building crumpled up. Something of the same kind seems to have taken place at Albany, and, if we are correct in supposing that cast iron was used for the columns, there is additional reason for mistrusting this material, especially in connexion with high buildings of the skeleton type, where inferior workmanship, or anything altering the calculated stresses, produces results far more serious than those to be anticipated for mild steel.

**Further Light on the Madrid Reservoir Failure.** SUBSEQUENTLY to the collapse of the concrete-steel reservoir at the Madrid waterworks in April last, it was observed that the main girders, connecting the columns of two other service reservoirs, were expanding under the influence of heat to such an extent that some of them had assumed a more or less serpentine form. Consequently many of the columns became seriously distorted, and after a few days some two hundred of these members were thrown down. This result occurred in June, but as access to the works had been strictly prohibited by the authorities, no personal casualties took place. The expansion was temporarily arrested by a reduction of the temperature, and, so far, no further destruction has occurred. It is highly probable, however, that the remaining columns are doomed. The girders in question extend continuously over a length of nearly 600 ft., and, as the range of temperature in Madrid is fully 65 deg. Fahr., it is easy to see that the expansion of concrete in these reservoirs constitutes a most important factor, which appears to have been overlooked by the designers of the concrete-steel construction.

Of the houses on the south side of Russell-street, which have been pulled down quite recently, No. 7 was the home in the earlier half of the XVIIIth century of Thomas Grignion, the celebrated watchmaker, his brother Charles, the line engraver, and his son Charles, the portrait painter and pupil of Cipriani, to whom Nelson sat at Palermo in 1798. Charles Grignion (the son) left England for Rome in 1782, and died at Leghorn in 1804; his uncle, Charles, removed to James-street, Covent Garden, and thence to Kentish Town, where he died in 1810, aged ninety-three years. The new buildings on the site, at the angle, west, of Wellington-street, will form an extension of the market premises, and are planned and designed for the Duke of Bedford by Messrs. Lander, Bedells, & Crompton. The frontage lines are to be rearranged, and the boundary fence in Russell-street is to be set back in alignment with No. 8, which (latterly the Caledonian coffee tavern) was the home of Tom Davies, actor and bookseller, who in his parlour there introduced Boswell to Dr. Johnson. The next house, No. 9, the Market House tavern, was Button's coffee-house, a resort in Addison's day of the wits who, after Dryden's death, migrated from Will's, by the corner, west, of Bow-street. Tom's coffee-house, No. 17, frequented by Cibber, Smollett, George Colman the elder, Johnson, and Arthur Murphy, was altered as its front was rebuilt forty years ago for the National Deposit Bank. Richard

Haines continued Thomas West's business there during many years in the second half of the XVIIIth century, and Tom's survived until 1814. Some relics of the coffee-house, including Sir Nathaniel Dance's sketch-portrait of Haines, the club book and snuff box, were sold at Sotheby's in July, 1899. It appears as Allen's tea and colonial warehouse in a water-colour drawing, 1857, by T. Hosmer Shepherd.

A CORRESPONDENT recently complained in our contemporary the *Westminster Gazette*, that in a walking tour in Surrey he had found the village churches closed. He would have had a similar experience as to many churches in other counties. But the accusation must not be too sweeping; a number of churches all over England will be found open day by day, so that the archaeologist has no difficulty in visiting them and examining points of interest. It is the experience of those who are responsible for the care of these open churches that no injury is done to them by the fact that they are open. It will generally also be found that in churches which are open to the public, monuments and brasses are better cared for than in churches which are shut except during the hours of service. The rector or vicar of a church which is open permits it, no doubt, first of all from a religious point of view, and, secondly, because he values the church as an historical and aesthetic object and is pleased that it should be seen by others. But the rector who keeps it closed is too often wanting in religious zeal, and is characterised by his ignorance of and indifference to historical monuments, which our mediæval village churches unquestionably are.

#### MAGAZINES AND REVIEWS.

THE *Art Journal* opens with an article, the first of a series, on the highly interesting subject of "Painters' Architecture," by Mr. Paul Waterhouse. Naturally, Mr. Waterhouse leaves out of his subject the painters who were also professedly architects, such as Michelangelo, Raphael, and Leonardo (though Raphael was not so much an architect as one who had architecture thrust upon him, somewhat to his consternation); and also those painters, such as Canaletto, Guardi, David Roberts, and others, who made architecture the special subject of their paintings. What he is dealing with is the architecture introduced into their pictures by those who were primarily figure-painters. How much there is that is curious and interesting in this respect, in the works of the earlier Renaissance painters, needs only a stroll round the Italian room of the National Gallery to remind one. It is with this school of painting that the present article deals. When the author comes to modern pictures there may be a good deal of room for criticism; architecture is very weakly treated in some of these, though much more realistic. The architecture of the early Renaissance painters, it must be admitted, is often very naive, sometimes hardly structurally possible; on the other hand, it shows a great deal of fancy and invention. Crivelli's "Annunciation," to which a full-page plate is devoted, is really a most remarkable architectural study, for a painter who professed to treat the figures as the principal *motif* of his pictures. Mr. Herbert A. Bone contributes a short article on "Arras Tapestry," describing its prevalent character and the method of construction. He says well, in regard to the effect of this kind of ancient tapestry, that one should see the work in dim light in a large hall, with a background of armour and dark oak, and broken by long

foldes—"Strained and displayed at large, they lose much of their mystery," which it is suggested was really intended. We rather doubt such an intention in the minds of the makers; it is a modern idea, but there is no doubt that the real effect of work of this kind is enhanced by its being only partially shown, as the chances of the hanging may determine. Its effect in this sense has prompted two fine passages in English literature—the chapter in "The Antiquary" describing Lovell's dream (or nightmare) in the tapestried bedroom at Monkham, and a long and elaborate piece of word-painting in Matthew Arnold's fine poem "Tristram and Isolt."

To the *Burlington Magazine* Mr. C. Ricketts contributes a short critical article on Dalou, which commences by referring to a period when French art was said to be entirely in a state of decadence, and only saved by two artists, Bastien-Lepage and Dalou. "Time and fashion," we are told, "have dealt very roughly with Lepage"; he has in fact been torn down from his temporary pedestal. It is curious that the advanced school of critics can see and note a reversal of opinion of that kind in the past decade, apparently without any suspicion that their own exaggerated admiration of special idols in art will probably suffer the same reversal in a few years. Mr. Ricketts then proceeds to let down Dalou to his proper place. There is truth in the criticism, as some of Dalou's limitations, but not, we think, in the accusation against him of want of sincerity. His real shortcoming was a lack of elevation of style, which is the defect in his great group of the "Triumph of the Republic" in the Place de la Nation, vigorous and energetic as it is. Hence Dalou's most complete successes were in realistic rather than in ideal subjects in sculpture. Mr. Clough's article on "Some Florentine Woodcuts" introduces us to some very interesting examples of early Renaissance wood-cuts, in the naive thick-lined style afterwards to be used with more refinement by Blake and Bewick; these are surrounded each with a simple decorative border formed by a repeated figure, white on black—a simple leaf shape cut out of the surface of the block. The cuts are most interesting historically, but their beauty is certainly exaggerated by the writer of the article. In Mr. Clouston's article of this month on "Minor English Furniture Makers" we come upon Angelica Kauffman, not indeed as a furniture maker, but as a decorator of furniture, for which Reynolds appears to have got her commissions; there is an illustration given of a chimney piece, formerly in Reynolds's house, decorated by Angelica, her portion of it no doubt being the centre panel, with a figure subject, and the frieze of children at each side.

THE *Architectural Record* (New York) contains an illustrated article on "The New State Capitol of Minnesota," at St. Paul, U.S.A., a fine and dignified classical building with a central dome, but which externally wants something more emphatic and a little more elevated in the end pavilions, to break the rather dead level of the skyline. There appear to be some fine apartments and staircases internally, all however in the beaten track of revived classic. The basement of the rotunda, with its domical ceiling, in a very flat curve, seems to have been suggested by a similar basement room in one of the erections of the Paris 1900 exhibition. Mr. Cass Gilbert is the architect. Messrs. Frost & Granger, whose architectural work is the subject of another article, appear to have done a good deal in railway station work, and done it rather well; their road-side stations do not show very much character, but the large La Salle Street station at Chicago shows very good and suitable treatment for a building of this kind—internally at least; externally it seems to be only a normal high building (with "offices to let" by the Company probably) with a large arched entrance in the ground story; hardly a treatment specially expressive of a railway station. The houses illustrated are not particularly interesting, but the small country town-hall for Lake Forest is an interesting and picturesque building. In an article on "The Life of Architecture"—that is, on the element of individuality which gives life to a building, there is an interesting example of



a country club-house which has been built across a small ravine, an arch spanning the ravine carrying a kind of gallery which connects the two main blocks of the club-house. This is a good example of turning to account an accident of site to produce a special bit of architectural picturesque. What strikes one, however, is that all the buildings illustrating this article on "The Life of Architecture" are by Messrs. Pond & Pond, and that the article is signed "Irving K. Pond." If this is one of the members of the firm, a rather obvious comment is suggested.

The *Architektonische Rundschau* contains an article by Herr Gottfried Mäler on the apse of the Neuweker Klosterkirche at Goslar, a very curious bit of richly decorated Romanesque work, with two orders of exterior wall shafts with elaborately carved capitals of transitional foliage. The most singular detail, however, is to be found in the corbels interposed between the upper and lower wall shafts, which have a convex profile of a shape often found, but in this case carved with short colonnettes which follow the curve of the corbel. Nothing could well be more ugly or unmeaning, but as an early architectural eccentricity it is worth note.



Pile Structures in Pits in South-west Scotland." Attention was first drawn to these by the circumstance of a series of depressions on the surface of a site in Stoneykirk parish, Wigtownshire. One might not have been noticed, but a series of five attracted notice, and they were dug into. The first pit presented, at a depth of 7 ft., a series of much decayed logs of round timber more or less vertically placed; they were found to make an oval enclosure of about 9 ft. by 7 ft. For the more detailed description of this and the other excavations we must refer the reader to the article. A noticeable point is that the timber had all been put in upside down, so to speak; that is to say, in the inverse direction of its natural growth. There seems very little reason in the idea of an earth pit lined with logs at the lower part only. Are we to suppose that the ground level had gradually risen? Mr. Mann seems to imply that the upper ends of the logs represented their original surface as put down. As far as we can gather from the article, the logs were nowhere more than about 3 ft. in length. As described, the remains seem difficult of explanation.

The only article in the *Quarterly Review* which comes within our class of subject is that on "The National Coal Supply," which is a résumé of the three Reports of the Royal Commission on Coal Supply. From the figures and the arguments used it is deduced that at our present annual rate of increase in consumption of coal, there is coal enough in England to last us for a period which may be estimated as between 400 and 600 years, and "after that the deluge," or the end of England's prosperity. A good deal may happen before even the shorter term of four centuries has run out; we know not what new source of heat might be discovered before then; but there is undoubtedly an argument for the exercise of economy in the use of coal in every possible way. The question of the wisdom of exporting our best Welsh coal, which is the very life of the Navy, for use in navies which may be turned against us, comes perhaps a little too near the region of politics to be properly considered in these pages, but it is one that may affect Englishmen of all professions equally. For the special requirements of battle-ships there is apparently no such coal in the world; its quantity is limited; to go on selling it to powers which may use it against us does seem rather suicidal.

The *Nineteenth Century* contains a short but most admirable critical article by Mr. Wedmore under the title, "Some French and English Painting." In the midst of the shallow depreciation of everything by the now popular school of art-critics, it is refreshing to come on an article commencing with the words—"After I had seen the Royal Academy this year with the usual interest, I saw the Salon with the usual delight." If one believed the so-called "art-critics" who write in some of our daily and weekly papers, the annual exhibitions at the Academy and the Salon are only to be regarded with contempt. The point of Mr. Wedmore's article is to answer the question, why the Academy exhibition excites his "interest" only, while the Salon gives "delight." One reason he gives is the greater freedom and range in subject and treatment seen in the Salon exhibition as compared with the Academy; the latter gives the impression of being more restricted in its sympathies. Then there is the presence of large decorative works, for which the English artist hardly ever gets a chance; and there is the greater sympathy shown at the Salon for originality of style and invention in new paths. At the Academy the *juste milieu* must always be maintained; too much originality is against a man's chances of acceptance. Mr. Wedmore gives a glance in passing at the absurd exaggerations of English critics in the worship of special favourites suddenly taken up as a fashion. "In France," he says, "Rodin was neglected; in France he has been reasonably appreciated; only in England did it occur to hot-headed sectaries and befuddled reactionaries that sculpture had not existed till Rodin came." That is what might be called a "useful truth"—not for the critics against whom it is directed, who are case-hardened in their self-confidence and irrationality, but it may be useful to some of the public who are liable to be taken in

by positive assertions expressed in exaggerated language. By the way, Mr. Wedmore is not quite correct in saying that Puvion de Chavannes "would never do ceilings at all"; he probably disapproved of them, but he painted one large and important one, which was exhibited at the New Salon shortly before his death; and which, it may be added, justified the painter in his usual neglect of ceiling painting, as it was certainly (in that light) not a success, and was in fact merely a wall-painting turned horizontally.

The *English Illustrated Magazine* contains an article by Mr. J. Tavenor-Perry on "An Ancient Port of London." This is a historical sketch of Brentford, a town which, as the author remarks, has had a very bad reputation among the poets—he thinks an undeserved one—for being especially dirty. It is suggested that some part of this "bad eminence" may have arisen from mud left by the river in times of flood or very high tide. It appears that the town is divided roughly into two portions, called respectively "Old Brentford" and "New Brentford," of which the latter is the older and the former the more modern; just as the "New Castle on Tyne" is the oldest thing there, and the "Pont Neuf" the oldest bridge in Paris. Old Brentford was probably the original village when New Brentford came into existence, and retains its local name though it has been obliterated by more modern building. The change came when the Grand Junction Canal was formed about the beginning of the last century, and brought down the coal and manufactures of the Midlands, and Old Brentford became a place of wharfs and a kind of small port for London. Mr. Tavenor-Perry's illustrations are very picturesque, and are excellent specimens of line-work in black and white.

#### LETTER FROM PARIS.

By an agreement between the Government and the Municipality, which will no doubt be ratified by Parliament, the Colonial Office, which has for so long occupied the Pavillon de Flore of the Louvre, will now take up its quarters in the large building formerly occupied by the Institut des Frères de la Doctrine Chrétienne, Rue Oudinot, which was the property of the Municipality. The latter will receive in exchange the proprietorship of the Caserne Napoléon behind the Hôtel de Ville, where various departments of the Municipal service, now very much restricted for space (the Caisse Municipale especially), will find room. This alteration will leave room for the formation, in the Hôtel de Ville, of a new Council chamber in theatre form, and surrounded by public galleries. Owing to the increasing importance of the Council proceedings, which are open to the public, as well as to numerous press representatives, this provision of a larger and more commodious chamber (modelled on the plan of the Chambre des Députés) has become an absolute necessity. This arrangement will necessitate a complete alteration, architecturally, of the part of the Hôtel de Ville bordering on the Rue de Rivoli, both in its external aspect and its interior plan. The cost of this work, it may be added, will be almost entirely covered by the sale to the State of land belonging to the Municipality.

The immense painting by M. Detaille, "Vers la Gloire," which figured in this year's Salon, has now been fixed up in its place in the Panthéon, where its general tone harmonises very well with the interior of the building. M. Detaille himself directed the fixing of the painting in the position for which it was intended.

After having exercised an unusually strict criticism in regard to the paintings submitted for the Prix de Rome, which it has refused to award this year, the Académie has shown itself more lenient in regard to the section of sculpture, and has awarded the prize to M. Lucien Brasseur, a pupil of Barrias and of M. Coutan, who had already obtained, in 1902, the Second Grand Prix. The "Second" this year has gone to M. Lorieux, who obtained some years ago a scholarship. The subject of the Sculpture competition was, as usual, of the most classic order—"Ceres giving instruction in Agriculture." The students in the Section of Architecture, whose drawings have already been exhibited, had



to treat, or to imagine, "Un Château d'Eau destiné à la distribution d'une Eau abondante dans une Grande Capitale." The author of the subject, in itself simple enough, thought it necessary to complicate it by adding in the programme, "des fêtes foraines viendraient, à certaines époques de l'année, s'installer dans la promenade, et borderaient les routes avoisinantes": an unfortunate puzzle to set the young architects, who thus had not only to design a classic structure but to make a kind of *genre* picture quite outside the line of their proper studies—to combine, in short, the monumental aspect of the fountains of Versailles with reminiscences of the fairs of St. Cloud and Montmartre. It is perhaps unnecessary to add that none of them have been able to accomplish this *tour de force*. We may mention as among the best the design of M. Bounet, who has endeavoured to reproduce the style of the garden art of the XVIIth century in France. The prize, however, has been awarded to M. Camille Lefèvre, a pupil of M. Laloux. The general result of an attempt to follow out the programme has been to produce a grotesque combination of a palatial "Château d'Eau" with the inferior and commonplace constructions which generally characterise "fêtes foraines."

The "Société Nationale des Beaux-Arts" (New Salon), now under the presidency of M. Roll, has decided that Music is an art on the same lines as Painting, Sculpture, and Architecture, and equally worthy of public manifestation. Accordingly, the programme of its future exhibitions will include two musical performances weekly, by an orchestra presided over by M. Paul Vicardot, a well-known violinist, in which composers of the new school will have the opportunity of bringing before the public their unpublished compositions, which will be examined and accepted or rejected by a jury, as in the case of painting and sculpture.

In spite of the objections raised by the Paris Municipality to the erection of the monument to Daudet in the Champs Elysées, there is talk of erecting a second monument there, to Philippe Lebon, one of the early promoters of the use of gas for lighting, and who fell a victim to a treacherous attack made on him in Champs Elysées. The sculptor of the proposed work is M. Péchiné.

M. Vernon, the medallist, has been commissioned to prepare the model for a new medal to be worn by members of Parliament, bearing on the obverse a head of the Republic, and on the reverse a female figure symbolising "La Patrie," who hands the French flag to another figure symbolising the Chamber of Deputies.

The Gobelins manufactory have in hand a tapestry intended for the decoration of the Senate House, after a cartoon by M. Albert Maignan, representing "Venus deploring the loss of Adonis." The Luxembourg museum will shortly receive from the same manufactory another tapestry, representing "Jupiter and Semele"; and the Gobelins is also at work on five tapestry panels intended for the main corridor of the Senate House, representing subjects from Ovid's *Metamorphoses*.

The stream of the Dhuy is to be arched over where it passes through the Communes of Montreuil, Bagnolet, and Rosnyville. The cost is estimated at about 280,000 francs.

The Palace of Fontainebleau is reported to be in a much worse structural condition than was supposed. Parliament had voted 50,000 francs for repairs to the building, but it is now estimated that the necessary work cannot be carried out for less than eight or nine times that amount.

The Académie des Beaux-Arts has to consider the election of a successor to the late M. Henner, and it is said that they intend to select M. Ziem, now 84 years of age, and whose principal works, presented by the artist to the City of Paris, are to be seen in a room of the Petit Palais. Another matter which is much discussed at the Académie is their possible part in the disposal of Henner's property. His will has not yet been opened; but as he had no legal heirs, and his liberality in assisting young artists was notorious, it is thought probable that he will have left some important legacy to the Académie for the founding of scholarships or funds of some kind for the assistance of struggling artists: so that the formal opening of the "testament" is looked forward to with considerable interest.

## THE ARCHITECTURAL ASSOCIATION EXCURSION.

THE Architectural Association made Lisieux, in Normandy, their headquarters this year, with the object of visiting the châteaux and manoirs that abound in the neighbourhood. These are not nearly so well known to architects as the châteaux on the Loire, and, although smaller, are hardly less interesting in many ways. Permission to visit them is difficult to get, and the guide books hardly mention them, therefore the thanks of all the members of the Architectural Association who took part in the tour, are due to those who so carefully and skilfully arranged it from the departure until Waterloo on Saturday evening, July 22, until the return home on the following Saturday. On the way cut the majority took the Southampton-Havre route, though a few went via Newhaven and Dieppe, passing through Rouen and Caudebec—probably the more interesting and quicker way of the two.

It is unnecessary to say much of Havre and Honfleur, as both are well known to frequenters of the Continent. It is sufficient to notice at the latter place, a fishing village of considerable character, the remarkable timber church of St. Catherine, in the market-place, with its curious tower standing quite apart. The church itself contains two parallel XVth century naves, with two aisles added in the beginning of the XVIth century, and is built entirely of timber with the exception of a cement portico added later still, and quite out of keeping with the rest. The choir has, unfortunately, been rebuilt in modern times with no sympathetic touch. The museum should also be visited, containing, as it does, examples of Normandy costumes of different periods of her history arranged in the rooms in chronological order, and in some cases displayed on wax models of peasants in characteristic attitudes and surrounded by the furniture, etc., of the time.

The journey from Honfleur to Lisieux gave one the impression of a rich and prosperous country of continuous pasture land, dotted here and there with flourishing villages connected by long straight roads and avenues of tall poplars. Indeed, everyone was much struck throughout the tour with the prosperous appearance of the homes of the peasants and the contrast to this afforded by the deserted condition of the châteaux and manoirs, which, even when occupied, are in the majority of cases surrounded by only the remnants of the magnificent gardens they once possessed. This cannot be entirely accounted for by the fact that labour in the country is extremely difficult to obtain owing to the prosperity of the peasants.

Another very striking fact was the cordial way in which the party were received at Lisieux throughout the stay there. On the first

evening M. Campserveux, the architect to the town, paid them a visit, offering to take them over his new hospital and show them everything of interest in Lisieux. On the Monday the Mayor and Corporation entertained the party to tea at the Hôtel de Ville, and in a short English speech afterwards expressed the extreme pleasure that he and his fellow-townsmen felt in welcoming artists to their beautiful town, but that when the artists were also Englishmen they were to them twice friends. On the Friday night the members returned this hospitality at the Hôtel de France, the headquarters, and a most enjoyable evening was spent. Mr. Dawber, proposing the health of the guests (in French



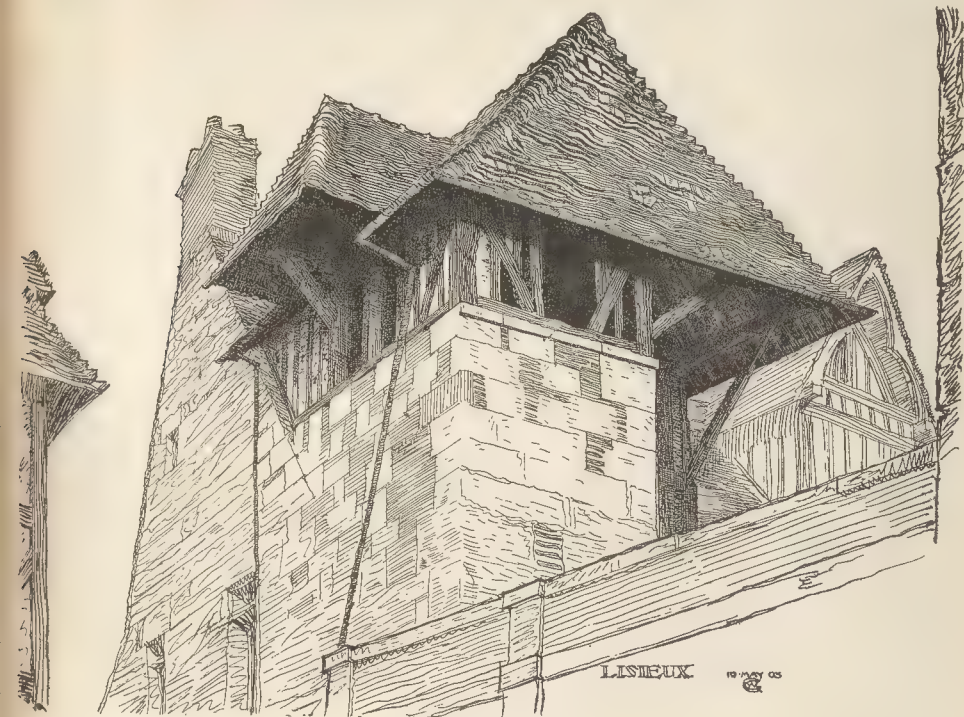
Garden Houses, Fumichon

thanked the Mayor most heartily for the help he had given in supplying information concerning the different places visited, without which the tour would have been impossible to arrange, and assured him that the kindness they had received throughout the week would never be forgotten by the members of the Architectural Association. In replying, the Mayor assured them that the pleasure was on his side, and that he hoped they would all come again and frequently to fraternise with the people of Lisieux. Several more speeches were made in all of which were references to the very real existence of the *entente cordiale* between the two countries at the present time.



HEMIVAL-LES-PAUX





Old House, now used as a Museum.

Before giving a detailed description of each building visited during the week, a general description of the type of château visited may not be out of place, especially as they are all built on similar lines and with very similar architectural treatment. Like the châteaux on the Loire, they were originally built as fortified moated castles, and may still show evidences of the drawbridge to-day. In later times they were converted into ordinary country houses by enlarging the windows from mere slits to more reasonable proportions, abolishing the drawbridge, and in some cases the moat, and laying out the grounds with terraces, orchards, formal gardens, etc. The date usually assigned to these châteaux is late XVIIIth and early XIXth centuries.

As we see them to-day, the site is usually a square or parallelogram, with the house itself in the corner and the rest of the ground divided into three equal divisions for the gardens. We find invariably a pigeon house somewhere, as the owners evidently made good use of the permission, only granted to nobles before the Revolution, to keep pigeons.

The plan of the house itself usually takes the form of a courtyard, with one, two, three, or four sides built upon, surrounded by the moat and rising directly out of it. At every exterior angle is placed a turret, which gives a picturesqueness not to be suspected from the severe and symmetrical planning of the whole. The rooms usually stand out of each other—an arrangement ill adapted to modern requirements, but allowing fine vistas from end to end of the building.

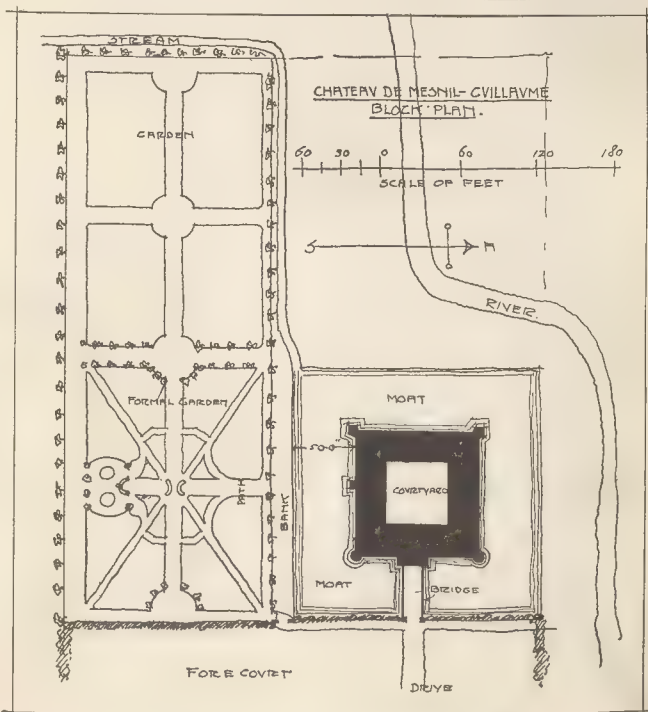
The exterior treatment is usually simple, and very materially by the reflections in the surrounding water, and consisting mainly of a mixture of brick and stone arranged in regular patterns over the whole, and of corbel arches cut right through to allow of the insertion of windows or dormers that have been effective at later times; but perhaps the most interesting feature in the exterior is the slating: no curves or combinations, though perhaps a little leakage in these days did not matter.

The interiors are not very interesting save

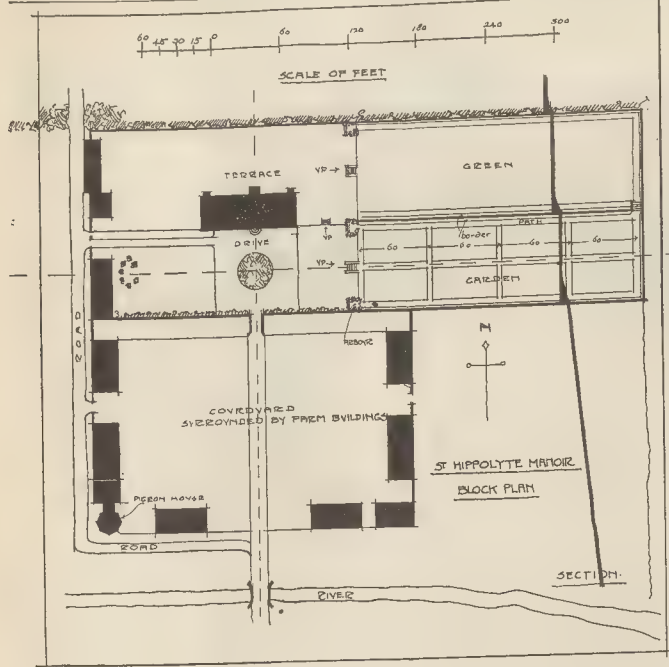
for specimens of Normandy ironwork, finger-plates, door-handles, etc., of which every house is full.

The gardens were evidently once very fine,

though during the whole week the party did not see one kept up in its ancient form; in places the traces were discoverable, and enabled one to realise the completeness with







which the whole scheme was carried through, only to be allowed gradually to fall into decay, until to-day the châteaux and their surroundings merely form an interesting landmark in the history of France, and clearly show the effects of the greatest change in that history, namely, the Revolution.

On Monday morning the party drove to Hermival Château, which, though a small one, is typical of all the rest in its exterior treatment of brick and stone and clever roofing of its flanking turrets. At Ouilly du Houlay a long stay was made, and without doubt this is the most picturesque of the series and one of the largest, owing to the numerous alterations and additions to the original building. Approached by a tower and draw-bridge, the house itself surrounds a small courtyard with a turret in one of the internal angles; on the south side runs a long terrace overlooking the position of the moat, now a large field, from the bottom of which Mr. Green's sketch in our last issue was taken. The interior is interesting for some nice paneling of a late date, including one bedroom with fittings complete. Another drive through long, straight poplar-lined roads and the party reached Fumichon Château, which, while obviously designed by the same hand as the other two, is planned on different lines, having two delightful turreted pavilions on each side of the entrance to the forecourt. The house itself fills the whole length of the side opposite the entrance, with the front elevations of the pavilions repeated (without a break in plan) at the ends; at least, that was the original scheme, but, unfortunately, a wing has been added connecting up one of the pavilions to the main building, thus destroying the symmetry of the whole. Probably the château never had a moat, which may account for the difference in arrangement.

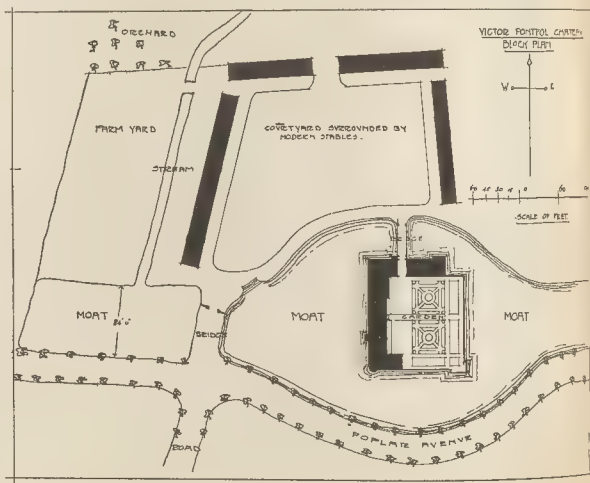
On Tuesday, after an early start, the excursionists spent the morning at Pont l'Évêque, a small town famous for its cheese, situated about ten miles to the north of Lisieux, containing many half-timbered houses and a late church with an unfinished, heavily-buttressed tower, with a temporary slate roof of possibly greater picturesqueness than any permanent finish would have. In guide-book language Pont l'Évêque "seems with subjects for the artist's brush," and certainly the brush was more in evidence than the pencil or

two-foot rule all this day, for in the afternoon the party drove to Canapville Manor, a half-timbered house planned on an obtuse angle, with a stone staircase turret of perfectly plain design, contrasting well with the half-timber work. A pleasing variety of the latter was noticed here, consisting of a broad horizontal band of chequer work of 7 in. by 3½ in. bricks and stones of similar size alternating, with a moulded timber string-course over, and above this more half-timber work, with the same pattern used as the infilling up to the window-sill level. The next objective was the St. André d'Herbelot Château, and en route the only hitch of the tour occurred. After a very long drive in the broiling sun, ending with what seemed an equally long walk uphill, the party found themselves in the grounds of a pretentious modern house. The drivers came in for a considerable quantity of abuse in English, which, perhaps fortunately, they

could not wholly understand, though the effect of getting the visitors to the château in time to have a hasty walk round before the train returned to Lisieux from the local station. St. André d'Herbelot is entirely built in stone with the exception of one modern stucco turret, and, although only one wing now remains, it was evidently originally very large and more severe in detail than the others. The village church is a picturesque church.

On Wednesday the excursionists had at first real opportunity of seeing Lisieux itself, a town with a long and varied history behind it, once the home of the Lexovii, a tribe several times mentioned by Caesar. In the IVth century it was destroyed, but by the Vth century it had grown up again, and we hear of it as a prosperous town and the seat of a bishopric. In 1135 Geoffrey Plantagenet laid siege to it, reducing its citizens to great straits, and they finally burnt down the city and cathedral. When peace was restored the present Church of St. Pierre was commenced, and, although since the end of the last century it has ceased to be a cathedral, it has the distinction of being one of the earliest and most complete Gothic churches in France. The nave, transepts, and part of the choir were built before 1180, and show clear evidences of classic traditions in the acanthus-leaved caps of the piers of nave arcade. The clearstory was added in the beginning of the next century. Thus we have an interior practically of one date unmarred by restoration and unaffected by decay. Of the west front we cannot say as much. The northern tower part of the original scheme has never been completed, while the southern one was altered and finished in the XVth century; the long lancet windows have been divided and a spire added. The main west entrance and window over have also been altered. Close by is the Church of St. Jacques, built in the early part of the XVth century. Its vaulted nave and choir are excellent examples of the later French methods employed in this form of construction. The peculiarity is that the floor of the church follows the natural slope of the ground. After inspecting these churches Mr. Campservieux very kindly took the party round the rest of the town, showing the best of the old timber houses that now remain, and explaining that these are now safe from mutilation, owing to a society for the preservation of ancient buildings which he has helped to found—an example that might well be followed in many towns in England before the ravages of the jerry-builder have finally destroyed the need for such a society.

In the afternoon Count de la Place, who owns the Château St. Pierre de Malleville, about five miles to the south-east of Lisieux, was most kind in showing the former and the most magnificent collection of scientific books. Afterwards, the party drove to the



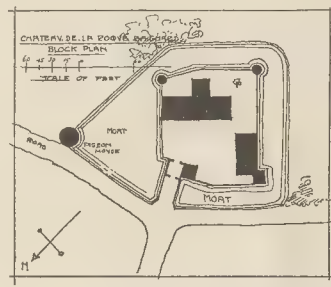
Masnil-Guillaume Château, of which we give a plan roughly drawn to scale: an uninhabited brick-and-stone building, mellowed with age, surrounding a courtyard with angle turrets at each external angle, two of which are a curious lozenge shape, rising directly out of the moat and reflected in it, on one side a garden overgrown with weeds, on all other sides green pasture land, watered by little streams, which catch the last rays of the setting sun, making a picture of melancholy beauty which must be seen to be appreciated—and seen, will not be forgotten.

On Thursday morning De Fougy Farm-house was the first stop of the day, after which the visitors made a long stay at St. Hippolyte Manor, a complete house and farm situated in a hollow, out of which it seems to grow as naturally as the neighbouring trees. Level terraces and gardens surround the house itself, while the farm buildings form an entrance forecourt on the sloping ground below. These are all half timbered, and, while laid out on symmetrical lines, sacrifice none of the picturesque quality of a more haphazard method. The house is built in stone, with square-headed late Gothic windows, now minus, unfortunately, the mullions, and two half-timbered dormers, a sketch of one of which appeared in our last issue.

Fervacques Château was the next visit, owned by the Countess de Montgomery, who possesses a magnificent collection of furniture, tapestry, and Normandy earthenware and china. The château was partially built in the XVth century and partly in the XVIth, and it was noticed in the later portion, that the heavy cornices were not broken at the dormers, as is usually the case, and that the corbels in some instances were strengthened at these points to carry them—distinct improvement in the appearance of the elevations. After tea here the party drove to the Château de St. Germain de Lavet, remarkable for the use of green glazed bricks and a few green glazed tiles sparingly used in the roofs, also for the fact that it has a picturesque entrance flanked by two small circular turrets at the angle formed by the two wings of the building, one of which has been rebuilt.

On Friday morning, Crevecoeur Manor was reached up when the visitors arrived, and, unfortunately, remained so until they left

in half an hour. The Hotôt Farm, reached after a long drive, proved to be a group of farm buildings hardly worth going so far to see had it not been that Victor Pontfol Château is close at hand, where a stay was made of about two hours. La Roque Baignard was the next and last



visit of the tour. Only one portion of the original building, together with the entrance tower and two small angle turrets, which denote the position of the original house, remain, the rest having been burnt down at the Revolution. The drive back to Lisieux was a long one, and ended with the dinner to the Mayor and Corporation before mentioned, and the usual sing-song afterwards.

Saturday is market-day in Lisieux, and the town appeared in a new light. The market-place was filled with people from early hours in the morning and gay with the bright colours of the flowers, fruit, and other merchandise for sale on the different stalls. The two towers of St. Pierre in the background seem to consecrate with their presence a scene they have witnessed every Saturday morning for nearly eight hundred years. As the visitors sat at the tables of the cafés surrounding the market-place and watched the animated faces of the crowd, they enjoyed a quiet morning, tempered by the regret that it might be a long time before many of them would be able to return to enjoy again the kindness and hospitality of the people of Lisieux.

#### THE ROYAL ARCHÆOLOGICAL INSTITUTE AT TUNBRIDGE WELLS.\*

On Saturday, the 29th ult., the party again went by special train to Maidstone, and devoted the morning to an inspection of the chief ancient buildings in that town. The fine parish church of All Saints, where the members were received by the vicar, the Rev. E. H. Hardcastle, was the first objective. Its architectural history was explained by Mr. Hope to date from its conversion into a collegiate church by Archbishop Courtenay in 1395, when it was begun to be rebuilt; but, as that prelate died the following year, he could not have done much, and the greater part was probably the work of his executors, to whom he devised the residue of his estate, to be expended "circa construcionem ecclesie collegiate de Maydeston." The whole of the existing church is of one design, and consists of a chancel with clearstory and aisles of three bays, with a southern vestry, a nave with clearstory and aisles of six bays, and a south porch, which is also carried up as the tower. The south aisle of the chancel and the porch were both intended to be vaulted in stone. The eastern part, at any rate, of the church was finished by 1417, for it contains the tomb, set up in his lifetime, of John Wotton, the first master of the college, who died in that year. None of the ancient fittings remains, except the canons' stalls in the chancel and a length of screen-work north of the altar. Part of the pavement of an older church and the plinths of its piers were found during a restoration. At the request of Sir Henry Howarth, the vicar added a few remarks, and quoted the opinion of the late Rev. J. Cave-Brown, that one of the windows in the north aisle of the chancel had evidently belonged to the earlier church. Mr. Hope pointed out that the window in question was actually of later date than the present building, an opinion which was confirmed by other architectural experts.

A visit was next paid to the remains of the college on the north of the church, but of this very little is left beyond the fine entrance gateway of Courtenay or his executors, and the main ranges of buildings had apparently never been completed.

From the college the party went to the

\* Continued from page 150.





ancient stables of the archbishop's palace, a two-storied structure, probably *temp.* Archbishop Morton, with an extremely picturesque external staircase to the upper floor. The palace or manor house itself is externally for the most part of the XVIIth century, but probably incorporates the great hall begun by Archbishop Uford in 1348. At the south end are some interesting traces of alterations by Archbishop Morton and his immediate predecessors.

Before luncheon a short visit was paid to the museum, which is noteworthy, not only for its fine collection of Kentish antiquities, but for the ancient Jacobean mansion in which they are housed.

After luncheon carriages were in readiness to convey the party to West Malling.

Here a halt was made first at the Abbey, which Mr. Hope explained was founded at the close of the XIth century by Bishop Gundulf for Benedictine nuns. The church has for the most part perished, but the south transept remains, as well as the south wall and west front of the aisleless nave. The front exhibits some interesting later Norman changes, the work of the same builders as the front of Rochester, and now forms the west side of a large tower, square below and octagonal above, which was built in the XIVth century. Mr. Hope called special attention to the remaining south alley of the cloister, which originally consisted of a series of trefoiled arches carried by slender triple shafts, and richly decorated within. The date is probably about 1230-40. In the XVth century an upper story was added, when various structural alterations were made to enable the arcades to carry the increased weight. Of the other buildings, a half-timbered guest-house of the XVth century and the gatehouse block of the same date, with a XIVth century chapel attached, are all that are left. The Abbey has in recent years again become the home of an Anglican convent of Benedictine nuns.

Some interesting comparative remarks were added by the Rev. G. M. Livett on the peculiar features of Bishop Gundulf's work in the Malling and Rochester districts, particularly in his use of tufa for quoins and facings.

On the way up to the parish church a number of the party examined a small house, apparently of the XIIth century, in rear of a shop in the High-street. It is a two-storied building, with a XIIth century doorway on the ground floor, and in the upper chamber two side windows built of Norman masonry, with zig-zag mouldings round the heads.

The parish church of St. Mary was described by the vicar, the Rev. A. W. Lawson, who called attention to the early Norman chancel and its XIIIth century extension, and to the tower, which was also early Norman. The old nave partly fell down in 1778, and was replaced by a plain barn-like room, which has lately given way to a new nave and aisles, the work of Mr. J. T. Micklethwaite. The cost of the fittings had been largely defrayed through the sale of the now famous Elizabethan bear jug at Christie's on February 19, 1903, for the huge sum of 1,450 guineas. This fact has been commemorated at Malling by the setting up of a representation of the jug in the church porch, with the inscription:—"Thanks be to God. 1903. This Porch and Pews of this Church were Made by the Sale of a Jug having Silver Mountings with the London Hall-Mark for 1581." The Rev. G. M. Livett also added some remarks on the early Norman work.

A move was next made to St. Leonard's Tower, which, despite its castellated appearance, Mr. Livett showed was the tower of a destroyed church of St. Leonard given to Malling Abbey by Bishop Gundulf, whose peculiar style of building it well exemplified. Some remains of the ruined church were also pointed out. The journey was afterwards resumed to Watlington station, en route for Tunbridge Wells.

Monday, July 31, was devoted to visits to Penshurst and Tonbridge. The party left Tunbridge Wells in carriages shortly after ten, and drove direct to Penshurst, where the church was first inspected. A visit was next made to Penshurst Place, where the members of the Institute were received by

Lord and Lady de l'Isle and Dudley, who themselves conducted them over the armoury and private apartments. After an inspection of the other portions of the building and of the beautiful gardens, the party reassembled in the great hall, where Mr. Hope gave a brief description of the architectural history of this famous mansion. An older house on the site was, he explained, rebuilt by Sir John Pulteney, who obtained licence to crenellate or fortify it in 1341, but died in 1349.

His splendid hall, with the solar or great chamber (and probably the chapel) over a vaulted basement at one end, and the buttery and pantry (also with lodgings over), with the way to the now destroyed semi-detached kitchen at the other end, form the nucleus of the present house. A later owner, Sir John Devereux, also had a licence to crenellate in 1393, but he died the following year, and all that remains of his work seems to be the so-called Buckingham feature of the ing, which exhibits the singular feature of the having all the windows built inside out. The mansion was brought to its present form by Sir Henry Sidney during the years that preceded his death in 1586.

After luncheon the journey was continued to Leigh Church, a building chiefly of the XIIIth century. Here a halt was made at the Castle, an interesting example of the mount-and-bailey type, the work of Richard of Clare, alias of Tonbridge, *temp.* William I. An ascent was first made to the top of the mount, when Mr. Harold Sands read an interesting paper on the history and arrangements of the Castle, and described the existing remains of the masonry defences. These consist chiefly of the grand XIIIth century gatehouse of the bailey, of the walls of the covered ways that connected it and the great tower on the mount with the other buildings, and of the river wall; but this last is so shrouded in ivy that its features are almost invisible. After a careful inspection of the gatehouse the party returned by train to Tunbridge Wells. In the evening the concluding meeting was held in the Pump Room, when the annual report and balance-sheet were read and the usual votes of thanks passed to all those who had assisted in the carrying out of a most successful meeting. Several places were suggested as the centre of next year's meeting, including Worcester, Colchester, Hull, and Normandy. The first named received the most favour, but the final selection was, as usual, left to the Council.

Tuesday, August 1, the last day of the meeting, was one of the most enjoyable. The party first went by train to Tonbridge, and drove thence to Old Soar, where the owner, Sir William Geary, received the visitors. Mr. Hope explained that what they had come to see was a small but perfect manor-house of the concluding years of the XIIIth century, now forming an appendage to an early Georgian farmhouse. It was two stories in height, and consisted of the hall, which was raised upon a vaulted cellar, with a semi-detached garderobe tower at the north-west angle, and a chapel, also semi-detached, and on a level with the hall, at the north-east angle. On the south-west was a circular stair-turret up to the hall, the outer door of which had been covered by a pentise supported by richly-carved corbels. The hall retains its original king-post roof above an inserted upper floor, but has lost the fireplace and its chimney. It had a large two-light window at each end, now bereft of their tracery. In the chapel is a richly-decorated piscina, but the east window has been destroyed for a modern entrance.

The journey was next continued to Ightham, where the church was inspected under the guidance of Mr. Hope, who pointed out that it had consisted originally of a small square chancel and a nave of early Norman date, to which narrow aisles had been added, and a western tower, apparently about 1420. The interesting south porch was built *temp.* Henry VII., and the north aisle rebuilt in brick in the XVIIth century. Attention was specially called to the remaining ends of the rood beam, to the enclosing screen of the chapel at the end of the south aisle, and to the XVIth century carved pews of the owners of Ightham Court, with the arms of the James family; also to the tomb and effigy of Sir Thomas Cawne, *circa*

1375, with a singular window over, for the making of which he bequeathed 20*l.*

The rector, the Rev. D. Barry, referred to another memorial in the chancel, that of Dame Dorothy Selby, who died in 1641, and was believed to have been the person who revealed to Lord Montague the existence of the Gunpowder Treason and Plot.

After luncheon a visit was made to Ightham Mote, where Mr. Henry Taylor described the main features of this fine and well-kept perfect courtyard house.

The journey was afterwards resumed to Tonbridge, and so the meeting of 1905 came to an end.

Although no Roman or Saxon remains could be included in the programme, and only one prehistoric monument, Kites City House, from the architectural standpoint the Tunbridge Wells meeting was particularly satisfying.

The parish churches included typical Kentish examples at Hawkhurst, Wrotham, Aylesford, West Malling, Penshurst, Leigh, and Ightham, as well as the fine Collegiate church of Maidstone and the lovely Saxon church at Etchingham. The religious houses comprised the White Canons' Abbey of Bayham, the Carmelite friary at Aylesford, and the Benedictine nunnery at Malling, to which may be added the remains of the College of Maidstone. The purely domestic work included such famous examples as Knole House, Penshurst Place, and Ightham Mote, the lesser-known buildings at Taldham and Old Soar, and the archiepiscopal manor house at Maidstone; while the castles were fully illustrated by such interesting structures as Allington, Bodiham, and Tonbridge. Lastly, mention must be made of the numerous picturesque odd cottages to be met with in the villages, especially at Penshurst and Ightham. The beauty of the scenery through which many of the excursions were made amply justified the claim of the county of Kent to be the Garden of England.

[In the reference last week to Allington Castle the XIIIth century bricks should have been described as purposely made to fit the jambs (not joints).]

#### FREEMASONS' HALL AND TAVERN.

THE trustees of the United Grand Lodge of England have appointed Mr. Henry L. Florence, the Grand Superintendent of Works to the Lodge, as architect for their new buildings on the site of Nos. 8-14, W.B. court, at the rear of the south side of Great Queen-street, and the reconstruction of the tavern recently vacated upon the expiration of the lease. The former tavern, which lay the Craft hall, was rebuilt by William Tyler in 1786. The present Nos. 8-13, is part of the combined and enlarged premises, having a depth of 200 ft. erected in 1865-6, after F. P. Colwell's designs, selected in open competition, which was taken the site in the main street of a row of houses called Queen's-place in order to give the hall a frontage to that thoroughfare (see the illustration, with plan of the principal floor, in the *Builder* of August 12, 1866, and Mr. W. Curtis Green's design, March 26, 1898). Mr. W. G. Nichol executed the statuary and carving. In the chronological account of Soane's career and works compiled by G. Bailey, and printed in our number of Dec. 12, 1845, he states that Soane, who, in 1813, was elected Grand Superintendent of Works, built "the new grand Masonic Hall adjoining Freemasons' Hall in Great Queen-street in 1826." The Society of Free and Accepted Masons separated from a Grand Lodge formed for England after a meeting held in London in 1811, similar lodges were formed for Scotland in 1736 and for Ireland in 1739. Having raised £5,000, by a lotteries, the Grand Lodge for England acquired, in 1774, their property in Great Queen-street, where Thomas Baskerville, R.A., built the hall, which was opened on May 23, 1776, Lord Petre being Grand Master. It was the first house erected in this country with appropriate symbols of Masonry and with suitable apartments for the holding of lodges and other ceremonies. Sandby designed all the emblematical ornamentation of the great hall, executed in plaster by Cox. There are drawings in the of the former buildings in Britain & Ireland volumes for 1825-8 of public edifice in London. In the "Crowle" Pennant was



sectional drawings of Sandby's building; the interior of the Masonic Hall is depicted in a print, after T. Stothard, R.A., of the procession of the Freemasons' orphan children. The hall has formed the meeting-place of the Madrigal Society founded in 1741 by John Immyns, the Melodists, and other musical clubs. The Grand Hall or Temple suffered much damage from a fire on the night of Thursday, May 3, 1883, which consumed the roof, organ, furniture, and portraits of Grand Masters; the records and E. M. Baily's marble statue of the Duke of Sussex were saved. Sir Horace Jones, Grand Superintendent of Works, prepared a scheme for general reconstruction, to include a new temple with a capacity of 1,500 persons, by taking in the banquet-hall of the tavern; the proposal for removal to the Victoria-embankment was relinquished as being too costly a measure. The scheme was modified so as to include the purchase of Bacon's Hotel, Nos. 64-5, and its rebuilding as part of the Freemasons' Tavern. In the result the site of Bacon's Hotel was acquired for Mark Masons' Hall (C. H. Driver, architect), which serves for the Grand Lodge of Mark Master Masons, the Royal Order of Scotland, the Order of the Temple, etc. Then, in 1899, was taken the site of Nos. 57-8 on the west side for the wing which comprises the library and museum, secretaries' offices, and rooms for office-bearers. Mr. Florence, the architect, followed the design, carried out by Messrs. W. Cubitt & Co. in red brick and Portland stone, of the Freemasons' Tavern by Professor Cockerell. Thus the present façade of the block to the west of Mark Masons' Hall has a balance and continuity of design, with a dignified example of modern Classic architecture for its central feature.

#### ST. PATRICK'S DISTRICT CHURCH, PIETERMARITZBURG.

This church, to be erected at Pietermaritzburg, Natal, has been designed with special reference to convenience for its being erected in sections, as funds are forthcoming.

The cost of skilled labour precluded any elaboration of detail. A picturesque local shale will be employed for the outer walls,

with brick dressings for the doors and windows. The roof will be tiled. The walls inside are to be covered with asbestos plaster, and the flooring is to be wood blocks on concrete, except the chancel, which will be paved. The architect is Mr. F. Chatterton, of Pretoria.

#### LONDON BUILDING ACTS AMENDMENT BILL.

THIS Bill, which a few weeks ago was before a Select Committee of the House of Commons, when the evidence given was reported in the *Builder*, came before a House of Lords Committee last Friday, Saturday, and Tuesday, when similar evidence to that given before the Commons Committee was tendered. The Committee found the preamble of the Bill proved on Tuesday, and the same evening the Bill passed third reading in the House of Lords, and now awaits the Royal Assent. The Bill as it has passed is a very different measure from that which was proposed by the London County Council at the beginning of the session, and is confined now to provisions for securing adequate means of escape from fire in existing and new buildings of a certain height and occupied by a certain number of people. The City of London is not excluded from the purview of the Bill, but the Mansion House and other public buildings will remain in the same position as they occupied under the London Building Act of 1894.

A new clause was inserted to the effect that no person shall convert a building without the consent of the County Council in such manner that the building when so converted will not be in conformity with the provisions of the Act.

The Committee decided that Staple Inn should be deemed to be buildings to which the exemption clause should apply, so long as they are used for their present purpose.

Lord Verulam (one of the Committee) remarked that if modern staircases were to be placed either within or externally they might just as well pull down the old Inn.

LIBERAL CLUB, HONLEY, YORKSHIRE.—A new Liberal Club is to be erected in Cuckoo-lane, Honley, from the designs prepared by Mr. J. Berry, architect, Huddersfield.

#### THE INSTITUTE OF SANITARY ENGINEERS:

##### VISIT TO SOUTHAMPTON.

THE members of the Institute of Sanitary Engineers paid a visit on Saturday last week to Southampton. Under the guidance of their President (Mr. J. A. Crowther, Borough Engineer to the Southampton Corporation), a visit was paid to the Southampton Docks, the party being conducted over the American Line steamer *New York* and the Union-Castle liner *Saxon*. At one o'clock an adjournment was made for lunch at the South-Western Hotel. The President presided, and there were also present the Mayor (Colonel E. Bance, D.L., J.P.), Mr. W. Matthews (Waterworks Engineer), Dr. Lauder (Medical Officer of Health), Mr. T. Brierly (Borough Analyst), and others.

At the conclusion of the repast the loyal toasts were duly honoured. Mr. Scott gave "The Powers that be, including the Mayor and Corporation and the Engineers who have contributed to our instruction and enjoyment." He expressed hearty thanks for the manner in which the visitors had been received, and said that they were delighted with the ancient town of Southampton, and to be so close to the old capital of England.

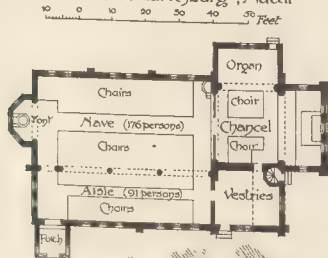
Winchester. He explained how excellently Southampton was placed from a sanitary point of view, and remarked on the very low death rate of the town, which showed how carefully it was looked after with regard to sanitary matters. One thing that had struck him in coming to Southampton was the large number of open spaces there.

The Mayor, in response, remarked, with reference to the low death rate in Southampton, he believed it was the only town above 100,000 population which was able to claim such a distinction, and he took it that it was due to their President (Mr. Crowther) and the other Southampton engineers, who took such a deep interest in the health of the community.

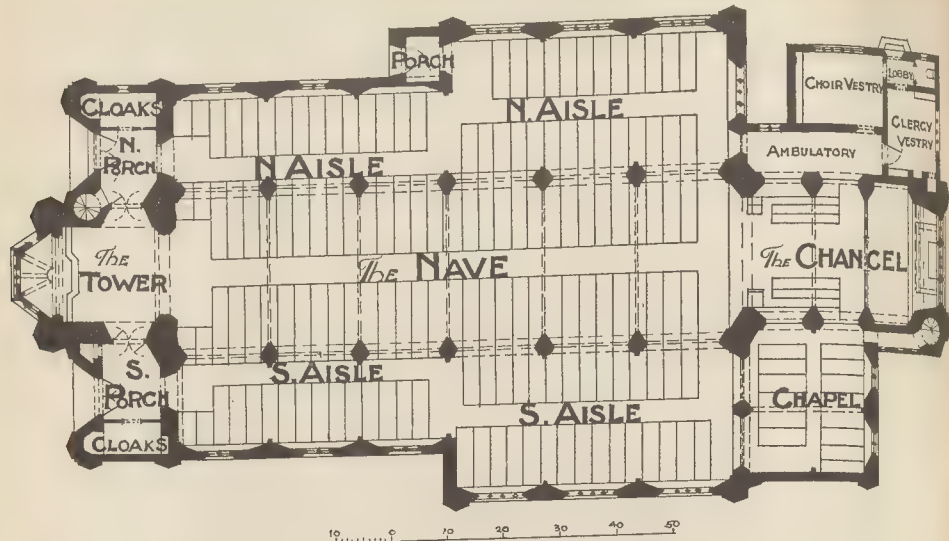
Mr. Palmer proposed the toast of "The Visitors." Colonel Swalm (U.S. Consul) responding.

Mr. Blakeway gave "The Institute." Mr. Butcher (Chairman of the Council of the Institute) replied, remarking that, though they were only a young Association, having

St. Patrick's Ch. Maritzburg, Natal







St. Agatha's Church, Birmingham. Plan.

been in existence only about seven years, they were now recognised in their examinations by many older Associations. They tried to be up to date in their methods of educating the rising generation in sanitary engineering, and candidates for examination must not only prove themselves to have a knowledge of theory, but they must above all things have a thorough knowledge of practical work. Besides their headquarters in London, there were branches for the benefit of provincial students.—The toast to the President being duly honoured, the party adjourned for a further tour of the Southampton Docks.

#### ARCHÆOLOGICAL SOCIETIES.

**EAST RIDING ANTIQUARIAN SOCIETY.**—A party of about forty members and friends journeyed to Thornton Abbey on the 31st ult. in connexion with the East Riding Antiquarian Society's excursion. On arrival the party, led by Mr. J. Bilson, F.S.A., visited the Abbey ruins. Thornton Abbey, Mr. Bilson stated, was founded in the year 1139, and dedicated to the Blessed Virgin by William le Gros, the third Earl of Albemarle and Lord of Holderness, who was also the founder of Meaux Abbey, etc. He died in 1180, forty-one years after the completion of the priory. The foundation was on the feast of St. Hilary, and was for Canons Regular of the Order of St. Augustine. In the following year Walthof, the first abbot, and twelve brethren left Kirkham Abbey, on the Yorkshire Derwent, to take charge of the Abbey. With regard to the history of the buildings, nothing was known whatever of the first buildings, but it went without saying that there must have been a permanent church and permanent buildings very soon after the foundation. Very likely they started with temporary buildings, but there was no doubt that a XIIIth century church and fine monastic buildings were erected on the site. As far as he was aware, however, there were no traces of them left. The fact that those buildings had existed and were not entirely replaced accounted for some misapprehension on that point. After the middle of the XIIIth century was begun what turned out to be a complete rebuilding of the church, and apparently also of the greater part of the monastic buildings. For what was known of the rebuilding and also of the late history of the Abbey they were indebted to a history written by one of the canons in the XVIth century, very soon after the dissolution. In 1308 the buildings were practically completed, and in 1541 the Abbey

was dissolved. There were then six canons in the Abbey, and the revenue was 846*l.* 13*s.*, which must be multiplied six or seven times to arrive at the value of what the church would be to-day. The plan of the church was very simple, and not unlike that of St. Mary's, York, the church itself being 281 ft. 8 in. from east to west and 127 ft. 7 in. the total length of the transept. It had a central tower, but not a western tower. The gateway is a really imposing structure. Mr. Bilson declared it to be one of the best specimens of a monastic gateway there is in the country. The licence to crenellate it is dated in the sixth year of Richard II., and no doubt, he said, it was built shortly after 1382, with which dates its architecture agreed. It was richly treated, and was defended on the outside by a portcullis. In the niches five figures were still preserved. The gatehouse was built of stone and brick, and seemed to have been built for the abbot's lodging. Referring to the destruction that has taken place, Mr. Bilson said some of it was due to XIXth century vandals, and therefore it was not surprising to find that Lord Yarborough restricted entry to the ruins, and very rightly made people pay for the privilege.—Tea was afterwards partaken of, and, before the party separated to walk to Thornton Curtis to inspect the church there, a little business was transacted. The Rev. A. N. Cooper, secretary, read a communication from the University of Leeds, which stated that discussions had recently taken place amongst some of those in the Leeds district who were interested in Roman antiquities as to the possibility of making more systematic provision than existed for the exploration of Roman roads, villas, etc., in the county of York, and for the maintenance of a continuous record of discoveries. That interchange of view had resulted in a suggestion that such work could be best promoted by the formation, not of a new independent society, but by the standing Roman Antiquities Committee, formed out of representatives of the various local archaeological and literary societies and similar bodies, together with representatives of the Universities of Leeds and Sheffield. It was proposed to call a conference about the end of October or early in November at Leeds for the purpose of discussing the scheme, and the East Riding Antiquarian Society was asked to send representatives to the conference. It was decided to accede to the request, and to leave it to the council of the Society to nominate their representatives. After the church at Thornton Curtis had been inspected the party returned to Hull.—*Eastern Morning News.*

#### Illustrations.

##### ST. AGATHA'S CHURCH, BIRMINGHAM.

**T**HIS church was the first to be erected by the Trustees of the Birmingham Churches Fund out of the proceeds derived from the sale of two churches in the centre of the city, Christ Church and St. Peter's, which, owing to the change in the respective parishes from residential to business districts, had become unnecessary.

The building, erected from the designs of Mr. W. H. Bidlake, was consecrated four years ago.

The west front presents a lofty tower to the Stratford-road, which it is hoped some day to equip with a peal of eight bells; the rest of the church is more or less hidden by surrounding houses.

The exterior is faced with Staffordshire brick, the interior with a buff-white brick, and the dressings are of Hollington and Bath stones. The spandrels of the nave arcade are in plaster with the view to future decoration. The builders were Messrs. Bowen & Sons.

##### SKETCHES WITH THE ARCHITECTURAL ASSOCIATION IN NORMANDY.

THESE sketches, and others which appeared in our last issue, were made to accompany the report of the Architectural Association's visit to Normandy. An account of the excursion will be found on another page.

**METROPOLITAN WATER BOARD.**—In the course of next Session the Board will introduce a Bill to enable them to remove the intake of the Eastern district on the river Lea from Pucker's End to near Fildes's Weir, and to intercept, by means of a main sewer, the sewage between the weir and Bishop's Stortford in the Stort valley and between the weir and Hertford in the Lea valley, with accessory works to purify the source of water supply, at a computed cost of about 775,000*l.* The Board's present undertakings include the construction of a reservoir holding 52 million gallons at Honor Oak, pumping machinery and buildings at Walton, and 13 acres of new filter-beds at Hampton, where a portion of the necessary land is already acquired. Of the total estimated expenditure (514,000*l.*), they anticipate that 200,300*l.* will be required during the year 1905-6; a large part of the outlay was virtually agreed upon before the Board assumed control powers. The Board have appointed Dr. A. C. Houston as director of water examinations at a salary of 1,000*l.* per annum, the office of Sir James Dewar and Sir William Crookes being abolished.



## COMPETITIONS.

**Schools, Bexhill.**—The award of the season in this competition. Mr. A. H. Ryan-Tension, F.R.I.B.A., is as follows:—First promoted design, Mr. H. P. Burke Downing, Merton; second, Mr. W. S. A. Gordon, Catford; third, Mr. Jessop Hardwick, Kingston-on-Thames. One hundred and six sets in all were received.

**The Mitchell Library, Glasgow.**—At a recent meeting of the Glasgow Corporation, the Libraries Committee recommended that the premiums of 100l., 75l., and 50l. be paid to the authors of the designs for the Mitchell Library marked respectively Nos. 47, 21, and 5, being the designs respectively placed second, third, and fourth by the assessors. Mr. Alexander Murray moved the adoption of the minute. Bailie Shaw Maxwell moved that No. 55 be placed before the two other designs. Mr. Mathieson seconded. The minute was approved by a majority. The Town Clerk, having opened the sealed envelopes, announced that the authors of the designs Nos. 47, 21, and 55 were respectively Mr. John Arthur, architect, 131, West Regent-street, Glasgow; Mr. Sidney R. Greenslade, 11, Gray's Inn-square, London; and Mr. James R. Rhind, architect, 67, Hope-street, Glasgow.

## Books.

**Pictorial Composition and the Critical Judgment of Pictures.** By H. R. POORE, A.N.A. New York: The Baker & Taylor Company. London: B. T. Eastford.

This is a rambling and not very well written book on a subject no doubt of the greatest importance and interest, but on which it is very difficult to formulate any theories which are not liable to be oversteered if regarded from another point of view, and all but useless to lay down rules. The fact is, all that can usefully be expressed in writing about pictorial composition could be compressed into a few pages. The rest is matter of perception and experience. A number of examples are given in the book, which are often suggestive; but when we find pictures labelled "Opposition of Light and Dark Measures"—"Opposition plus Transition"—"Triangles occurring in the Leading Line" etc., etc., anyone who looks at the compositions so defined can see at once that they might be defined by two or three other different formulae. The first-named, for instance, might just as well be defined "Horizontal Line interrupted by Dark Masses." Some of the main considerations in regard to the importance of composition are well put in the third chapter, "On Balance"; but the attempt to give a number of definitions only becomes a kind of verbal pedantry. What else can we call such dicta as these?

A series of oppositional lines has more effect than the tangent, its equivalent. A triangle may have the equivalent attraction of a circle.

More jargon, we should call this. Reynolds, in the passage quoted by the author on pages 158-9, gives the main idea to be kept in mind in studying the composition of existing pictures which are satisfying in effect—to make a small diagram or sketch of the proportions and positions of lights and darks, such as the picture itself might give when seen at too great a distance to see the detail; and Reynolds adds some general results of his observations, but without attempting to reduce any formal rules from them. There are some facts which may be positively asserted, for instance, that a small area of light in an otherwise dark composition is much more brilliant, in proportion to its area, than a large amount of light in a picture where there is little dark. Such statements, however, and some others, can be made as axioms, as already observed, a matter of experience and perception, and rules and formulae are of little or no value.

The book will be of no value to artists, for, perhaps it is not intended; but though very much wants condensation and clearing up of arrangement, many things in it may be of use to those who look at pictures, in suggesting to their minds points in connection with art which they have not thought of. The importance of the placing of figures in a landscape, so that they assist in the composition instead of being merely

"lugged in," is a point that may be new to many people. We agree with the author as to the bad placing of the figures in Corot's "Orpheus and Eurydice"; though this should have been brought in in connexion with the general subject of figures in landscape, instead of only being alluded to *en passant* on a different page; an instance of the want of plan in the book. The objection to a composition with equal balance on both sides combined with a weak centre, thus cutting the picture in halves to no purpose, is a good point, and is well illustrated in the picture called "The Poulterers," but we do not know that the "Dutch Peasants on the Shore," grouped with it as an example of the same defect, is really in the same category. The balance in this case is not equal; the group of people in the right foreground is the leading motive, the ship in the middle distance is a secondary point, in subordination to the group. "The Poulterers" (by an American artist) is really a picture without any composition at all; the "Dutch Fisher-folk" is not an example of the difficulty of trying to reduce these things to rules.

The photograph on page 69 of a view taken with a wide angle lens, with the succeeding prints showing how three satisfactory compositions could be made of it by division and omission, is one of the most practical illustrations in the book. This is a way in which photography may very well be used to afford an illustration; but the chapter on "The Place of Photography in Fine Art" sets up a claim to rank photography as an art which is totally untenable. We have heard this kind of argument many times lately, but it does not alter the fact that the interest of even the best photographic exhibition is quite below, and different from, that of even a second-class exhibition of original pictures.

**By Nile and Euphrates: A Record of Discovery and Adventure.** By H. VALENTINE GREERE. Edinburgh: Clark, 1904.

To the archaeologist the chief interest in Mr. Greere's book will centre round the author's description of the excavations and discoveries at Nippur (now known as Niffer or Niffar, the Calneh of Genesis). But it is just at this part of his book that Mr. Greere will not let himself go. He refers us instead to his articles in the *Times* of June 2, to the *Monthly Review* for September, 1903, and also to the larger account by Professor Hilprecht himself in his book with the title, "Explorations in Bible-lands During the XIXth Century." We give these references because, on the whole, it would seem to be advantageous to become more or less familiar with the nature of the discoveries themselves before reading the experiences of a member of the exploring party.

Certainly, Mr. Greere's very sketchy treatment of the real object, aim, and end of his sojourn in the East serves but to whet the appetite of the reader, who would like to learn more of those great mounds at Nippur, whose flanks enclose all sorts of structures, from pre-Sargonic city walls to Parthian fortifications; where was found a complete college library of school and scientific books and works of general literature; tombs as late as 14 A.D., and a little palace (discovered in the first "campaign," as Mr. Greere always calls it), "utterly un-Babylonian" in character; its style, plan, and the refinement of its details being such as to lead the discoverers to pronounce it "unmistakably Hellenistic in its essentials."

Mr. Greere has the real traveller's spirit, and notes with real care and evident zest much in Eastern life which many Europeans never trouble to look for; and thus his book is interesting, and, for anyone contemplating a dash for adventure in Mesopotamia, instructive.

Messrs. Clark's printing is, as usual, excellent, and both the choice and reproductions of the many illustrative photographs as good as is possible with process blocks.

**The Venerable Bede: A Lecture by Canon Rawnsley.** Sunderland: Hills & Co. 1904.

THE *raison d'être* of this little pamphlet is the national monument erected at Sunderland to the memory of Britain's early historian, Bede. Mr. Charles C. Hodges was the architect of the memorial, and from the drawings and

photographs appended to Canon Rawnsley's lecture it would appear to be a very thoughtful design, carried out in the style and manner loosely called Anglo-Saxon.

In sixty-four pages the lecturer contrives to convey a great deal of information, and is exceedingly interesting. Some six pages are devoted to early British art, as exemplified by the Anglian stones in the North of England. Until quite lately it was the fashion and habit of those archaeologists who busied themselves with the arts of early Britain to describe, under the vague generic term "Anglo-Saxon," every monument which could possibly be regarded as of date anterior to the Norman Conquest. This was to show a fine contempt for history. But even now, when we know, as Canon Rawnsley points out, something of the Italian and Byzantine influences which were affecting the arts of pre-conquest England, we have by no means accounted for all its peculiarities. Professor Baldwin Brown has, perhaps, done more than anyone else to arrange the evidence for genuine Saxon influence. There yet remains to be set at work a great deal of investigation into the probable effect of Norse influence, especially upon Northumbrian art. It is true that very little evidence can be gleaned from early Scandinavian buildings still extant, but of early Scandinavian jewellery there is sufficient to establish a very strong belief that not a few of the apparently indigenous British (some say Celtic) "motifs" hail from the land of those old piratical fellows, the Norsemen.

**Society of Engineers: Transactions for 1904.** London: E. & F. N. Spon.

YOUNG engineers who contemplate taking up survey work abroad will do well to study the paper contained in this volume on "Railway Surveys and Design in New Countries," by Mr. Percy G. Scott. The contribution in question is full of information, and has the merit of being based on practical experience. Another excellent paper is one by Mr. R. G. Allanson-Winn on "Deep-sea Erosion and Foreshore Protection." The author was the first to suggest that the encroachment of the sea is very often due more to erosion of material below low-water level than to visible causes on the exposed shore. Mr. Allanson-Winn devotes himself to the task of proving the accuracy of this theory, for which he makes a strong case. Other papers of interest to our readers in the present volume are entitled "Some Recent Works of Water Supply at Penzance" and "The Latest Practice in Sewage Disposal."

**British Progress in Municipal Engineering. Three Lectures.** By WILLIAM H. MAXWELL, Assoc. M. Inst. C.E. London: Archibald Constable & Co., Ltd. 1904.

THIS volume is the first instalment of a series of "National Engineering and Trade Lectures" to be delivered in connexion with a scheme assisted by the Board of Trade, Colonial and Foreign Offices, Colonial and Foreign Governments, and leading technical and trade institutions.

Apart from an introductory review of municipal progress during recent years, the first lecture is little more than an illustrated account of the machinery made by various British firms for use in connexion with the construction, care, and maintenance of roads. Lecture II. opens with a *résumé*, which shows very clearly the marked improvements that have been effected during the last fifty years in the way of sewerage and main drainage systems.

The third lecture commences with a really thoughtful essay on public water supply, illustrated by a map showing the gravitation supplies of various cities in Great Britain, and photographic views of the aqueducts and reservoirs in connexion with some large water-works systems. The main objects of the lectures are to record the progress made in the manufacture of appliances for municipal engineers, and to advertise the names and addresses of those firms who are so honourably connected with the improvements described by Mr. Maxwell. The classified trade directory forming an appendix to each lecture very much enhances the value of the book to architects and engineers who are not already acquainted with the names of British manufacturing firms interested in the branches of engineering mentioned in the lectures.



*The Progress of the German Working Classes in the Last Quarter of a Century.* By W. J. ASHLEY, Professor of Commerce in the University of Birmingham. Longmans & Co. 1904.

THIS is not a particularly satisfactory little book. It is too small to be exhaustive, and yet deals so much in details that it does not give us a complete outline of the progress of the German working man. For example, Professor Ashley tells us that the builders (workmen) of Berlin fell (he means the wages fell) from 45-50 pfennigs an hour "in the early seventies" to 30-35 pfennigs in the early eighties, and since that time have gone up to 70 pfennigs per hour, that is about 7d., in 1904. But this is very fragmentary and crude, and we are really not that much the wiser as to the condition of the German artisan engaged in building operations from a perusal of this work.

*Building Stones, with Numerous Illustrations.* Edited by PAUL N. HASLUCK. London: Cassell & Co. 1904.

FORMING one of a series of "Mechanics' Manuals," published in a most convenient size and at a merely nominal price, this handbook contains a comprehensive, though necessarily brief, summary of facts relative to building stones of different kinds. The practice followed in quarrying and blasting stone is very clearly described, some useful notes on selection and testing are given, and five classes of stone, covering the chief varieties used in building operations, are discussed in detail. One of the most interesting chapters in the book, upon "The Weathering of Stones," will well repay perusal. The next chapter includes a handy table, with particulars of about ninety varieties of marble, and the manual concludes with some practical hints upon "Dressing and Polishing Granite." In several chapters the information given is so brief that its chief value is to point out the way to further study, but this is by no means an undesirable feature in an elementary treatise of the kind.

*Road and Footpath Construction, with Numerous Illustrations.* Edited by PAUL N. HASLUCK. London: Cassell & Co. 1904.

THIS is another of the series mentioned in the notice above. In the introductory chapter we have the inevitable references to Macadam, Telford, and MacNeill, but the reader may congratulate himself on being spared the usual history of road-making from the earliest times. In dealing with macadam road surfaces we are glad to find that the editor insists upon the point that binding material should only be applied after the roller has been passed several times over the newly-laid stones. This certainly assists the natural adjustment of the fragments of metal, and tends to give a well-consolidated road. Macadam contended that binding material was unnecessary, but this view is not generally held in the present day. To insure thoroughly satisfactory results, however, we need far better binding material than that ordinarily employed, and in this connexion it should be noted that in the present handbook the recent application of tar to road-making is briefly discussed. The chapters on stone, wood, and asphalt paving are brought well up to date, and are illustrated by sectional drawings that will be found of practical assistance to the student. The concluding chapter on various kinds of footpaths is equally worthy of commendation, and in our opinion this is a most useful little handbook.

*Cassell's Cyclopædia of Mechanics.* Edited by PAUL N. HASLUCK. Fourth series. London, Paris, New York, and Melbourne: Cassell & Co. 1904.

THIS is rather a curious mixture of a volume, giving information and illustrations in regard to an immense variety of practical operations, but not arranged, like most cyclopædias, in alphabetical order, nor even grouped in any way in regard to classes of subjects. There is, however, an alphabetical index of subjects.

It is difficult to say exactly to what class of readers it would be useful. For anything like serious study of mechanical subjects it is too rudimentary. It might be useful to householders for information as to simple ways of making or cleaning various things; or it might be a good book to give as a present to a boy who has a turn for mechanical work. We do not think we can say more for it than that; it is a voluminous but an essentially popular publication.

#### BOOK RECEIVED.

THE LABOURER AND HIS COTTAGE. By Robert Williams and Fred Knee. (London: The Twentieth Century Press, Ltd. 2s. net.)

### The Student's Column.

#### STEAM BOILERS AND PIPES.—VI.

##### BOILER SETTING.

HAVING discussed the general principles and data governing the design of steam-generating plant and shown how the efficiency of a boiler may be affected by the manner in which the installation has been made and by the employment of auxiliary apparatus for dealing with feed water, we shall now devote attention to the question of boiler setting.

As we have already pointed out, boiler setting is a most important detail in the design of a steam-generating plant. The choice of the place in which a boiler is to be fixed is the first matter for consideration. Far too many boilers have been relegated to out-of-the-way places, where they cannot be inspected without trouble and inconvenience, and where they are apt to suffer from neglect, as well as from the effects of damp. In marine practice it may be necessary to bury the boilers in the depths of a steamship, but on land no occasion arises for analogous practice, except perhaps in hotels, clubs, and other buildings in cities and large towns where yard room cannot be obtained.

The proper place for a boiler is on a perfectly dry seating at ground level, or only so much below it as may be convenient for the delivery of fuel into the coal store and to provide for the return of condense water to the hot well. A light and airy boiler-house conduces to efficient management and inspection and to the well-being of the staff, and is in every way preferable to the dismal underground dungeons once so common, and of which too many still remain.

*Cornish and Lancashire Boilers.*—Owing to the general similarity in the design of brick-work for Cornish and Lancashire boilers, it will be convenient to consider these two types together.

Assuming a suitable site has been selected, the next point is to provide a dry foundation of sufficient strength to carry the weight of the boiler, with its fittings, mountings, pipes, and setting, and of the water to be contained in the boiler.

It is not an uncommon thing to find in textbooks instructions to the effect that the brickwork of a boiler should be laid on a concrete foundation so many inches thick. In one treatise of the kind we are told that the foundation bed should be at least 6 in. thick, and in another that 12 in. is generally sufficient if footings be given to the brickwork.

Vague generalities of this kind are exceedingly apt to lead the uninitiated astray, and it cannot be too strongly emphasised that the bearing power of the soil and the actual weight to be supported per square foot must be ascertained before the proportions of the foundation are settled.

The weight of a Cornish or Lancashire boiler set in the usual manner comes directly upon the two walls forming the sides of the central flue below the furnace tube or tubes. Therefore the main load is concentrated along two lines, and it is necessary to make sure that the earth shall not be subjected to a greater pressure than it is capable of supporting without subsidence of any kind.

In cities and towns special care is desirable, because the soil is very often of artificial character for some depth below the surface. When the soil is of marshy character, or consists of sand containing water, the whole area to be covered should be excavated to a sufficient depth to provide for a solid foundation slab of concrete, which can then be formed so as to consolidate the material and keep moisture from the brick-work to be built above. Another point deserving consideration is that the heat from a boiler furnace may have the effect of driving moisture out from wet sand to such an extent as to induce settlement of the walls. This is one more reason in favour of a good deep foundation.

When protected from the effects of running water, sand affords excellent support. If so protected, there may be considerable subsidence.

Soft, damp clay is liable to be squeezed under heavy loads. Hence it may sometimes be desirable to drain soil of this character, and to take measures for preventing the readmission of water. Hard clay is capable of supporting almost any load, and can be imposed, and the same may be said of the softest varieties of rock.

From the foregoing remarks it will be gathered that the thickness of the concrete foundation may vary from 6 in. up to 18 in. in thickness, according to circumstances.

By making a complete foundation slab a good solid basis is provided for all the flues, walls, as well as for the floor of the boiler-house, and the risk of cracks which sometimes appear in the brick-work is reduced to a minimum.

In arranging the flues for a Cornish boiler the three following methods of dealing with the furnace gases are available for adoption by the designer:—

(1) The gases leaving the furnace tube of the boiler are led through a side flue; after passing below the front and end of the boiler, they enter a flue along the other side, and are discharged into the main flue leading to the chimney.

This is the old-fashioned "wheel-draught" now only used in very exceptional cases, as for instance, when a boiler has to be installed in an existing building where there is no sufficient headroom for other system of setting. We remember on one occasion being compelled to adopt this method for two Cornish boilers supplied to a building in London, where the height of the only room available as a boiler-house was so limited that every inch became of importance. As very little excavation was permissible, a good deal of scheming became necessary in order to give the necessary space between the top of the safety valve and the under side of the main flue.

(2) The gases leaving the furnace tube are split into two streams, each passing along one of the side flues, which meet below the front end of the boiler and pass along a bottom flue to the outlet giving access to the main flue leading to the chimney.

This system of setting, illustrated in Fig. 13, is still adopted to a considerable extent.

(3) The gases leaving the furnace tube are first taken down to a flue under the bottom of the boiler, and on reaching the front end they are split into two streams, each passing along one of the side flues, which finally enter the main flue by separate outlets.

This system, illustrated in Fig. 14, is generally adopted in the present day. The arguments in its favour are that the temperature of the boiler is maintained at a temperature more nearly approaching that of the atmosphere, because the hot gases come directly from the furnace tube without previous cooling by contact with the sides of the boiler, and occurs in the second system.

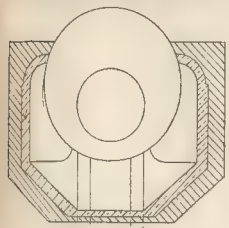
In addition to the greater uniformity of temperature secured, the stratum of cold water below the furnace is broken up and the circulation of water in the boiler is improved.

Having decided upon the direction to be taken by the furnace gases, the next thing to settle the dimensions of the flues.

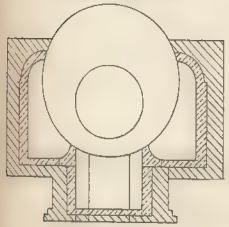
In the following notes we assume that the third of the above-mentioned systems of setting has been adopted, but some of the dimensions given will also be serviceable as guidance in the design of boiler setting upon the other methods.

The dimensions of the various flues depend mainly upon the size of the boiler, but certain minimum measurements must be observed in order that sufficient space shall be provided for ready access.

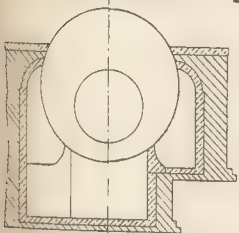
The downtake flue, formed immediately behind the furnace tube at the back of the boiler, should not be less than 1 ft. 6 in. deep measured from front to back, and need not be more than 2 ft. 6 in. deep for the largest Cornish boiler made. The width of this flue is governed by the diameter of the furnace tube, and its side walls should be set sufficiently free to leave the mouth of the flue perfectly free, so that the hot gases can pass freely impinge upon the brick-work. Examples of boilers of the smallest size, this flue has to



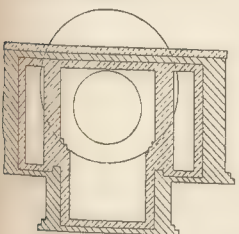
— Cross Section A.B. —



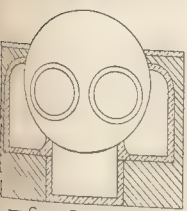
— Cross Section C.D. —



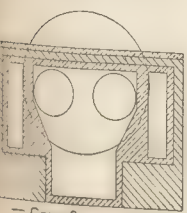
— A.B. — Cross Sections — C.D. —



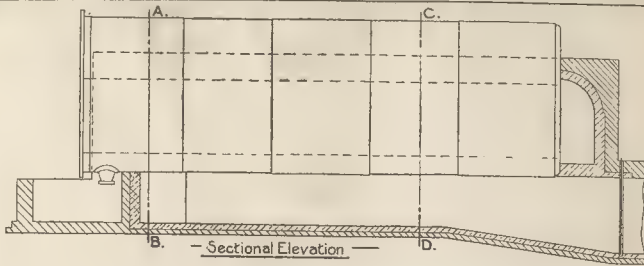
— Cross Section E.F. —



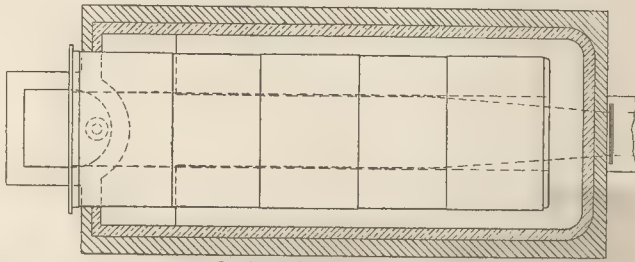
— Cross Section A.B. —



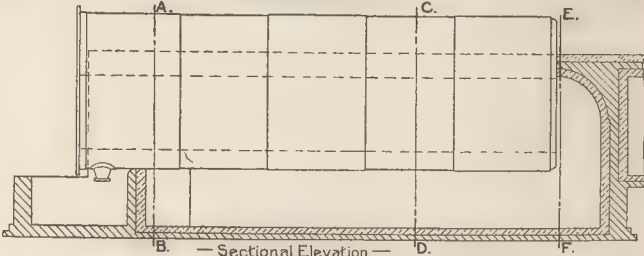
— Cross Section C.D. —



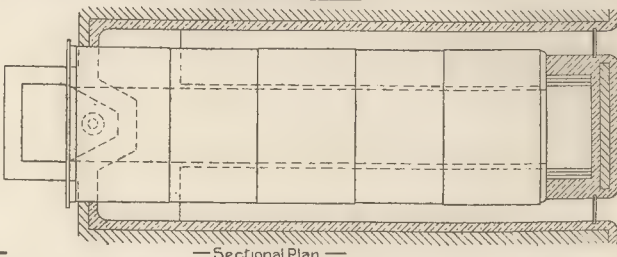
— Sectional Elevation —



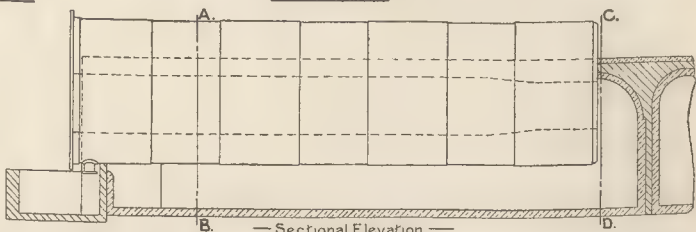
— Sectional Plan —



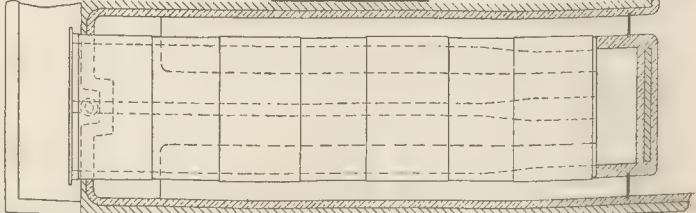
— Sectional Elevation —



— Sectional Plan —



— Sectional Elevation —



— Sectional Plan —

— FIG. 13 —

— FIG. 14 —

— FIG. 15 —



tapered down to the width of the bottom flue. The height of this flue is governed by the distance from the crown of the furnace tube to the bottom of the horizontal flue passing below the bottom of the boiler. The top of the downtake, measured from the inside of the arch, should be 3 in. above the crown of the furnace tube.

The bottom flue should never be less than 1 ft. 6 in. high for the smallest boiler, and need not be more than 3 ft. 6 in. for the largest size, these dimensions being taken between the centre of the shell and the floor level of the flue.

The walls of the bottom flue must be stopped at a suitable distance from the front of the boiler to make room for the cross flues leading up to the flues on either side of the boiler.

Measured from the inside of the front cross wall of the setting to the front end of the bottom flue wall, the cross flues should be from about 2 ft. 6 in. to 3 ft. 6 in. wide, so that the space behind the recess wall enclosing the blow-off pipe shall not be too cramped.

The side flues should commence about 2 in. above the crown of the furnace tube and continue down to about the level of the bottom of the boiler, or a little lower, the exact height depending upon the proportions of the bottom flue and of the seating blocks used.

The minimum width of the side flues varies from 6 in. to 12 in. in practice, this measurement being taken at the horizontal centre line of the boiler. Sometimes the side flues are made narrow with the idea of keeping the furnace gases in contact with the sides of the boiler. Nothing is gained by this, as the hotter portion of the gases always rises to the top whatever be the width of the flues. On the contrary, a good deal is lost by adopting narrow flues, for they make it difficult to clean the heating surfaces of the boiler from soot, and thereby result in serious diminution of heat transmission through the plates.

Lack of available space often renders necessary the use of narrower side flues than are desirable. This restriction may be avoided in some cases by the adoption of special forms of material, such as Poulton's serrated brick, by the aid of which several inches can be saved in the thickness of the intermediate and outer flue walls in a battery of two or three boilers.

Table X. gives approximate dimensions for the various flues of a Cornish boiler, but it should be understood that these can be varied according to circumstances, the chief points

TABLE XI.—APPROXIMATE DIMENSIONS OF BRICK FLUES FOR LANCASHIRE BOILERS.

Diameter of Boiler Shell.	Downtake Flue.			Bottom Flue.		Cross Flue.		Side Flue.
	Width at Top.	Width at Bottom.	Front to Back.	Width.	Depth.	Width to Cross Wall.	Width to Recess Wall.	
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	in.
6 0	4 2	3 0	1 9	3 0	2 3	3 2	1 8	9
6 6	4 8	3 3	2 0	3 3	2 6	3 4	1 10	9
7 0	5 2	3 6	2 2	3 6	3 0	3 6	2 0	10
7 6	5 8	3 9	2 4	3 9	3 3	3 8	2 2	11
8 0	6 2	4 0	2 6	4 0	3 6	3 10	2 4	12
8 6	7 0	4 3	2 9	4 3	3 6	4 0	2 6	12

of the boiler, in accordance with the general rules adopted in the case of Cornish boilers.

Approximate dimensions are given in Table XI. for the flues of Lancashire boilers of various diameters. These dimensions may require slight modification to suit the proportions of the boilers to be installed, and to comply with structural and other conditions.

#### CONSISTORY COURT OF LONDON.

On July 18 Dr. Tristram, K.C., Chancellor of the diocese, granted a faculty to sanction the Commercial Banking Company of Sydney to enlarge their premises by extending a wide bay window upon steel girders over the churchyard of St. Edmund the King, Lombard-street. The Banking Company will, in return, pay 100l. for a term of sixty years to the rector and churchwardens on behalf of the parish. The arguments and evidence adduced in Court showed that the application was of an uncommon character, inasmuch as the main point at issue was whether the land is, or is not, a burial ground within the provisions of the Dissolved Burial Grounds Act, 1854. The London County Council, who objected to the grant of the faculty, urged that it is, and therefore cannot be built over excepting for the purpose of enlarging the church. It seems that after the Great Fire the church was rebuilt north and south, with the altar in a squared recess at the north end and in that case the small piece of ground on which stood over the small piece of ground on the west side of the present fabric, over which the bay window would project. The east end stood on the opposite side of the churchyard, now used as a passage and entered from the street; there is no trace of the latter portion having been used for burials. The churchyard, about 46 ft. square, on the north side has remained closed against interments since 1853 by Order in Council. Mr. C. E. Allan, for the petitioners, cited Mr. Justice North's decision in the Ecclesiastical Commissioners and the New City of London Brewery Contractor, 1895; the Commissioners contracted

we may observe, Wren cleared the ground for a plan which is not rectangular, nor are its sides parallel; he built the tower in the middle of the elevation to the street, from the face of which it projects only 18 in. In the earlier church was buried, 1563, John St. John, architect and painter, author of the folio volume "The Plans and Chief Grounds of Architecture," being one of the first works upon practical architecture published in this country. Butterfield restored the fabric in 1865; the register contains an entry of the marriage on August 9, 1716, of Addison and Charlotte Countess Dowager of Warwick and Holland.

At the same sitting of the Court Dr. Tristram granted a faculty to the vicar, the Reverend V. G. Borraisdale, who moved in person, for the carrying out of some alterations and improvements of St. James's Church, Hampstead-road, to consist of the removal of part of the gallery for the provision of a side chapel and of additional vestry and seating accommodation. The Court at the same time suggested that some trifling work should be erected to separate the side chapel from the west end of the church. The church was built as a chapel-of-ease to St. James's, Piccadilly; the burial ground, opened to the public in August, 1887, was formed in the fields between a reservoir of the New River Company (now the site of Tolmer's-square) and Rhodes's farm. One of the first interments was that of Lord George Gordon, who died in Newgate Prison in 1793; there, too, were buried John Hopper, portrait painter, and, near the north gate, George Mortimer.

#### METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of the Managers was held on Saturday last week at the offices.

**New Central Stores.**—The Asylums Committee submitted amendments for a new central store at an estimated total cost of £2,000. They pointed out that their intention as regards these new stores was simply that adequate accommodation should be provided for the convenient reception, examination, storage, and issue of goods to meet the requirements of the numerous institutions with reasonable promptitude. The plans were approved, and submitted to their approval by the Local Government Board, the Works Committee were instructed to take all necessary steps for carrying out the work without delay.

**New Workshops at the North-Eastern Hospital.**—A report of the Hospitals Committee recommending the erection of a new boiler-house and workshops at the North-Eastern Hospital, and asking the Local Government Board to give its assent to the work, was adopted. The scheme provides for the provision of workshops for the painters, fitters, and carpenters, and space is left for an electrical workshop and store in case it is found advisable to install electric light plant at the hospital in future. The estimated cost of the scheme is about 16,000l. Messrs. W. H. Barber & Son, of 22, Buckingham-street, Adelphi, were appointed to take out the quantities of the proposed new boiler-house and chimney shaft at a commission at the rate of 1½ per cent. upon the amount of the accepted tender. The estimated amount of this portion of the work is 4,100l. Messrs. Fowler & Hugman, of 9, Craig's-court, Chancery Cross, were appointed to take out the quantities of the proposed alterations and additions at the Millfield Homes, which are being carried out at an estimated cost of 2,500l., at a commission at the rate of 2½ per cent. upon the amount of the accepted tender.

**Central Coal and Coke Store.**—A plan proposed by Messrs. Treadwell & Martin, architects, for the provision at the Southern Hospital of a central domestic coal and coke store at an estimated cost of 860l. was approved.

**Cost of Works.**—A statement was submitted by the Accountant showing the estimated and actual cost on completion of the following works:—Erection of laundry at the Down School, estimated 13,650l., actual 11,660l. 7s. 6d.; resisting works at the Fountain Hospital, 11,000l.—14,918l. 19s. 4d.; accommodation for small-pox nurses at the South-Eastern Ambulance Station, 1,900l.—1,625l. 5s. 6d.; and receiving home for children and ambulance station at Tooling Bee Asylum, 17,533l.—14,032l. 16s. 10d. The

TABLE X.—APPROXIMATE DIMENSIONS OF BRICK FLUES FOR CORNISH BOILERS.

Diameter of Boiler Shell.	Diameter of Furnace Tube.	Downtake Flue.			Bottom Flue.		Cross Flue.		Side Flue.
		Width at Top.	Width at Bottom.	Front to Back.	Width.	Depth.	Width to Cross Wall.	Width to Recess Wall.	
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	in.
3 6	1 9	2 0	1 9	1 6	1 9	1 9	2 6	1 4	8
4 0	2 0	2 2	2 0	1 6	2 0	1 9	2 6	1 4	8
4 6	2 3	2 8	2 3	1 6	2 3	1 9	2 8	1 6	9
5 0	2 6	3 2	2 6	1 9	2 6	2 0	2 10	1 6	9
5 6	2 9	3 8	2 9	1 9	2 9	2 0	3 0	1 6	9
6 0	3 0	4 2	3 0	1 9	3 0	2 3	3 2	1 8	9
6 6	3 3	4 8	3 3	2 0	3 3	2 3	3 4	1 10	9
7 0	3 6	5 2	3 6	2 0	3 6	2 9	3 6	2 0	10

for observance being the provision of ample space for the gases and for cleaning the flues, and the avoidance of narrow necks and other obstructions to draught.

Further, it may be necessary to vary some of the dimensions given in this table for the reason that the proportions of steam boilers made by different firms are not fixed in accordance with a universal standard.

The dimensions of brick flues for Lancashire boilers are very similar to those required for the Cornish type.

Owing to the width from side to side of the furnace tubes, the downtake flue has to be tapered down to suit the width of the bottom flue. The downtake is often divided into two compartments by a thin, vertical wall between the two furnace tubes, this wall being continued for a distance of about 2 ft. into the bottom flue, with the object of keeping the gases separate, and thus preventing disturbance of the draught.

The other flues are proportioned to the size

to sell the site of All Hallows the Great, Upper Thames-street, then recently pulled down, to the Brewery, and Mr. Justice North decided that the buildings on the actual site of that church were not prohibited by the Dissolved Burial Grounds Act, 1854. The learned Chancellor said that decision was binding upon him in determining that a piece of ground which is set apart for the building of a church cannot be held to be set apart for the purpose of interments. In Mr. Cornish, had not sustained their objection, and he adjudged that the portion in question of the churchyard formed part of the site of the earlier church and had never been set apart or used for burials. The Court, however, considered that the Council were entitled to their costs, to be paid out of the 100l. grant to the rector and churchwardens. Mr. Cornish, on behalf of the Council, gave notice of appeal. In rebuilding the church,



Engineer-in-chief also reported the completion of the erection of sanitary annexes at Seaham Asylum by Mr. T. Cole at a cost of £3,784. 6s. or £4,767. 7d. in excess of the contract sum, and of the provision of pipe trenches at the North-Western Hospital by Mr. T. Cole at a cost of 60l.

### GENERAL BUILDING NEWS.

**CHURCH, SEAHAM HARBOUR.**—The New United Methodist Free Church at Seaham Harbour has been built to replace the former one destroyed by fire last year. The approximate cost of the new building is 4,000l. The new church and school occupy the site of the old one in Church-street. The front elevation is of stone and red pressed bricks in the Renaissance style. Accommodation has been provided in the church for 600 people. In the rear of the building on the ground floor there are a lecture-room, classrooms for young women and young men, and a minister's vestry. There is a sliding shutter between the lecture-room and a class-room for enlarging purposes. On the first floor behind the church is the Sunday school, which will accommodate about 300 scholars on the floor and in the gallery above. The work of erection has been carried out by Mr. W. B. Cooper, contractor, of Sunderland, from the designs and under the supervision of the architects, Messrs. W. & T. R. Milnes, of Sunderland.

**BIBLE CHRISTIAN CHURCH, WHILDON DOWN, DEVON.**—The foundation-stones were laid, on the 1st ult., of a new Bible Christian Church at Whildon Down, near Chagford. Mr. J. Crocker, of Exeter, is the architect. The chapel is to be of granite, with granite dressings and mullion windows, with leaded lights. Seating accommodation will be provided for about 200 persons.

**CHURCH RESTORATION, CLEVELAND.**—After undergoing restoration, under the supervision of Mr. W. D. Carge, the old parish church of Cleveland was re-opened on the 26th ult. In the nave of the church there was formerly a plaster ceiling, with a few iron rods, but this has given way to an open-timbered oak roof, and, where possible, spandril pieces of the wood of the old roof have been retained in the reconstruction. Wood blocks have taken the place of the old platforms. The top of the aisle roof is covered with Pyramont roofing paper. In opening out the north transept roof an early Norman window has been discovered. It was covered with lath and plaster, but is now left in its original state, high up in the wall, and glazed. A doorway has been cut from the old vestry into the chancel, and the floor of the vestry lowered to give better access. There are new altar-rails, and the pulpit has been reconstructed. A double piscina was revealed by taking away the organ.

**CHURCH BUILDINGS, HAMSTEAD.**—The new church buildings at Lyndhurst-road are now nearing completion. The work consists of a hall on the ground floor to seat 450 persons, for the use of the Sunday school, for church meetings, lectures, etc. On the first floor over the hall, nine classrooms are provided, also a ladies' committee-room and cloakroom adjoining. The portion of the old church-room left now forms the guild-room and church parlour, and will seat about 160 persons. On the second floor, above the classrooms, accommodation is provided for the caretaker, consisting of a kitchen, scullery, parlour, and three bedrooms. Where the caretaker's cottage stood premises have been erected for a boys' club, consisting of two rooms, one on the ground floor and the other above, with library adjoining. The estimated total cost is 10,000l., and the architects are Messrs. Spalding & Spalding.

**CONGREGATIONAL CHAPEL, EATON, NORWICH.**—The foundation stone of the new Congregational church, which is being built at Eaton village, south of the city, has been laid recently. The structure faces north and south; it has east and west transepts, which can be shut off from the body of the chapel by moveable partitions so as to be useable as classrooms; and there will be a hundred and fifty sittings provided in all. It will be a brick-and-tiled building, with moulded dressings. The main four-light tracery window, and the main entry is by a porch on the west side. The architects are Messrs. Boardman & Son, and the builder is Mr. E. J. Taylor, of Cromptford.

**METHODIST CHAPEL, LONAN, ISLE OF MAN.**—The foundation-stones of the new chapel which is to be erected at Lonan were laid recently. The building is to accommodate about 160 persons, and has been designed by Mr. J. T. Boyde, of Ramsey. Mr. R. Corlett, of Laxey, N.W., is the contractor.

**MEMORIAL SCHOOL, SNAPE.**—The new Snape memorial school has just been opened. The building consists of three rooms, the large school-room being in the centre, with accommodation for 140 scholars. A corridor gives access to the infants and to the entrance for girls and boys respectively. On the other side of the corridor are cloakrooms, lavatories, etc. There is a room, with stairs to basement and store-room. Asphalted pathways lead to the outbuildings, in which are a pump-house and

cistern-room. The heating is by hot water, with radiators, from a boiler in the basement. The buildings are in the Tudor style of architecture, and were designed by Messrs. Bishop & Cantley, of Ipswich. Mr. H. Pulham, of Tunstall, was the builder, and Mr. E. Scott, of Ipswich, was employed for the heating apparatus.

**SCHOOL BUILDINGS, WALSALL.**—Alderman T. P. Brownhill, Chairman of the Walsall Education Committee, recently opened a new block of school buildings which has been erected at the Chucky, Walsall. The schools consist of two mixed departments, one for seniors and another for juniors. In addition to large asphalted playgrounds, considerable areas are set apart for gardens for the children with a view to instruction being given in gardening. The architects were Messrs. Bailey & McConna. In addition to five classrooms and teachers' rooms, there is a central hall, 54 ft. by 24 ft., which can be used in wet weather for drill and also for science work, while it is proposed to provide a gymnasium for the junior classes.

**EXTENSION OF BRADFORD CHILDREN'S HOSPITAL.**—Viscountess Grey, opened on the 2nd inst. the new out-patients' department of the Bradford Children's Hospital. The new building, which has been erected from the plans of Mr. James Ledingham, is situated quite close to Bertam-road, on land which formed part of the grounds of the hospital, the object in making it a separate block being that it should not interfere with any future development of the older building. It comprises a waiting-hall, capable of accommodating 200 patients, with registration, consulting, and operating rooms, a dispensary and drug store, and the curator's residence. In style it is in keeping with the other hospital buildings. The fittings are of pitch-pine varnished. It is estimated that the cost of the building, including fittings and the adaptation of the old out-patients' department to other uses, will amount to about 1,900l.

**HOSPITAL EXTENSION, ESTON, CLEVELAND.**—On the 29th ult. the new extension hospital at Eston, near Middlesbrough, was re-opened. The premises provide accommodation for about seventy beds. The east wing of the hospital has been enlarged, and an upper ward has been added, which is to be known as the children's ward. The bottom ward is intended to be used for the treatment of male medical cases. The west wing of the hospital has been remodelled. A wing has been made on the ground floor, and an upper ward has been constructed. Mr. W. S. Roberts was the architect for the work, the cost of which was about 5,000l.

**PARISH HALL, SOUTHBOROUGH.**—The new parish hall for St. Katherine's Parish, Southborough, was opened a short time ago. The building was designed by Mr. G. A. Bligh Livsey, architect, and is in Queen Anne style, the facings of the exterior being composed of Milton red facing bricks and Portland stone dressings, and the roof of dark Broseley tiles. The main hall is 60 ft. long and 29 ft. 6 in. wide, with a wing on the north 22 ft. by 10 ft. It is capable of seating 400, and is lighted by six windows, and the heating is by series of gas stoves, the artificial lighting being electricity. The contractors were Messrs. Miller & Sons, of Bournemouth, and the cost was about 2,000l.

**GLADSTONE CLUB, SOUTHAMPTON.**—The Gladstone Club Building Co., Ltd., was formed some years ago for acquiring the club properties, and the present scheme for enlarging the club and adding some new features provides for the pulling down of a plumber's shop and other old buildings, erecting on the site two lock-up shops on the ground floor, also a large meeting-room (or trades hall) on the first floor, and steward's apartments on the second floor. Plans were drawn by Mr. J. H. Blizard, F.S.L., and the work has been entrusted to Messrs. Jenkins & Sons, builders, of Southampton.

**WORKMAN'S DWELLING, DUBLIN.**—The new workman's dwelling, which has been erected on Bride-road, occupies a site having a frontage of 166 ft. to Bride-road and a depth of about 100 ft., and is five stories in height, exclusive of the basement. The general outline is that of the letter U, this form giving, it is thought, the greatest possible facilities for the complete lighting and ventilating of the 516 cubicles occupying the four floors above the ground story, while the open spaces between the limbs of the U afford airing for the laundry. The elevation of the red brick facings, relieved with artificial stone of red tint. All the floors and roofs are of fireproof construction, and the stairs, landings, and passages are of granolithic material. The building is entered by a porch and vestibule in the centre of the frontage. On the right is the office, with pay counter, where lodgers will receive admission; while adjoining the office are the superintendent's quarters. The lodger on entering passes through a short passage into the great corridor running from east to west of the building, and from which he will have access to the following apartments:—A dining-room, about 62 ft. by 50 ft., with tables and seats able to accommodate 230 lodgers at one time; a smoking-room, 60 ft. long and 11 ft. wide; a reading-room, 50 ft. long and 19 ft. wide; two halls containing lockers, where each

lodger can deposit his possessions under lock and key; a shoemaker's shop, with space for boot-cleaning; and a tailor's shop. Lodgers will be able to cook in the dining-room, or those that they may purchase outside, or those that they buy in the catering department of the lodging-house. For the latter purpose a shop is provided, opening into the dining-room, where food, raw or cooked, will be sold approximately at cost price. A passage leads to the basement, which is practically a lower ground floor. There are a lavatory, 46 ft. by 18 ft., fitted with forty-seven basins; six bath-rooms, and two dressing-rooms, a row of 6 ft. baths, a wash-house, with arrangements for the rapid washing and drying of linen, and a barber's shop. In the basement are also situate, but with separate accesses, the boiler-house and coal store, the porter's common-room, and the luggage-room. The domestic servants' common-room, and four bedrooms, with separate access, are also in the basement. The linen stores, household stores, and general domestic offices as well as part of the superintendent's quarters, are in the front part of the basement, separately accessible from the ground floor. The four upper floors, containing the 516 cubicles, are reached by three fireproof staircases. All the four floors are similar in arrangement, a long central corridor 4 ft. wide being placed in each limb of the building with the cubicles disposed on each side of the corridors. Each cubicle measures 7 ft. 6 in. by 5 ft., and has its own window. The divisions are made of wood, finished at a distance of 18 in. from the ceiling so as to secure ventilation without interference with privacy. The building has been erected from the designs of Messrs. Joseph & Smith, of London, and under the supervision of Messrs. Kaye, Parry, & Ross, Dublin, the contractors for the general works being Messrs. S. H. Bolton & Sons.

**BRADFORD TOWN HALL EXTENSIONS.**—The foundation-stone was laid on the 28th ult. of the Town Hall extensions. The area upon which the Town Hall now stands is 2,600 sq. yds., with a total floor space of 56,900 sq. ft., and the area reserved for the extension is 2,211 sq. yds., with a prospective floor space of 63,400 sq. ft., exclusive of the sub-basement and attics. There will be as little disturbance as possible of the existing fabric, and the unity of architectural features will be so preserved as to give the appearance of a complete building under one roof. The contracts already let provide for the whole of the work up to the level of the ground floor, and amount to 10,969l. The scheme was prepared by the City Architect (Mr. F. E. F. Edwards) in consultation with Mr. R. Norman Shaw, R.A.

**FREE LIBRARY, ABERYSTWYTH.**—The foundation-stone of the Carnegie Free Library at Aberystwyth was laid on the 28th ult. by Mr. David Davies, J.P. The library is being erected at a cost of 3,000l., and the plans for the buildings were by Mr. Walter G. Payton, Birmingham, and were selected by the assessor, Mr. S. B. Russell, from among forty-eight others. They provide for a newsroom, with stands for sixteen newspapers and seats for thirty-six readers; a lending library, arranged on the open-access system, allowing the public to choose their own books, with shelf accommodation for about 10,000 volumes; a reference reading-room, with seats for thirty-two readers and shelving for 2,000 volumes; magazine-room or school of art on the first floor, having an area of 1,468 sq. ft.; librarian's office and committee-room, lavatories for both sexes, cleaner's store, heating chambers, etc. The contract has been let to Messrs. Edwards Brothers.

**MEMORIAL HALL, BALLYCASTLE.**—The laying of the foundation-stone of a new hall, to be erected in memory of the late Rev. Dr. M'Alister, Roman Catholic Bishop of Down and Connor, was performed on the 26th ult., at Ballycastle. The contractor for the work is Mr. Bernard Boyle, of Ballycastle; while Mr. James A. M'Cormick, Coleraine, has prepared the plans.

**BRANCH READING-ROOM, BELFAST.**—The reading-room provided in the new premises built by the York-street Flax Spinning Company, Ltd., in Henry-street, was formally opened on the 27th ult. by Alderman Sir James Henderson, D.L. The premises have been built by Messrs. M'Laughlin & Harvey, Ltd., from the plans of Mr. A. Basil Wilson.

**RESTAURANT, ALDERSHOT.**—The opening of the Cecil Restaurant in High-street, Aldershot, took place recently. The work in connexion with the building has been carried out by Mr. Caesar, builder, of Hale, under the direction of Mr. S. Friend, who was the architect. The furniture was supplied by Messrs. T. White & Co.

**GYMNASIUM AND BATHS, DUNFERMLINE.**—The Carnegie Gymnasium in Dunfermline, which has cost, together with the baths, nearly 40,000l., occupies a site in Pilnir-street. The gymnasium has a floor area of 103 ft. by 46 ft. The water area of the swimming-bath is 75 ft. by 35 ft., and on two sides are fifty-one dressing-boxes, entirely of teak. At one end of the hall are footbaths and sprays and superintendent's room. There is a gallery along three sides, and this accommodation, including the movable seats in the area, affords sitting room on gala occasions for 1,000



persons. The decoration is from designs drawn by the architect, Mr. Blanc, and has been executed by Mr. Don, painter.

**IMPROVEMENT OF THE TOWN HALL, BIRMINGHAM.**—The alterations which are being carried out at the Birmingham Town Hall have involved the reconstruction of the orchestra, an improvement of the existing exits, and the provision of others, as well as the provision of proper sanitary arrangements. Mr. Fred Martin, of the firm of Martin & Martin, architects, Birmingham, prepared the plans. The whole of the work will cost about 6,000.

**NEW OFFICES FOR THE "YORKSHIRE POST."** **FLEET-STREET.**—The new London offices of the *Yorkshire Post* at 171, Fleet-street, built under the supervision of Mr. J. M. Anderson, are mainly in Portland stone. It is a structure of six stories. The walls of the ground floor and staircases throughout are covered with Barmantofts tiles from Leeds, and the walls of the basement, containing storage for newspaper files and a dining-room for the staff of clerks, are covered with white tiles. The builder was Mr. J. Darch, Mr. J. A. Spooner being the clerk of the works and Mr. H. England the architect's surveyor.

**HOSPITAL EXTENSION, BARNSTAPLE.**—Additions and alterations are to be carried out at the North Devon Infirmary at Barnstaple from plans prepared by Mr. J. C. Southcombe, architect. The scheme provides for the addition of sixteen men's beds, twenty for women, and fourteen for children, making a total of fifty.

**WAR MEMORIAL, CHATHAM.**—On the 26th ult. the King unveiled the Royal Engineers' War Memorial at Chatham. It consists of an arch, and was designed by Mr. E. Ingress Bell, architect. A feature of the structure is a series of sculptured panels in high relief. The alto-reliefs are by Mr. W. S. Frith. The composite capitals to the columns, the keystones of the arch (figures of Victory), and the spandrels are the work of Messrs. Fagan & Bell. The marble tablets and inscriptions are by Messrs. Farmer & Brindley, and the copper lamps on the detached piers are by Messrs. Thomas Easley & Co. The general contractors are Messrs. Longley & Co., Crawley, Sussex.

#### SANITARY AND ENGINEERING NEWS.

**WATER SUPPLY, MORREHOE.**—A new water supply for Morrehoe and Woolacombe was inaugurated on the 1st inst. The new supply is an extension of the Ilfracombe undertaking—the 4½ miles of iron pipe necessary to connect with the Ilfracombe mains, having been laid in nine months. Mr. O. M. Prouse, Surveyor to Ilfracombe Urban Council, has acted as engineer for the scheme, which involves an expenditure of about 7,000, for the laying of the pipes from Iron Gate to Woolacombe, and an additional sum of 2,000, will be devoted to the building of filter-bed.

**LAGER STEEL CASTINGS.**—In the construction of the piers of the Blackwell Island bridge, between New York and Brooklyn, some steel castings of remarkable size are being used. One of these measures 12 ft. 2 in. square at the base, 10 ft. 5 in. by 8 ft. 5 in. at the top, and 45 in. high. Three furnaces were necessary for pouring this casting, which weighs nearly 90,000 lb. It consists of a network of ribs radiating from a central column, and completed by top and bottom plates; the metal being nearly 3 in. thick throughout.

**BRIDGE, MAR LODGE, N.B.**—The new Victoria Bridge across the Dee, erected by the Duke of Fife at Mar Lodge, has just been completed. It measures from abutment to abutment 301 ft. 6 in., and the width between the girders is 12 ft. It is in three spans, with two piers, of granite, in the river. The girders are 6 ft. 2 in. deep, with flanges 12 in. wide, and are of parallel double Warren type, with sway bracings every 13 ft. The flooring is of continuous steel troughing. The roadway is of tar macadam, with cement concrete channel on either side to carry off the surface water. There is an ornamental cast-iron railing with moulded cope running the length of the bridge on each side. The piers are of hammer-blocked rustic granite. The bridge has been built to the design and under the superintendence of Mr. P. M. Barrett, C.E. The foundations and mason work of the piers and the tar macadam of the roadway have been executed by Mr. George Hall, builder, Aberdeen; and the steel work by Messrs. James Abernethy & Company, Ferryhill Foundry, Aberdeen.

**REFUSE DESTRUCTION, WORTHING.**—A visit was recently paid by members of the Worthing Town Council to the new refuse destructor works, which have been installed at the eastern extremity of that town. The new buildings and chimney shaft have been erected from the designs of Mr. F. Roberts, A.M.Inst.C.E., the Borough Engineer and Surveyor, who also superintended the whole of the work. The builders were Messrs. Rowlands Brothers, of Horsham, and the entire cost amounts to 6,500.

**PROPOSED DRAINAGE AND STREET WORKS, SOUTHERND.**—Col. A. C. Smith, R.E., Local Government Board Inspector, held an inquiry at the Southend Council Chamber recently

with reference to the application by the Council for sanction to borrow 22,878*l.*, being 20,500*l.* for a system of surface water drainage for a part of the Borough west of High-street, 1,878*l.* for street improvements in London-road and Southchurch Beach-road, and 400*l.* for a water supply to the new conveniences on the pier extension. The town Clerk said, in connexion with the first item, the scheme was for the purpose of easing the existing sewers, and the purpose of easing the existing sewers, and if not done it would necessitate the laying down of larger sewers. The Borough Engineer (Mr. E. J. Elford) submitted plans and details. The town Clerk, with reference to the second application, said it was divided into two portions, 1,500*l.* for widening and improving London-road, and the balance in respect of improvements in Southchurch Beach-road. The Borough Engineer also gave details. The remainder of the loan (376*l.*) was for the purpose of constructing a footpath along Southchurch Beach-road, where up to now there had been no footpath. This concluded the inquiry.

**PRINCE'S BRIDGE, MANCHESTER.**—This structure, which forms connexion between Water-street and Ordral-lane, replacing a previous bridge erected in 1883, has just been opened. The plans and estimates were prepared by the City Surveyor, and the work, entrusted to Messrs. Morton & Co., of Garston, has been completed at a cost of 12,500*l.*

#### MISCELLANEOUS.

**CHERBOURG QUARTZITE.**—Mr. Consul Loftus, in his report for 1904, writes:—The stone quarries situated near Cherbourg attract many smaller British vessels on larger wharves. Owing to the over empty to load, which is a disadvantage, the high customs tariff levied on all British manufactured goods introduced these vessels are obliged to come over empty or in water ballast. The stone exported from Cherbourg is almost exclusively used for road-making purposes. This trade has shown a very considerable falling-off, from the Rhine district to the United Kingdom. Nevertheless the Cherbourg stone, if somewhat soft, has for many years maintained a high reputation in the market. The stone is a grey quartzite, and is broken by hand, as this method, although apparently antiquated, has proved more effective and satisfactory than the application of machinery. The stone is broken into cubes varying in size from 1½ in. to 2½ in. It is then passed through revolving drums, driven by steam, by means of which a more accurate and precise size is obtained. The stones are shipped to Swansea, Dover, Faversham, Poole, Rochester, Strood, Margate, Ramsgate, and Thames ports. There are three principal stone-exporting companies, i.e., two British and one French—The Kent-road Maintenance Company, the Gravesend Quartzite Company, and La Compagnie des Carrières de l'Ouest, with head office in Paris. These are in addition several smaller stone exporters who rent quarries or parts of quarries. The amount exported in 1904 (92,900 tons) shows a decrease on the amount exported during the previous year of 26,037 tons. Cherbourg quartzite is extensively used, and is in high estimation in France, a country renowned for its good highways.

**PUBLIC WORKS IN GENOA AND DISTRICT.**—The British Consul-General reports that the pulling down of old streets and the building of new ones goes on at a great pace in Genoa. The enlargement of the principal railway station is nearing completion, and the new portion is now in use, by which Genoa is no longer a terminus. The Brignole new station is also nearly completed. There have been several schemes submitted for further improvements, but so far none of them has been finally accepted. It is stated that the work of enlarging the port of Genoa is to be begun this year. The cost of the enlargement is estimated at 2,000,000*l.* This work is one of the very greatest importance to Genoa, and, indeed, to Italy in general, especially now that the Simplon Tunnel is about to be opened, and it is of the utmost importance for the welfare of the port that the railway question should be immediately settled, and that every provision should be made for the speedy handling of an increase in seaborne imports, which it is only reasonable to anticipate. No progress has been made in the competition for the best plans for the drainage of Spezia and suburbs, for which the municipality has offered a prize of 400*l.*, open to international competition. It has been found necessary to postpone the final date on which schemes may be presented by intending competitors. At San Remo a new casino has been erected on the site of the old public gardens. A new post-office has also been erected.

**SWEDISH GRANITE AND WOOD EXPORTS.**—Mr. Consul Duff reports from Gothenburg that granite quarrying, the most important industry on the west coast of Sweden, has latterly been in a languishing state, and the outlook is not cheering as to the future, for in the case of Germany, the largest and most important customer, tariffs are tending to annihilate the trade. There has been a falling-off in the export to the United Kingdom,

but it is hoped that a revival will take place, for the excellence, strength, and beauty of the granite exported from this district have, when introduced, secured the market, even when the distance of transport has been an obstacle. The establishment of the Swedish Stone Company's establishment at Hjelmselund on the Bro-fjord, there have been laid extensive foundations for machinery for the purpose of manufacturing paving-stones similar to what is already taking place in the province of Blekinge, on the island of Bornholm. This is with the object of being not altogether dependent on the workmen. Few wood exporters will be able to look back upon the campaign of the year 1904 with anything like satisfaction. Yielding and varying prices were characteristic throughout the year. Contracts of earlier date certainly show higher prices than obtained later, but these have been materially reduced by disputes, which during the past year have, on an average, been of greater frequency than in previous years have been the case. The fall in price has much affected all kinds of goods, sawn and planed round as well as hewn timber) has chiefly to do with deals and battens, the former to the figure of 30 per cent., and the latter to about 15 per cent. upon smaller dimensions were reduced still more towards the close of the season. The figures of export are, of course, smaller last year than last. They are likely to be about 16 per cent. less. The greatest diminution has been in the South African market, for which probably not so much of the export of 1903 has been taken place. The demand encountered in this market may chiefly be looked upon as the principal cause of last year's considerable fall in prices. The exporters have made preparations for a good year out. When these expectations were frustrated they were forced to accept the reduced prices of other markets, and then commenced the weakening of prices, which in 1904 was not so much influenced by the prevalent political uncertainty. Not a few sales have lately been effected, but contracts of any magnitude have been entered into.

**DANTZIG TIMBER TRADE.**—Col. Brockfield, reporting on the commerce of the consular district of Dantzig (which comprises the East and West Prussia, Posen, and Silesia) for 1904, states that the business in the timber trade was much retarded owing to the drought. Sea freights were low, and there was a plentiful supply of wood from Russia and Galicia; but with no water with which to float the rafts down everything was brought to a standstill, and wood was ready to be sent down in April had to wait till September before it could be dispatched. The total number of rafts which reached Dantzig was 206, consisting of 100,000 loads (English measurement), and representing a value of 468,839*l.* The chief demand from the United Kingdom was for railway sleepers, and Dantzig shippers complained that for other purposes, such as building, there was a decided stagnation in the British market. On the other hand, there was a very animated demand from Belgium, the Netherlands, and especially from Germany itself. The war, it may be mentioned, did not have any effect on the quantity of wood produced in Russia, though it is found more difficult to cut and in Galicia, to procure wood of finer qualities. The following are Dantzig exports of wood for the year—1904: United Kingdom, 78,730 tons; Belgium, 21,882 tons; Denmark, 2,626 tons; France, 888 tons; Netherlands, 12,677 tons; Russia, 110 tons; other parts of Germany, 50,406 tons; total 167,119 tons, compared with 152,648 tons in 1903, and 242,308 tons in 1902.

**WESLEYAN CENTRAL HALL, WESTMINSTER.** In our issue for July 29 the name of one of the three architects concerned in the design which is published of the Wesleyan Central Hall was given as "Savidge." It should have been "R. Savage."

**MONUMENTS IN CHURCHES.**—In the House of Commons recently, Sir E. Lees (Birkenhead) asked the Secretary to the Board of Education whether the Department of Science and Art, with a view to maintaining an historical record of the phases of British monumental art, would consider the desirability of re-erecting, and preserving at South Kensington, such of the important monuments erected in churches out of public money, and in pursuance of a vote by Parliament, as might now or hereafter be removed from those churches by the ecclesiastical authorities in charge thereof. Sir W. Anson (Oxford University): Unless a monument is of interest in the history of art generally, or in the development of monumental art, the Art Museum at South Kensington would not seem to be an appropriate place for it. Certainly the Board would not be willing that the Art Museum should become a repository for outcast monuments which ecclesiastical authorities may, for one reason or another, have decided to displace.

**HAWICK ARCHAEOLOGICAL SOCIETY.**—At a recent meeting of the Hawick Archaeological Society Mr. J. J. Vernon read a letter from Dr. Christison, Edinburgh, secretary of the Society of Antiquaries of Scotland, in which he stated:—"Sir Herbert Maxwell has requested me to send



an account of the progress of the excavations at Newstead. The undertaking is the most serious we have had to do with, as the area is three times larger than that of any Roman station previously excavated by us, and it will take several years to complete the work in the thorough manner it deserves. The mere fact of its great extent indicates that this station or town has been of unusual importance in the Roman occupation of Scotland. As yet our work has been entirely exploratory by running trenches across the ground to get a general idea of what is before us, and is not yet detailed. The general indications are that the whole interior has been occupied by stone buildings, and that, although in many places they have been entirely removed, their position can always be ascertained from the foundations of walls and cobbles on which they are laid, so that we expect to get a complete plan of the place. As to the detailed work, we have made one section through the fortifications, which prove to have been of great strength, the earthen ramparts having been of unusual width, with a strong pavement of stone. The supposed prætorium, now being cleared out, will show the bases of a stone wall rising to a height of some 20 feet in the courtyard. A buttressed building and another square structure with an apse projecting to its courtyard were partially cleared. One of the most interesting indications met with both in the fortifications and buildings is that there were two occupations, the earlier Roman, the number of relics found is very considerable, and include a novelty—a Roman stylius. They are seen in the museum here. The excavations are under the charge of Mr. James Curie, Prior, of Glasgow.

**TEMPERATURE AND INSULATION MATERIALS.**—A voluminous report by the Engineering Standards Committee deals very fully with the various series of experiments undertaken at the National Physical Laboratory and elsewhere for the purpose of obtaining reliable data upon which to base recommendations as to the permissible temperature rise for electrical machinery. From the report by Mr. E. H. Rayner of the tests conducted at Birmingham, we notice that various insulation materials were heated for several weeks in electrical ovens at temperatures ranging from 100 deg. to 150 deg. centigrade, and the alternating current required to pierce these materials was determined both for heated and for unheated specimens. The table on pp. 10 and 11 shows that varnished papers and other substances are more damp-resisting when cold, but that when heated the untreated materials give the better values. The subject of this report is an interesting one, but, of course, the special value of the report is represented by its bearing upon the manufacture of electrical machinery.

**LEAKHAMPTON QUARRIES.**—Rising to the height of nearly a 1,000 ft., Leckhampton Hill overlooks the town of Cheltenham, and its steeply rising heights still form a pleasant feature of the landscape. As in the cases of Clifton, Malvern, and other towns, the presence of many of the Leckhampton stone has tempted landowners for many years past to subordinate beauty to utility, and immense quantities of material have been removed from Leckhampton Hill within the last century. The chief stones yielded by these quarries are oolite and Bath stone, both of an identical in constitution with the rocks of the Mendips, and in adjoining counties. We have received from Mr. W. Graham, of Leckhampton Stoneworks, two samples of local oolite, and the same thing as Bath stone. One of the former part of a piece of ashlar taken from old Fairfield House, Leckhampton, where it stood for over a century, and so far as we can see, without the least sign of disintegration. It must be remembered that air on the Mendips is remarkably pure, and similarly the results are not to be expected in the Mendips and large towns. We have before us also a sample from the same quarry of the well-known oolite grit, or "farewell rock," so-called by the Mendips because it denotes the limit of workable oolite. This is a good specimen of a variety of oolite familiar to our readers, and of which large quantities are still being removed from the Avon gorge at Clifton.

**INDIA AND MILLWALL DOCK COMPANIES.**—In the course of next Parliament a Bill will be promoted for the amalgamation of the two dock companies with a capital value of about 21 millions sterling—namely, the London & India Dock Company, valued at 19 millions. Should the Bill be ratified, some new works will be constructed at reconstructing the Millwall lock communications between the Millwall Docks and the docks of the London & India Dock Company. It is that over the docks on the north side of the River Thames under one management. In 1838 an amalgamation was made between the East India and West India Dock Companies. The West India Docks, the first in the world, were constructed by William Jessop, in 1800-2, and the northern part of the Isle of Dogs, and

covered 295 acres; George Gwilt the elder and his son George designed the warehouses. The Corporation of London cut the City Canal (enlarged as the second dock in 1870 by Harrison Hayter) to communicate between the quays at Limehouse and Blackwall; other improvements were carried out by Sir J. Hawkshaw and, in 1894 (the Blackwall lock), by Mr. Robert Carr and Mr. H. F. Donaldson. The Honourable East India Company built their docks at Blackwall, having a water area of 32 acres, in 1805-6, Rennie and Ralph Walker being the joint engineers. The London Docks, having 55 acres of water-area, were built for the tobacco, spirit, and wine trades, from John Rennie's plans, and opened on January 30, 1805, the warehouses being designed by D. A. Alexander and W. H. Ashpitel, who together made a survey of the ground; the lock-entrance at Shadwell, close to Wapping Old Stairs, 1831, is by H. R. Palmer; the tea warehouses were added fourteen years afterwards; the entire works cost 4 millions, and cover 90 acres of land. In 1864 the London Dock Company combined with the St. Katharine Dock and Victoria Dock Companies (1865). For this, the Katharine Dock, planned by Telford and constructed by P. Hardwick, R.A., in 1828-8, was cleared away the Flemish burial-ground, Hanson's (or Hangman's) Gains, 1,250 houses and tenements, and the church and hospital of St. Katharine-by-the-Tower, founded in 1148 by Queen Matilda. The hospital church and the fishermen's lodgings stood near the lock-entrance, just below Towse Bridge. The excavated soil was carried up the river for filling in the cuts and reservoirs of the Chelsea Waterworks Company for the building by Cubitt of that portion of Piccadilly. Then, in 1880, the London & St. Katharine Docks Company opened the Royal Albert Dock, since enlarged (1885-6) from designs by Colonel Martindale, R.E., and the company's engineers, Messrs. Carr & Thomas; and, two or three years subsequently, the East & West India Docks Company built their docks at Tilbury. In pursuance of the Working Union Act, 1888, the docks of the London & St. Katharine and the East & West India Companies passed to the control of the London & India Docks Joint Committee, who were dissolved by an Act which came into force on January 1, 1901, when the several undertakings we mention were united and taken over by the present London & India Docks Company. The Millwall Docks, opened in 1868, were built by Sir John Fowler.

**UNION JACK CLUB-HOUSE.**—The first ordinary meeting of the members of the Union Jack Club was held a few days ago, under the presidency of Colonel Sir Edward Ward. The club-house in Waterloo-road is now in course of being erected, after Mr. H. B. Measures's plans and designs for 250 bedrooms, which, as far as possible, will be dedicated to the memory of particular individuals, warships, and regiments; already 175 bedrooms are thus named and provided for, including some established and equipped by the King and members of the Royal Family. Whilst forming a resort for our sailors and soldiers when away from duty, or travelling to and from the quarters, the club will constitute a national memorial to those who have fallen in their country's service. The site of the club premises has been obtained at a cost of 29,729. The funds in hand amount to nearly 45,000, but more than 40,000 is still needed to defray current expenditure and to settle the institution upon a sound basis, free from liabilities.

**SPURGEON MEMORIAL.**—At a sitting of the Baptist World Congress at Exeter Hall a statue of the late Mr. C. H. Spurgeon was unveiled. By reason of a slight leakage of metal that happened during the process of casting, the statue at present consists of a model executed by Mr. Derwent Wood. When completed the bronze statue will be placed in a niche of the Baptist Church-house, Southampton-row, W.C.

**BUSTS, BOROUGH POLYTECHNIC.**—Busts of Michael Faraday and Joseph Lancaster, carved in marble by Mr. H. C. Fehr, have been set up in the vestibule of the Borough Polytechnic. Faraday was born and passed his childhood in Gibraltar street, in the vicinity, and Lancaster established his school on the site in Borough-road whereon the Polytechnic now stands.

**SOCIETY OF ARTS.**—At their last meeting the Council elected Sir Owen Roberts as Chairman of the Council in succession to Sir William Abney, F.R.S. The Council have awarded their medal to Mr. T. Graham Jackson, R.A., for his lectures upon "Street Architecture," delivered in December. May last to the Architectural Society of the Society, and their Albert Medal for 1904 to Mr. Walter Crane "in recognition of the services he has rendered to art and industry by awakening popular interest in decorative art and craftsmanship, and by promoting the recognition of English art in the forms most material to the commercial prosperity of the country."

**PROPOSED WORKMEN'S DWELLINGS, BODMIN.**—A Local Government Board inquiry was held at Bodmin Guildhall on the 27th ult., by Col. A. J. Hepper, R.E., D.S.O., into the application of

Bodmin Town Council to borrow 3,000, for the erection of workmen's dwellings. The Town Clerk said the site now proposed covered a quarter of an acre. Mr. R. T. Buscombe, the Borough Surveyor, stated that there would be eighteen houses, each of three rooms on the ground floor and three on the second floor. After some discussion the inquiry closed.

**ROYAL SANITARY INSTITUTE.**—At a public meeting held on the 3rd inst. at the Guildhall, Bristol, it was unanimously decided to invite the Royal Sanitary Institute to hold its annual congress at Bristol next year.

**ABERDEENSHIRE QUARRYING INDUSTRY.**—The depression in the local building industry which has prevailed for a considerable time back is having its effect on the quarries in Aberdeenshire. Generally speaking the results on quarrying have not, as yet, been markedly serious, but as there is no sign of a revival of the building trade in the immediate future, the depression will undoubtedly affect the quarries more or less adversely as time goes on. At one of the quarries, however, which usually does a large business in the supply of building material there is stated to be already an accumulation of stone for which there is no demand. Several of the quarries are devoted largely to the production of stone for manufacture into setts, and there the dulness in building would be felt to a comparatively small extent. Locally the setting industry seems to be in a fairly prosperous position, which is a most fortunate circumstance for quarry-owners in view of the brisk demand for building material. Several settmakers have come from the South and found employment at the Aberdeenshire quarries recently, and there are said to be more settmakers employed at the local quarries at present than there have been for some time. After the system had been introduced at most of the quarries of piece-work by the drillers, the settmakers, from whom complaints as to scarcity of material used to be common, had an abundance of work. There are one or two big building jobs yet to be finished in Aberdeen, and this will keep up the demand at the quarries which have the order in hand for some time, but when these are completed it does not appear that the outlook will be at all bright. It is stated that at one quarry a number of men have been paid off.

**MULL GRANITE QUARRIES.**—The Duke of Argyll's chamberlain has notified that his Grace's granite quarries in the Island of Mull, Argyllshire, from which vessels can load at all seasons, and massive work of the Albert Memorial, Hyde Park, are to let, and it is thought that a company may be formed for working them. The granite is red of various shades, and the supply of rock is said to be practically unlimited. The quarries are on the shore, and there are piers, etc., at which vessels can be loaded at all seasons.

**HARBOUR IMPROVEMENT, NORTH SUNDERLAND.**—In order to make the harbour at North Sunderland more convenient for the larger vessels now engaged in the herring fishing, a scheme of improvements is being carried out. The depth of water between pier head and breakwater has been increased by 2 ft., and the sides of the old pier are being straightened, and new landing berths arranged on either side. The improvements are being carried out by Mr. Davison, a local contractor, under the superintendence of Mr. J. W. Sandeman, Newcastle, Engineer to the Crewe Trustees.

**THE TESTING ARRANGEMENTS OF THE BRITISH FIRE PREVENTION COMMITTEE** for the month of August comprise—on Wednesday, August 16, a fire test with (1) a Kinnear Roller Shutter (erected by Messrs. A. L. Gibson & Co.); with (2) a 24-in. porous terra-cotta plastered partition by the National Fireproofing Company; and (3) with an armoured semi-porous brick floor, plastered with asbestos plaster by Messrs. Faber. On Thursday, August 17, the Committee undertakes an experimental test with a concrete floor, 5 in. thick, supported by protected broad flange girders provided by Messrs. Skelton & Co. Members of the Committee desirous of attending these tests are requested to apply to the General Hon. Secretary not later than Monday, August 14, for cards, of which a limited number will be allotted in rotation of application. The tests in September will comprise—a fire test with (a) Terra-cotta protective coverings to stanchions constructed by Messrs. Jabez Thompson, of Northwich; (b) with a ceiling protecting an ordinary floor constructed by Messrs. Cullum & Co.; and (c) an armoured concrete floor on the Coignet system constructed by Workman & Co. There will also be an experimental investigation by the Committee with floor bays constructed of seven different aggregates of concrete, the cement being provided by the Associated Portland Cement Manufacturers Limited. The autumn tests will include a floor with girder coverings by the New Expanded Metal Company and a number of partition tests. The reports to be issued in the course of August and September in respect to tests already completed are the following:—Two reports on tests with wire glass by Messrs. Pilkington Brothers, Limited, a report on the National Fireproofing Company's



6 ft. and 7 ft. 8 in. span flooring (protected on the underside by special plastering), and a report on two composite doors (one solid and one panelled) constructed by the Gilmour Door Company, of Trenton, Canada.

### Legal.

#### BUILDER'S OBJECTION TO ARCHITECT AS ARBITRATOR.

THE case of Roberts and another v. Stythe came before the Court of Appeal, consisting of Lords Justices Romer and Mathew, on the 3rd inst., on the plaintiffs' appeal from an order of Mr. Justice Bucknill in Chambers, affirming an order of the Master, and referring the action to arbitration. The plaintiffs are a firm of builders carrying on business at Llandudno, and they brought the action against the defendant, Mr. R. R. Stythe, of Carnarvon, to recover 416*l.* under a building contract.

Mr. F. Marshall, K.C., and Mr. Ellis Griffiths, appeared in support of the appeal, and Mr. Ralph Bankes for the respondent.

Mr. Marshall said that Mr. Justice Bucknill had stayed all proceedings in the action and referred the matters in dispute to the architect named in the contract, Mr. R. L. Jones. The circumstances giving rise to the claim were as follows. The plaintiffs undertook by contract in the early part of last year to erect a house for the defendant at Carnarvon. Things went on satisfactorily until December last year. On December 2 the plaintiffs, wanting further payments of money from defendant, spoke to the architect about the matter, and told him that their bankers were ready to make advances to them provided the architect would give a statement as nearly as he could as to the amount that would be due to them at the termination of the contract. The architect agreed to do that, and wrote a letter in which he said: "I think you will be entitled to 250*l.* or 300*l.* for extras. Without prejudice." The contract was for 1,400*l.*, and there had been paid on account 1,120*l.*, leaving a balance of 280*l.* due on the contract. Then the architect estimated that there would be deductions to the amount of about 30*l.*, and on the other hand there would about 30*l.*, so that the total amount payable to the builders would be about 250*l.* or 300*l.* Upon the faith of that letter the builders obtained an advance of 250*l.* from their bankers. At that time the work was practically finished. In the early part of January the builders sent in their claim for extras amounting to 176*l.*, showing, after taking off the deduction estimated by the architect, a balance of 416*l.* in the builders' favour, which was the amount claimed in the present action. The plaintiffs sent in their claim on March 9, and on the same day the defendant sent in a long and formidable list of deductions to the architect. These deductions amounted to 300*l.* The architect sent them on to the builders, stating that he proposed to make them, and inviting criticisms by the builders. Eventually the architect made a final certificate showing that all that was due to the plaintiff was 36*l.* over the contract price of 1,400*l.* The deductions which the architect made amounted to about 294*l.*, and the ground of the deductions were that certain of the work was alleged not to be in accordance with the specification.

Lord Justice Romer: You do not say that the architect has not done his best?

Mr. Marshall: We say from the evidence we have in the affidavits that the defendant threatened the architect with an action for negligence, and when he sent in his deductions the architect yielded to the threat and adopted deductions which, in his own conscience and in honesty, he could not have adopted.

Lord Justice Romer: The objections came from the building owner and passed through the architect to the builders. Do you complain that that course was taken?

Mr. Marshall: No, the building owner ought to have views in the matter. What I do complain of is that the architect, knowing he was threatened—

Lord Justice Mathew: Building owners often labour under an impression, generally ill-founded, that the architect is friendly with the builder, but I do not know that you could accuse the architect because a building owner took up a certain view. I should have thought that such a threat was more likely to set the architect's back up.

Mr. Marshall submitted that in the circumstances the architect was not a fit and proper person to decide the dispute, and that therefore the case ought not to be referred to him.

Mr. Bankes, for the respondent, submitted that the order of the learned judge was quite right. He said there was no foundation whatever for the attack that had been made upon the architect, who was a gentleman of high standing in North Wales. It was quite clear that there never was any action threatened by the defendant against the architect.

Lord Justice Romer said that, in the circumstances he thought the architect ought to be

given an opportunity of making an affidavit, if he chose, in reference to the attack made upon him, and for this purpose the matter would be adjourned for a week. In the meanwhile, also, he thought it was desirable that the parties should consider the advisability of referring the dispute to an independent architect. He made no order as to this, and only threw it out as a suggestion.

The matter was adjourned accordingly.

On Thursday, the 10th inst., Mr. Eldon Bankes, K.C., said he was instructed in the case on behalf of the defendant. The learned counsel read an affidavit by Mr. Jones, in which that gentleman denied that he had ever been threatened by the defendant, and said that the first he had heard of the alleged threatened action was from the newspaper reports of the proceedings last week. He added that the deductions which he made were made from his own judgment, and quite independently of the defendant. He absolutely denied the allegation of collusion between himself and the defendant. The learned counsel said that Mr. Jones occupied a high position in the locality, and that this matter having gone so far it was quite impossible for him (counsel) to assent to another architect being appointed to deal with the dispute. Were he to consent to such an arrangement the impression would remain that Mr. Jones was not a fit and proper person to deal with the dispute. He submitted that there was no ground whatever for withdrawing the case from the architect, and that the appeal should be dismissed.

Mr. Marshall then proceeded to reply, and submitted that on the face of the plaintiff's affidavit it was clearly a case which ought not to be submitted to the architect.

In the result their lordships held that there was not the slightest ground for the imputations made against the architect, and dismissed the appeal with costs.

The Master of the Rolls added that he had never before seen such reckless charges made on affidavit—charges made without the slightest foundation.

#### DISPUTE AS TO ARCHITECT BEING ARBITRATOR.

THE case of Nye v. Crossley & Jay came before the Court of Appeal, composed of Lords Justices Vaughan-Williams, Stirling, and Cozens-Hardy, on the 1st and 2nd insts., on the plaintiff's appeal from a judgment of Mr. Justice Warrington in the Chancery Division.

Mr. Carson, K.C., and Mr. Beddall, appeared for the appellant; Mr. Rowden, K.C., and Mr. Mark Romer for the respondent Mr. Crossley; and Mr. Norton, K.C., and Mr. Stone for the respondent, Mr. G. M. Jay.

Mr. Carson, in opening the case, said the notice of appeal asked that so much of the judgment of Mr. Justice Warrington as declared that according to the true construction of an agreement dated April 22, 1903, the defendant, Mr. Jay, was the arbitrator to whom the matters in dispute between the plaintiff and the defendant Crossley were referred under the agreement, should be discharged, and that judgment should be given for the plaintiff as claimed in the statement of claim. The question raised by the appeal was as to who was the arbitrator under a building agreement entered into between the plaintiff and the defendant Crossley, a builder.

The plaintiff was the owner of some land at Brighton, and he was minded to erect houses upon it, and employed Crossley to build them. Mr. Jay was an architect carrying on business at Brighton, and Mr. Crossley said he (Mr. Jay) was the arbitrator appointed under the agreement. Mr. Nye said that a Mr. Puttick was the arbitrator, and that Mr. Jay was not the arbitrator. A short outline of the case was as follows:—In March, 1903, the plaintiff was anxious to build these houses on his land at Brighton, and he obtained from Mr. Jay certain specifications for that purpose. On or about April 20, 1903, plaintiff agreed with Mr. Jay that he (Jay) should superintend the works. On April 22, 1903, the plaintiff and Mr. Crossley entered into the building agreement, which was in the usual form. Mr. Jay was not a party to it, but in one of the clauses there was a reference to him as the architect to prepare the plans, and in the rest of the agreement there were a number of duties attributed to "the architect." Finally, there was an arbitration clause referring disputes "to the architect." During 1903 Mr. Jay continued to act in superintending the works for the plaintiff. In December, 1903, the plaintiff rightly or wrongly came to the conclusion that Mr. Jay was not serving him properly, and dismissed him, and "to the architect." Finally, he appointed Mr. Puttick to be his architect and surveyor in the place of Mr. Jay. All through the year 1904 the work went on, and Mr. Puttick performed, with Mr. Crossley's assent, the duties which by the agreement of April 22, 1903, were assigned to the architect—the giving of certificates and so on. Then in November, 1904, the work being finished, or practically so, there arose the question of the amount to be paid to the builder for doing the work, and that had to be settled by arbitration. The question then was, who was to be the arbitrator? The plaintiff said Mr. Puttick;

Mr. Crossley said Mr. Jay; and thereupon the present action was started. The statement of claim asked three forms of relief: (1) A declaration that Mr. Jay was not the arbitrator; (2) that if he was the arbitrator the plaintiff should be at liberty to revoke the submission; and (3) a declaration that Mr. Puttick was the arbitrator. On behalf of the plaintiff, Mr. (Counsel) might say that all the three reliefs claimed were important was the negative one that Mr. Jay was not the arbitrator. The plaintiff said that upon Mr. Jay as a dismissed servant. He was willing to accept an independent person appointed by the parties, or by the Court, as arbitrator.

Lord Justice Vaughan-Williams: What does Mr. Rowden say to that?

Mr. Rowden replied that he could not agree to that. Lord Justice Vaughan-Williams said that *prima facie* they seemed to be a reasonable case, but that in the circumstances it would be better that him not to act as the arbitrator. It might be that Mr. Jay had been perfectly right in assuming that Mr. Rowden said there was no evidence of the unfitness of Mr. Jay to act as arbitrator.

Lord Justice Vaughan-Williams: I do not say that. He does not deny that he was dismissed, and that since his dismissal Mr. Puttick has been acting as architect. It seems to me that under those circumstances, if we have any creation in the matter at all, the last thing that would be to appoint Mr. Jay to act as arbitrator.

Lord Justice Vaughan-Williams: My submission is that Mr. Jay by the contract, is not to give his decision, and there is no evidence of undue influence on his part. I submit there is no reason why we should have the person to whom we bound ourselves. Lord Justice Vaughan-Williams could not say that Mr. Jay had any rights in the matter.

Mr. Norton said that that had always been his submission on behalf of Mr. Jay. Mr. Jay did not care which way it was, Mr. Crossley said that Mr. Jay was the arbitrator, and the plaintiff said he was not. Mr. Jay was perfectly willing to do what the Court said he ought to do. Mr. Jay could never understand why he had been brought there.

Mr. Carson said that as against Mr. Jay there was that he had given a notice of arbitration which notice he had never withdrawn.

Lord Justice Cozens-Hardy: Do you contend that you can remove him if he is the arbitrator appointed?

Mr. Carson: No, I do not; but I ask for leave to revoke the submission. The construction of the document he is not the arbitrator, and further, if he is, that there are grounds on which the Court will give me leave to revoke the submission. I do not suggest corruption against Mr. Jay. I say I have the right to revoke the submission on the ground that in the circumstances there was no arbitration.

Lord Justice Vaughan-Williams, at the conclusion of the learned counsel's address on the construction point, said it would be convenient if the Court heard Mr. Rowden on the question of the construction of the agreement before any further argument from Mr. Carson was heard.

Mr. Rowden contended that the decision of the learned Judge was quite right. His learned friend, Mr. Carson, had been really arguing that the building owner had the right to choose his own judge.

Lord Justice Vaughan-Williams: I suggest to you that, according to the reasonable construction of this contract, the arbitrator means "the architect for the time being."

Mr. Rowden replied that the words "for the time being" were not to be found in the contract. The learned counsel said he was informed by Mr. Romer, who was present in the Court, that an offer was made by the plaintiff to give an independent person as arbitrator. The answer to that was that they had been brought into Court to resist Mr. Puttick holding the arbitration, and they were willing to go to an independent person on the terms of their own being paid.

After some further argument, Lord Justice Vaughan-Williams said they did not as yet waste the time of the Court by discussing questions the solution of which seemed so very unlikely to be any good to anybody. Here they were with the assumption that both the parties, subject to the question of terms, were willing to have an independent architect or gentleman to act as arbitrator to judge of the question which was arisen. As then advised, he thought in these circumstances that Mr. Justice Warrington's order should be varied to meet that suggestion, that Mr. Justice Warrington's order as to the costs in the Court below should not be disturbed, that, so far as the appeal was concerned, it should be dismissed without costs as between Mr. Jay and Mr. Crossley, and that Mr. Jay's costs should be paid by the person who had brought the case there unnecessarily.

Mr. Rowden said he would accept those terms on behalf of his client.

Mr. Carson, on behalf of Mr. Nye, also agreed to the proposals of the Lord Justice as between



client and Mr. Crossley. He objected, however, to paying Mr. Jay's costs. Mr. Jay had given notice of the arbitration, and had refused to withdraw it. Mr. Jay asserted after the writ was issued that it seemed to him he must be the arbitrator. He submitted that Mr. Jay was properly made a party to the action.

Lord Justice Vaughan-Williams said Mr. Jay had been improperly joined as a party by the plaintiff, and plaintiff must pay the costs of Mr. Jay both in the Court below and on the appeal.

Mr. Carson said it had been arranged that if the parties could not mutually agree on an arbitrator, the arbitrator should be left to the nomination of the Registrar of the Brighton County Court.

#### CASE UNDER THE LONDON BUILDING ACT.

The case of the London County Council v. Collins came before a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Lawrence and Ridley, on the 7th inst., on an appeal by the London County Council from the decision of the magistrate on an information under the London Building Act, 1894.

Mr. Horace Avory, K.C., and Mr. Daldy appeared for the appellants, and Mr. Danckwerts, K.C., and Mr. Cunningham Glen for the respondent.

Mr. Avory said that the short question to be decided was whether a person had commenced to form a street in breach of conditions under which consent was given for its formation. The condition was that the respondent should not build on either side of the street until he had thrown it open from end to end as a public highway. The road in question was situated at Hammersmith. The magistrate found that the respondent had granted a lease of part of the land—a triangular piece at the back and some 119 ft. from the roadway—for the purposes of a factory, and the building had been erected. The person who had the factory had certain rights over the road. In addition to this fact, the road had eventually to run over a railway, but the bridge had not yet been built. Under these circumstances, the magistrate found that the respondent had not yet commenced to lay out or form a new street, and he dismissed the information. The learned counsel said the point of decision was whether the building in question was upon the side of the proposed new street or upon a site abutting upon a new street. He submitted that the learned magistrate was wrong in his finding, he taking too narrow a view of the meaning of the words of the condition.

Mr. Danckwerts argued that the condition only became operative if and when the respondent had laid out the new street. If the respondent never laid out a new street or road, then the condition did not become operative.

The Lord Chief Justice, in giving judgment, said he had come to the conclusion that the decision of the magistrate in this case was right. But he was not quite sure that he agreed with the way it had been put. The ground of his decision was that the magistrate did not find that the respondent had laid out or commenced to lay out a new street. As to the factory abutting on the street, he expressed no opinion. The question that would have to be considered when all the circumstances were reviewed. He thought the learned magistrate was right in his findings, and that the appeal ought to be dismissed.

Justices Lawrence and Ridley concurred.

#### THE WIDENING OF PICCADILLY: ACTION AGAINST THE WESTMINSTER CORPORATION.

MR. JUSTICE SWINFEN EADY, in the Chancery Division, on the 8th inst., delivered a considerable judgment in the case of *Pencod v. The Mayor, etc., of Westminster*, an action by the plaintiff to restrain the defendants from proceeding with a notice to treat which they had given under the provisions of Michael Angelo Taylor's Act, under which the defendants claimed the right to acquire compulsorily the premises of the plaintiff in No. 36, Piccadilly. The case was reported in last week's issue of *The Builder*. The material facts of the case sufficiently appear from the following judgment:—Mr. Justice Swinfen Eady said the plaintiff was the lessee for a term of which about two years and a half were unexpired of the basement, ground floor, and entresol of a house, No. 36, Piccadilly, which he carried on the business of a newsagent and ground floor to a tobacconist for the residue of the term with a nominal exception. The defendants claimed to take the plaintiff's premises under Michael Angelo Taylor's Act for the purpose of widening Piccadilly, and duly served a notice to treat dated in June, 1905. The plaintiff alleged that the adjudication made by the defendants, that the whole of the house No. 36 would be necessary for that purpose, was an *ultra vires* act, and he claimed an injunction to restrain the defendants from proceeding under their notice to treat. The plaintiff

alleged that defendants required only part of the house for street widening—namely, a strip extending backwards from the Piccadilly front for about 22 ft. 6 in.—and that he was willing to sell all part of the house and could not be required to sell the whole. He also alleged that the adjudication of the defendants that it was necessary to take the whole house was not made *bona fide*, the defendants having agreed to sell to a hotel company the portion not actually required for street widening. On the hearing of the plaintiff's interlocutory motion, it was objected that the plaintiff in any case had a right of pre-emption under section 96 of the Act, and this was conceded by the defendants, who explained why the point was not further raised at the trial. The defendants insisted at the trial that for the purpose of the street widening it was necessary to take the whole house. The plaintiff's premises consisted (1) on the ground floor of two shops having a total frontage to Piccadilly of 18 ft. and a total depth of 64 ft., the width of the back being 25 ft. for a depth of about 32 ft.; (2) the basement beneath the whole of the ground floor; and (3) a large room of about 650 ft. superficial area at the back of the premises on the first floor, the nearest side of such room to the street being 26 ft. therefrom. The plaintiff had no interest in the front portion of the entresol floor, nor in the first, second, third, and fourth floors of the house fronting Piccadilly except in respect of a claim to flues and a cistern of water. Fronting Piccadilly there were four floors above the entresol with a separate entrance, part of the same house, although numbered separately, and all the upper floor extended not only over the two shops of the plaintiff, but over the separate entrance adjoining, the total width of the entire building on the Piccadilly front being about 25 ft. At the extreme rear the premises did not rise above the entresol floor, which was lighted by two skylights as well as by windows. This back addition extended about 24 ft. or 25 ft. to the rear of the main building. The plaintiff contended that it was physically possible to pull down and remove so much of the entire building as lay to the south of a line shown in red ink on the plans, and which was 22 ft. 6 in. back from Piccadilly. That was the new building line of Piccadilly. The plaintiff contended that so much of the building as was north of that line must be left standing—at all events, that portion in which he was interested, and that care must be taken in pulling down the front portion, so as to support properly the back portion left standing. The conclusions of fact that his lordship had come to were that it would be physically possible to pull down the front portion and leave the rear portion standing, but that the cost of so doing would be very excessive; that it could not be done without entering upon every floor of the rear portion remaining standing and placing struts and ties to uphold it when the front part had been removed, and also entering upon the adjoining land each side and placing raking shores there to afford the rear portion external support; and that the opinion of Mr. Stenning was well founded that when this had been done the District Surveyor would come in and condemn the back portion as a dangerous structure. It was also put in evidence that the plaintiff had another action pending against the Piccadilly Hotel Company, Ltd., who, he alleged, had acquired the leasehold interest in the whole house subject to his own underlease of a part, and the plaintiff in that action claimed an injunction to restrain any interference with the upper portion of the premises No. 36, so as to interfere with his chimneys and flues, water tanks, and supply pipes. Continuing, his lordship said that in his opinion the plaintiff had not any absolute right to restrain the defendants from taking more land than was intended to be actually dedicated to the public; and, again, section 96 of the Act enabled the local authority to resell lands purchased by them after they had first been offered for sale to the persons from whom they were purchased. In all the circumstances, he was of opinion that the defendants could not stop short of taking the whole premises. It was clear that the portion of the building which it was necessary to be removed to lay out the site of its inlet to the street was so indissolubly linked with the whole fabric of the house that it could not be removed without practically destroying the identity of the house as a house. He was quite satisfied that the real purpose of the defendants, the purpose for which their compulsory powers were being used—*bona fide*—was to acquire the whole building for the purpose alone of street widening. The result was that the action failed and must be dismissed with costs.

#### POINT UNDER METROPOLIS LOCAL MANAGEMENT ACT.

The case of *Bridgett v. The Mayor, etc., of Wandsworth* came before a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Lawrence and Ridley, last week, on an appeal from an order of the stipendiary sitting at the South-Western Police Court, under the Metropolis Local Management Act.

Mr. Macmorran, K.C., for the appellant, stated that the point in dispute arose on the construction of Section 77 of the Metropolis Local Management Act, 1862. The facts were, shortly, these:—There was a street called Briar-walk, Putney, which was a street at right angles to another called Woodborough-road. Briar-walk had been made up as a new street, but in making up that street, and in charging the frontages for it, the Council had included the expenses of a new crossing which, it was said, was now part of the road. The learned counsel's submission was that the Council ought not to have included the costs and expenses of making that crossing in the apportionment in respect of Briar-walk, and on behalf of the frontagers he appealed from that apportionment, the magistrate having upheld it.

The Lord Chief Justice, without calling upon Mr. Horace Avory, K.C., for the respondents, in giving judgment, said he was of opinion that the magistrate's decision was right, and ought to be affirmed. He thought the costs and expenses of the crossing ought to be borne by the frontagers of Briar-walk, and that the appeal should be dismissed.

Justices Lawrence and Ridley concurred. Leave to appeal was refused.

#### PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.\*  
18,813 of 1904.—H. E. CURTIS: *Construction of Cornices, Skirting, Dados, and the like.*

The object of this invention is to provide means whereby wires and pipes may be concealed from view, but to which access may readily and rapidly be obtained at any point, without any damage being inflicted on the surrounding parts, and with very little expense. According to the invention there is arranged a casing or tube of thin steel or other suitable material, so as to form part of the whole of such features as cornices, dados, skirtings, and the like, and which casing can be adapted to suit any shape or desired moulding, so as to participate in the general design thereof. In this casing the wires or pipes are run to any desired part of the room or building, and provide special angles and intersections in one or more pieces to facilitate turning corners, bends, etc. For the further protection of electric or other wires, guards or rounded shoulder pieces of vulcanite or other non-conducting material may be used, with a hollow or suitable section, and placed inside the casing so as to form a bed or groove for the wires to rest in and turn the angle or corner without friction or injury. The said casing may be constructed in sections fitted to the cornices, dados, and skirtings, by means of suitable screws or suitably shaped lugs, dowels, or other fastenings adapted to the particular circumstances of the case. Thus if any part of a wire or pipe requires to be inspected, part or all of the casing can be quickly detached by removing the screws or fastening, and when desired the casing may be as readily replaced without difficulty or unnecessary destruction of adjacent fittings.

18,783 of 1904.—W. BELL: *Urinals.*  
This invention consists in the formation of a special drip dish or tray to catch the dripping, the same being fixed upon the floor and having a projecting lip, and the use of this dish in combination with a urinal. In some cases this drip dish may be used with circular-backed urinals. The special arrangement and formation of the drip dish renders it applicable to other forms of urinal, and the fact that it is manufactured in glazed ware renders it exceedingly cleanly in use.  
19,439 of 1904.—T. HOLCROFT & SONS, LTD., and A. H. MOULD: *Standards for Water-closet Seats, and other purposes.*

This invention relates to a standard for water-closet seat or other purposes, consisting of separately-formed lower and upper members, of which the upper is adjustably carried from the lower by means of studs fixed to one of the members, and passing through holes which have sufficient plate therein to allow the upper member to be tilted in relation to the lower one, and nuts screwed upon such studs by means of which the height of the upper member above the lower may be adjusted, and the upper member tilted in relation to the lower member to bring its top to a level, notwithstanding unevenness of the floor upon which the standard rests.

19,577 of 1904.—W. L. HAMMILTON: *Fittings for Windows, and the like.*

This invention relates to a fitting consisting of a slipper, to which the sash-cord is attached, and a face-plate fixed to the sash with means for coupling the slipper to the face-plate, in combination with a hand operated locking bolt, with means acting in conjunction with the bolt to lock the slipper to the face-plate when the sash is in its sliding condition, and to unlock the

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



slipper from the face-plate while securing it to the window-frame when releasing the sash to be swung inwards.

19,816 of 1904.—J. SCOTT: *Construction of Ventilator Inlet or "Grating" for Fitting in Walls, Partitions, and the like.*

This invention consists of a tubular casing fitted with a slide having radial vanes connected together and rounded centrally, the slide having a disc or other shape closing head, the corners forced between the back of said closing head, and the vanes being filled in for deflecting the incoming air, the slide being also fitted with a fixed ring with half-loops, which on turning the slide will coincide with stops in the casing for complete withdrawal of the slide when required.

20,032 of 1904.—W. ROSS, and T. ROSS: *Ball-cocks for Valves for the Supply of Water to Flushing Cisterns for Water-closets, Urinals, and the like.*

The essential feature of this invention is the fixing of the nose or outlet to the ball-cock of a nozzle piece with a fine gauze diaphragm, to form a solid jet of water. Further, the plunger or valve which is actuated by the lever and ball float is fitted with a cup of leather or other suitable packing, to prevent air having access to the water before discharge, which is thus rendered noiseless.

20,043 of 1904.—C. BOLLE: *Stone-breaking Machines.*

The construction or arrangement of stone-breaking machines with two breaking jaws arranged at an acute angle to each other, and supported upon rollers adapted to roll on inclined surfaces fixed to the frames, which jaws receive simultaneous reciprocating motion, the formation of the jaws with teeth, the ridges of which are vertical in the upper and inclined in the lower part of one or of both of the jaws.

1,414 of 1905.—A. C. H. WINTERFLOOD: *Automatic Valves for Water Heaters, and the like.*

In automatic gas valve apparatus for water heaters, and the like, arranging the water and gas valves in separate casings, and affixing between such casings a rocking lever or levers so positioned that the movement of the water valve spindle, after first opening the water supply, will act upon such rocking lever or levers, and move it to act on the spindle of the gas valve to open the gas supply.

2,373 of 1905.—G. DAUCHER: *Joiners' and like Clamps.*

This invention relates to a lever clamp, comprising a base, a flat bar rigidly secured in the said base at right angles thereto, a clamping member sliding on the said flat bar, and provided with a tubular guide, in which slides a pressure bolt, and a cam lever fulcrumed in the forked top end of the said guide, the cam portion being so shaped that the surface which contacts with said pressure bolt is divided into surfaces of unequal distance from the fulcrum.

3,513 of 1905.—H. EAGON, and M. N. BROWN: *Combined Window Screen and Weather Strip.*

This invention relates to a combined window screen and weather strip, consisting of a flexible screen adapted to be wound and unwound about a spring roller, an attaching strip having a rounded upper corner for attaching the outer end of said screen to the bottom of the lower cross-piece of the window sash, a laterally curved spring metal protecting casing and anti-rattler secured at its lower edge to the outside window sill, and formed on the upper edge with a bead adapted to bear against the outer side of the lower cross-piece of the sash, and a downwardly curved cap strip secured to the lower cross-piece of said sash for ensuring a tight closure.

24,451 of 1904.—A. J. BOULT (HULABERG & Co.): *Impregnation of Wood and other Porous Materials.*

The nature of the invention consists in that in the individual cells of the material to be impregnated there is so much air or gas, that during the impregnation the air contained therein is compressed, and after the impregnation again expands, and after partly or wholly pressing the impregnating material outwardly, escapes itself. The material or substances to be impregnated are brought under atmospheric pressure into a chamber, and are then exposed to the influence of the liquid having a pressure of one, two, or three atmospheres. The surplus of the impregnating liquid is then upon allowed to run off, and the impregnating apparatus is put under vacuum, the result being that a large part of the impregnating liquid which has penetrated into the pores, and cavities during the process of impregnation, is expelled by the expansion of the air contained in the cells and compressed during the process of impregnation.

2,026 of 1905.—G. L. MOUCHEL: *Concrete Piles.*

This invention relates to concrete piles, and has for its object to provide a pile which will give great resistance and stability when driven, and which will be capable of sustaining heavy loads without failure. The pile is tapered in its length, and

may be provided with a flange or flanges at any desired positions on its surface. It may be solid, hollow, or cellular, and if hollow it may be with or without internal flanges or diaphragms, and may be circular or polygonal in cross-section as desired. The piles are strengthened by metal bars strutted and tied together, or by steel of any sections or section embedded in the concrete.

2,467 of 1905.—G. B. BROWN: *Manufacture of Mortar, Cement, Building Composition, and the like.*

This invention relates to the manufacture of plaster and of articles made therefrom, consisting of dry slaked poor lime, such as Lias lime, anhydrous plaster of Paris, and finely-ground chalk, or other alkaline earth carbonate, magnesium, or other compounds, colouring matters, and with or without admixtures with inactive or neutral material, such as sand, sawdust, or the like, the whole being made ready for immediate use on being mixed with water.

4,503 of 1905.—D. H. and J. KAY: *Purifying the Air in Weaving Sheds, Spinning-rooms, and the like.*

This invention relates to an air filtering apparatus for use in weaving sheds, spinning-rooms, and the like, consisting of a compartment with an aperture for the free inlet of air from the outside of the building or structure, and an enclosure within said compartment, whose sides are arranged so as to form corrugations, similar to the bellows of a photographic camera, and a flat or corrugated top, all covered with filtering material through which the air is caused to be drawn by a fan, and passed through a tube to the humidifier.

6,059 of 1905.—A. VON WIELEMAN: *Ceilings.*

This invention relates to the construction of ceilings, in which the base between the ceiling supports are filled by coffers arranged in series, and composed of separate elements, characterised by the fact that these coffers are constituted as sunk panels adapted to act as supports.

10,066 of 1905.—W. PATRICK: *Field and other*

This invention relates to a device for preventing sagging in field and other gates, consisting of a bracket having a horizontal socket hole for the stem of the hinge socket, a hinge socket piece provided with a stem fitting said socket hole of said bracket, and a washer or washers of different thickness fitting over the stem of said hinge socket piece.

## TO CORRESPONDENTS.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

July 25.—By COOK & BIRMINGHAM (at Tiverton).	
Wetheridge, Devon.—"Hensford Estate," 235 a. l. ....	£7,000
July 26.—By STROKE & SON (at Hereford).	
Kinnareley, etc., Hereford.—"The Newton Estate," 614 a. 3 r. 6 p. l. ....	21,000
July 27.—By ROBERT NEWMAN (at Uxbridge).	
Uxbridge, Middlesex.—49 a. and 70, St. Andrew's, 4 r. 10 p. l. ....	2,050
Pinner Common, Middlesex.—Nine freehold cottages, w. r. 194. ....	1,530
By J. BURR (at Brighton).	
Henfield, Sussex.—"Wentley Farm," 223 a. 0 r. 13 p. l. ....	5,850
Part of "Blunden's Farm," 7 a. 2 r. 1 p. l. Part of "Buckwold Farm," 5 a. 1 r. 20 p. c. ....	150
Various enclosures, 13 a. 1 r. 14 p. f. and c. ....	730
By HENRY MORTON (at Uxbridge).	
Ruislip, Middlesex.—Mainard, cophold farmhouse and 14 a. 1 r. 0 p. c. ....	2,750
Cottage and land, 1 a. 0 r. 8 p. f. and c. ....	500
July 28.—By DYER, SON, & HILTON (at Lewisham).	
Lewisham.—39, Thurston-rd., u. t. 58 yrs., g. r. 21. 16s., y. r. 28l. 12s. ....	230

Greenwich.—31, 33, and 35, Dutton-st., u. t. 15 yrs., g. r. 5s. 6d. 6s. ....	170
21, Bridge-st., u. t. 31 yrs., g. r. 10l. w. t. 29l. 18s. ....	130
By ROBERTS, SON, & TONY (at Yeovil).	
Yeovil, Somerset.—"Lichester-rd., enclosure of land, with slaughter-house, stabling, etc., 3 a. 3 r. 14 p. f. ....	1,100
45, Hensford-hill, and two building sites, 1 r. 10 p. f. ....	1,100
Brickyard-la., building land, 5 a. 3 r. 8 p. f. By EDMUND BECK & SONS (at Downham Market).	
Downham, Norfolk.—"Crown Hall Estate," 139 a. 2 r. 20 p. f. (in lots) ....	8,000
By A. J. RUMFORD (at Sittingbourne).	
Bredgar, etc., Kent.—"The Walswood Estate," 786 a. 3 r. 1 p. f. (in lots) ....	6,000
By RUSKORTH & STEVENS (at Redditch).	
Redditch, Worcester.—79 to 93 (odd), Evesham-rd. f. ....	600
293, Evesham-rd., f. ....	100
Headless Cross, a freehold plot of 1 a. 1 r. 10 p. f. ....	100
Evesham-rd., two cottages and 1 an acre, f. ....	100
8 and 10, Lislely-rd., f. ....	100
Beoley-rd., etc., three freehold plots, f. ....	100
Green-la., three cottages and 1 acre, f. ....	100
Green-la., cottage, smithy, and 1 an acre, f. ....	100
Green-la., cottage and enclosure, 4 a. 1 r. 10 p. f. ....	100
July 29.—By FRANKLIN & JONES (at Okeham).	
Eynsham Oxon.—"The Home Farm," 120 a. 1 r. 32 p. f. and c., y. r. 21l. ....	4,000
July 31.—By BEARD & SON.	
Bayswater.—8, Leabury-rd., f. r. 83l. ....	1,100
Paddington.—40, Woodfield-st., u. t. 51 yrs., g. r. 5l., w. r. 44l. 4s. ....	500
By ELLIOTT, SON, & BORTON.	
Oxford-street.—23, Castle-st. East (s.), u. t. 100 yrs., g. r. 20l., y. r. 16l. ....	1,100
By TYLID & SON.	
Kenneth Town.—73, 84, Agnes-pl., u. t. 60l. yrs., g. r. 8l., e. r. 88l. ....	700
Pockham.—16, 18, 20, and 22, Wivenhoe-rd., u. t. 59 yrs., g. r. 20l., y. r. 148l. 4s. ....	700
By T. FRASER.	
Kentish Town.—12, Alma-st., u. t. 19 yrs., g. r. 4l., y. r. 30l. ....	100
By FULLER & RUNDOK.	
Shepherd's Bush.—18, Brookly-rd., u. t. 61 yrs., g. r. 10l., e. r. 85l. ....	200
By HARRIS.	
Byfleet, Surrey.—"The Vine," f. p. ....	1100
By MAY & PALFROT.	
Brixton.—27, Helix-gds., u. t. 55 yrs., g. r. 8l. 10s., e. r. 85l. ....	100
By SYMOND & SON.	
Merton.—Cannon-hill-la., a block of freehold land, also "utton's Cottages" (four), area 2 a. 3 r. 18 p. ....	1,100
Brixton.—60 to 63, Trinity-st., f. r. 124l. ....	1,100
408, Brixton-rd., u. t. 204 yrs., g. r. 32s., e. r. 65l. ....	1,100
Old Kent-rd.—9, 11, 13, and 15, Ruby-st., u. t. 42 yrs., g. r. 20l., w. r. 100l. 4s. ....	1,100
Lambeth.—19 to 25 (odd), Newburgh-st., u. t. 68l. yrs., g. r. 16l., w. r. 88l. 8s. ....	1,100
Peckham.—14, Gordon-rd., f. r. 24l. ....	1,100
Sydenham.—West Hill, "Roches," u. t. 58 yrs., g. r. 14l., y. r. 112l. ....	1,100
By F. VARELEY & SON.	
Finsbury Park.—13, King's-rd., u. t. 65 yrs., g. r. 8l., e. r. 55l. ....	1,100
August 1.—By NORMAN & HADLEY.	
St. John's Wood.—56, Acadia-rd., u. t. 14l. yrs., g. r. 14l., e. r. 80l. ....	1,100
By NOYES & HOWES.	
Caledonian-rd.—112, Copenhagen-st. (s.), u. t. 40 yrs., g. r. 32l., y. r. 60l. ....	1,100
Streatham.—189, Streatham High rd. (s.), u. t. 69 yrs., g. r. 24l., y. r. 100l. ....	1,100
By MORRIS & SANDER.	
Islington.—Gerrard-st., f. g. r. 8l., reversion in 25 yrs. ....	1,100
New Cross.—2, Popsy-rd., u. t. 52 yrs., g. r. 10l., y. r. 45l. ....	1,100
Brixton.—Tulse Hill, f. g. r. 120l., reversion in 72 yrs. ....	1,100
53, Upper Tulse-hill, f. p. ....	1,100
Trinity-rd., f. g. r. 22l. 14s., reversion in 54 yrs. ....	1,100
Trinity-rd., "Clarendon House" and building estate adjoining, 3 a. 0 r. 30 p. l. p. ....	1,100
Cantham, Surrey.—West-st., a freehold house and shop, y. r. 15l. ....	1,100
Cantham Park-rd., etc., six building plots, f. Mill-la., f. g. r. 10l. 10s., reversion in 60 yrs. ....	1,100
By G. LOVELLY & SON (at Coventry).	
Coventry, Warwick.—541 to 549 (odd), Fotherhill-rd. (s.), f. y. r. 130l. ....	1,100
302 to 310 (even) Fotherhill-rd., f. ....	1,100
1 and 8, Station-st. West, f. ....	1,100
3 College-sq. and message adjoining, f. ....	1,100
60, Clarendon-st., and 64 and 66, Arden-st., f. ....	1,100
By August 2.—By D. J. CHATFIELD & SONS.	
Chislehurst West, Kent.—High-st., four freehold e. and premises, y. r. 257l. ....	1,100
High-st., freehold shop and premises, f. ....	1,100
High-st., three s. and premises, f. y. 140l. ....	1,100
High-st., a freehold cottage, y. r. 22l. 10s. ....	1,100
By ELIAS & SON.	
Cheapside.—12 to 13, Bow-la. area 3,100 ft., building lease for 10 yrs., let at per annum ....	1,100
By TRIST & CO.	
Peckham.—Pitt-st., f. g. r. 10l. 10s., reversion in 24 yrs. ....	1,100
Camden-ter., f. g. r. 40l., reversion in 88 yrs. ....	1,100
By WILFORD, DIXON, & CO.	
Hyde Park.—33 and 36, Cambridge-rd., u. t. 24l. yrs., g. r. 24l., y. r. 210l. ....	1,100
Fulham.—70, Sherbrooke-rd., u. t. 97l. yrs., g. r. 15s., p. ....	1,100



WOOD (continued).

WOOD (continued).		At per standard.	
		2 s.	3 s.
JOHN'S WOOD (continued).....		2 s.	3 s.
White Pine and Peterburg.....		14 10	15 10
First white deals, 8 in. by 11 in.	14 10	15 10	0
" " 3 in. by 9 in.	13 10	0	14 10
" " battens	11 0	12 0	0
Second white deals, 8 in. by 11 in.	13 10	0	14 10
" " 3 in. by 9 in.	13 10	0	13 10
" " battens	10 0	11 0	0
Pitch-pine: deals.....	15 10	20 0	0
Under 2 in. thick extra.....	0 10	1 0	0
Yellow Pine—First, regular sizes	4 0	upwards.	
" " " " " "	32 0		
Seconds, regular sizes.....	33 0		
Yellow Pine ordinaries.....	23 0		
Kauri Pine—Planks, per ft. cube.	0 3 8	0 5 0	
Danzig and Steetin Oak Logs—			
Large, per ft. cube.....	0 3 0	0 3 6	
Small, " " " " " "	0 2 6	0 2 9	
Wainscot Oak Logs, per ft. cube.	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. cube.			
" " " " " "	0 0 8	0 0 9	
" " " " " "	0 0 7	0 0 8	
Pin. de Indes.....			
Pin. de Hongrie—Hulls.....			

inch ..... 0 1 6      0 2 6  
Dry Walnut American soft gun

Dry white, American, pert, sup.	0	0	10	0	1	0
as inch .....	17	0	0	22	0	0
Teak, per load	0	4	0	0	5	0
American Whitewood Planks,						
per ft. cube .....						
Prepared Flooring, etc.—						
1 in. by 7 in. yellow, planed and						
shot .....	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and						
matched .....	0	14	0	0	18	0
11 in. by 12 in. yellow, planed and						
shot .....						

1 in. by 7 in. white, planed and shot .....	0 12 0	0 14 6
1 in. by 7 in. white, planed and		

1½ in. by 7 in. white, planed and matched .....	0 15 0	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6
1 in. by 7 in. do. do.	0 14 0	0 18 0
¾ in. by 7 in. white do. do.	0 10 0	0 11 6

1 in. by 7 in.	do.	do.	0 12 9	0 15 0
6 in. at 6 ft. to 9d.	per square less than 7 in.			
<b>JOISTS, GIRDERS, &amp;c.</b>				
In London, or delivered			Railway Vans, per ton.	
			£ s. d.	£ s. d.
Bolled Steel Joists, ordinary sections			6 4 0	6 15 0
Compound Girders, ordinary sections			7 10 0	8 10 0
Steel Compound Stairs			9 3 6	10 12 6
Angles, Tees and Channels, ordinary sections			7 10 0	8 10 0
Cast Iron Columns			7 15 0	8 5 0
Flat plates including ordinary patterns			6 12 6	7 15 0
<b>METALS.</b>				
Per ton, in London.			£ s. d.	£ s. d.
Iron—			7 0 0	7 10 0
Common Bars				
Staffordshire Crown Bars, good			7 10 0	8 0 0
Staffordshire "Mark Bars"			9 10 0	—
Mild Steel Bars			8 10 0	8 15 0
Hoop Iron, best price			16 5 0	9 0 0
Galvanized			16 5 0	—
(*And upwards, according to size and gauge.)				
Sheet Iron, Black—				
Ordinary sizes to 20 g.			9 0 0	—
24 g.			10 0 0	—
26 g.			11 15 0	—
Sheet Iron, Galvanized, flat, ordinary quality—				
Ordinary sizes—				
3 ft. to 20 g.			12 10 0	—
Ordinary sizes to 22 g. and 24 g.			13 0 0	—
26 g.			14 0 0	—
Sheet "Iron, Galvanized, flat, best quality—				
Ordinary sizes to 20 g.			15 10 0	—
22 g.			16 0 0	—
24 g.			17 0 0	—
26 g.			18 10 0	—
Galvanized Corrugated Sheets—				
Ordinary sizes 6 ft. to 8 ft. 20 g.			13 0 0	—
22 g.			13 0 0	—
24 g.			13 15 0	—
26 g.			13 15 0	—
Best Soft Steel Sheets, 5 ft. by 2 ft.			11 0 0	—
do. do. do. 6 ft. by 2 ft.			11 0 0	—
do. do. do. 8 ft. by 2 ft.			12 0 0	—
Best Soft Steel Sheets, 22 g. and 24 g.			13 0 0	—

26 g.....	13	10	0	...	9	10	0
Cut nails 8 in. to 6 in	8	0	0	...			

Cut nails, 3 in. to 6 in.	26 g.....	13 10 0	...	—
		9 0 0	...	9 10 0
(Under 3 in., usual trade extras.)				
<b>LEAD, &amp;c.</b>				
	Per ton, in London.			
	£ s. d.	£ s. d.		
LEAD—Sheet, English, 3lb. and up	16 10 0	...	—	
Pipe in coils	17 0 0	...	—	

Type in cone .....	19	10	0	...	—
Soil pipe .....	19	10	0	...	—

Sold pipe	.....	19 10 0	...	—
Compo pipe	.....	19 10 0	...	—
Zinc Sheet—				
Vieille Montagne	..... ton	29 15 0	...	—
Silesian	.....	29 10 0	...	—
COPPER—				
Strong Sheet.....	per lb.	0 0 11	...	—
Thin	.....	0 1 0	...	—
Copper nails	.....	0 0 11	...	—
BRASS—				
Strong Sheet.....		0 0 10	...	—
Thin	.....	0 0 11	...	—
Thin—English Ingots	.....	0 1 3	...	—
Solder—Plumbers'	.....	0 0 8	...	—
Fluxing	.....	0 0 8	...	—
Fluxing	.....	0 0 9	...	—

#### PLANTS WHICH GROW IN CRATES.

ENGLISH SHEET GLASS IN CRATES.		
15 oz. thirds .....	2½d.	per ft. delivered.
12 oz. fourths .....	1½d.	"    "
11 oz. thirds .....	3½d.	"    "
10 oz. fourths .....	2½d.	"    "
9 oz. thirds .....	4½d.	"    "
8 oz. thirds .....	2½d.	"    "



(For some Contracts, etc., still open, but not included in this List, see previous issues.)

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Ferro-Concrete Bridge, "Bournville-Station. Shirecly ELECTRICITY WORKS—SUB-STATION. Eng. Hse., Boiler Hse., Store, etc., Bromsbrow-ham Trough-Lines, Road Clearing Works, Scurbridge School for Deaf and Dumb Children Alterations to Premises. Luther-street, etc., Oxford Buildings for Gas Plant. Tetford. Sewerage, Raining, etc., Works, Walsall. Roads, Sewerage, etc., Works, Walsall. Free Library, Normanton Materials .. Steel Flat-top Rail, and Fishplates Bulk-up Cables and Switches Portland Cement 800 Kilowatt set Dredging works (St. Lawrence), Montreal, Egin Addit. to Bath and Shelters at Glenview Public School Keeping 48 Public Pumps in Repair 2,400 linear yds. of Invert Blocks Cavalry Lower Chord, etc., Works, Walsall Treaching & Levelling 6 Acres Ground, nr. Garmouth Ipswich-road Sewer Covering Two Tanks at Sewage Works Cast-Iron Pipes, Ventilating Columns, etc. Drainage Works, Cobble's-row, Dudley Colliery Nineteen Houses at Edward-valley, near Treharis Additions to Property West Church-street, Bucks Hospital Addition, Thornton Villa at Skirbourn, Silloth Stables, etc., Wallington, en Durham Rearranging of Seats, etc., at ROYAL MANSWITH Wesleyan Schools, Queen's Ferry, Flintshire Private Street Works, Matthew's Lane Underground Conveyance, High-street Furnace, etc., Works, Walsall Farmhouse etc., at Meeting House Farm, Norton Enclosing Ground at Gorgie Public School Harrison Sewerage and Sewage Disposal Works Refrigerator, Laundry, etc., at Blawie's End, nr. Dudley New Department, Hanson School, Barker-road CONSTRUCT. 1,000 YD. ROAD-W. ETC. HIGHGATE SORTING OFFICE AT CRICKLEWOOD Works, etc., at Kingswood Council Offices, etc. WORK OF CARPENTERS FOR ELEC. TRAMWAYS FOUNDNS. NEW TINY COLL. B.T. GARFIELD REPAIRS TO GREEN BLOCK IV. (SUBSTUR) Footpath Works. ALTERNS AND NEW STAIRCASE AT WKHE. Steam-rail Motor Coaches Electricity, etc., Works, Walsall 1,200 tons of Broken Granite Fren Library, Bridgend POST OFFICE AT NEW SCHOOL, THORNTON HEATH Steel Swing Bridge over River Hull at Scolcoates NEW SCHOOLS NEW ELEMENTARY SCHOOLS, AYLESBURY Railway Sidings, 400 yds. long Sinking a pair of Pits at Treherbert Repairs to Ashby Rectory, Newmarket Repairs to Chapel of Ashby Church Repairs to Farm Buildings on Globe, Ashby Rectory Repointing, Washing, & Painting 218A, Barkling-m., E. Scavenging (Northborough) Two Houses, Princes-on-Tyne Works, etc., at Kingswood (A) REBOT. OF CHRIS. (B) VENTL. ETC. SAME KXT HAM. ETC. FACTORY, HARROW, MIDD. NEW WORKS, HARROW, MIDD. ROOF REPAIRS, ALL SAINTS CH. ROTHERHITHE	Kings Norton and Northfield U.D.C. Finchley U.D.C. Merton U.D.C. Stourbridge Education Committee Oxford Education Committee  Pontyrridd U.D.C. Ralford Corporation Leeds R.D.C. Normanton U.D.C. Normanton Corporation. East Indian Railway Co. do. do. Fulham Borough Council  North Dublin R.D.C. Great Crosby U.D.C. Mr. G. W. C. Soltau Symons. Shrewsbury U.D.C. Hwyton U.D.C. Penybont Main Sewerage Board. Weatlands U.D.C. Nantddn Building Co. Mr. H. W. Gunn  Captain Penrice. Co-operative and Industrial Society Herts C.C. The Trustees. Gorton U.D.C. Gorton U.D.C. Penzenlan Building Co., Ltd. Sir P. C. J. Milbank, Bart. Edinburgh School Board Northwich E.D.C. S. Staffordshire Water Works Co. Bradford Education Committee.  H.M. Office of Works Romley R.D.C. Heysham U.D.C. South Shields Rural Valley, Colne, South Wales and Mon. Commissioners of H.M. Works Cardinal U.D.C. Chelsea Quarantine Royal Railway & Dock Co. Enfield U.D.C. Walton-on-Thames U.D.C. Fren Library Committee Crofton Education Committee N. E. Railway Co. Wallasey U.D.C. Bucks Education Committee Troedyrhyl Coal Co.  Parochial Com. for Elaby R.D.C..  Wakefield Cricket Club Handsworth Education Committee Messrs. J. Adamson & Co., Ltd.. The Vicar and Churchwardens ..	A. W. Cross, Engineer, 23, Valentine-road, King's Heath .. Electrical Engineer, Electricity Works, Finchley, N. .... Aug. 19 W. O. Thorn, Surveyor to County Council, Scurbridge .. Aug. 19 W. North, Engineer, Works, Scurbridge .. Aug. 19 Estates Surveyor's Office, Town Hall, Oxford .. do. J. B. Jones, Gas Officer, Tetford .. Aug. 19 Borough Engineer's Office, Town Hall, Salford .. Aug. 19 J. Phillips, Engineers, 20, Park-row, Leeds .. Aug. 19 A. Hartley, Architect, County-chambers, Castleford .. Aug. 19 A. Hellard, Town Hall, Portsmouth .. Aug. 19 C. W. Young, Secretary, Nicholson-lane, E.C. .. do. do. A. J. Fuller, Borough Electrical Engineer, Townmoad-rd., Fulham J. Jameson, Architect, 77, High-street, Egin .. J. O'Neill, Council Offices, North Dublin .. Watkin Hall, Surveyor to Council, Great Crosby .. G. W. Soltan, 7, Courtenay-street, Warrington .. H. Caruso, Secretary, Garmouth, N.B. .. G. W. Lingwood, Surveyor, Station-road, Skowmarket W. Lloyd Marks, Surveyor, 61, High-street, Rhymney .. N. Williams, Engineer and Surveyor, Bridgend .. J. Llewellyn Smith & Davies, Architects, Aberdare .. Mr. Gunn, Cycle Agent, Buckle .. P. Fulton, Architect, Farnes, N. ... J. Spencer, Archt., Bank Chambers, Warrington .. Gr. Armstrong, Architect, 24, Bank-street, Carlisle .. R. W. Hamilton, Secretary, at Offices County Surveyor, County Surveyor's Green, 19, 19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 19I, 19J, 19K, 19L, 19M, 19N, 19O, 19P, 19Q, 19R, 19S, 19T, 19U, 19V, 19W, 19X, 19Y, 19Z, 19AA, 19AB, 19AC, 19AD, 19AE, 19AF, 19AG, 19AH, 19AI, 19AJ, 19AK, 19AL, 19AM, 19AN, 19AO, 19AP, 19AQ, 19AR, 19AS, 19AT, 19AU, 19AV, 19AW, 19AX, 19AY, 19AZ, 19BA, 19BB, 19BC, 19BD, 19BE, 19BF, 19BG, 19BH, 19BI, 19BJ, 19BK, 19BL, 19BM, 19BN, 19BO, 19BP, 19BQ, 19BR, 19BS, 19BT, 19BU, 19BV, 19BW, 19BX, 19BY, 19BZ, 19CA, 19CB, 19CC, 19CD, 19CE, 19CF, 19CG, 19CH, 19CI, 19CJ, 19CK, 19CL, 19CM, 19CN, 19CO, 19CP, 19CQ, 19CR, 19CS, 19CT, 19CU, 19CV, 19CW, 19CX, 19CY, 19CZ, 19DA, 19DB, 19DC, 19DD, 19DE, 19DF, 19DG, 19DH, 19DI, 19DJ, 19DK, 19DL, 19DM, 19DN, 19DO, 19DP, 19DQ, 19DR, 19DS, 19DT, 19DU, 19DV, 19DW, 19DX, 19DY, 19DZ, 19EA, 19EB, 19EC, 19ED, 19EE, 19EF, 19EG, 19EH, 19EI, 19EJ, 19EK, 19EL, 19EM, 19EN, 19EO, 19EP, 19EQ, 19ER, 19ES, 19ET, 19EU, 19EV, 19EW, 19EX, 19EY, 19EZ, 19FA, 19FB, 19FC, 19FD, 19FE, 19FF, 19FG, 19FH, 19FI, 19FJ, 19FK, 19FL, 19FM, 19FN, 19FO, 19FP, 19FQ, 19FR, 19FS, 19FT, 19FU, 19FV, 19FW, 19FX, 19FY, 19FZ, 19GA, 19GB, 19GC, 19GD, 19GE, 19GF, 19GG, 19GH, 19GI, 19GJ, 19GK, 19GL, 19GM, 19GN, 19GO, 19GP, 19GQ, 19GR, 19GS, 19GT, 19GU, 19GV, 19GW, 19GX, 19GY, 19GZ, 19HA, 19HB, 19HC, 19HD, 19HE, 19HF, 19HG, 19HH, 19HI, 19HJ, 19HK, 19HL, 19HM, 19HN, 19HO, 19HP, 19HQ, 19HR, 19HS, 19HT, 19HU, 19HV, 19HW, 19HX, 19HY, 19HZ, 19IA, 19IB, 19IC, 19ID, 19IE, 19IF, 19IG, 19IH, 19II, 19IJ, 19IK, 19IL, 19IM, 19IN, 19IO, 19IP, 19IQ, 19IR, 19IS, 19IT, 19IU, 19IV, 19IW, 19IX, 19IY, 19IZ, 19JA, 19JB, 19JC, 19JD, 19JE, 19JF, 19JG, 19JH, 19JI, 19JJ, 19JK, 19JL, 19JM, 19JN, 19JO, 19JP, 19JQ, 19JR, 19JS, 19JT, 19JU, 19JV, 19JW, 19JX, 19JY, 19JZ, 19KA, 19KB, 19KC, 19KD, 19KE, 19KF, 19KG, 19KH, 19KI, 19KJ, 19KK, 19KL, 19KM, 19KN, 19KO, 19KP, 19KQ, 19KR, 19KS, 19KT, 19KU, 19KV, 19KW, 19KX, 19KY, 19KZ, 19LA, 19LB, 19LC, 19LD, 19LE, 19LF, 19LG, 19LH, 19LI, 19LJ, 19LK, 19LL, 19LM, 19LN, 19LO, 19LP, 19LQ, 19LR, 19LS, 19LT, 19LU, 19LV, 19LW, 19LX, 19LY, 19LZ, 19MA, 19MB, 19MC, 19MD, 19ME, 19MF, 19MG, 19MH, 19MI, 19MJ, 19MK, 19ML, 19MN, 19MO, 19MP, 19MQ, 19MR, 19MS, 19MT, 19MU, 19MV, 19MW, 19MX, 19MY, 19MZ, 19NA, 19NB, 19NC, 19ND, 19NE, 19NF, 19NG, 19NH, 19NI, 19NJ, 19NK, 19NL, 19NM, 19NO, 19NP, 19NQ, 19NR, 19NS, 19NT, 19NU, 19NV, 19NW, 19NX, 19NY, 19NZ, 19OA, 19OB, 19OC, 19OD, 19OE, 19OF, 19OG, 19OH, 19OI, 19OJ, 19OK, 19OL, 19OM, 19ON, 19OO, 19OP, 19OQ, 19OR, 19OS, 19OT, 19OU, 19OV, 19OW, 19OX, 1

Nature of Appointment.	By whom Advertised.	Salary.	Appointed to be in
*APPOINTMENT OF ARCHITECT .....	Northumberland Education Com...	250l.....	None.

Public Appointments, xvi.

ENGLISH SHEET GLASS IN CRATES (continued).		VARNISHES, &c.		Per gallon.		TENDERS.	
				£	s. d.		
32 oz. thirds	54d.	per ft. delivered,	Fine Pale Oak Varnish	0	8	Communications for insertion under this	
40 " fourths	44d.	39	Fine Pale Oak	0	8	should be addressed to "The Editor," and must	
Flat Sheet, 21 oz.	42d.	39	Superior Pale Oak	0	10	not later than 10 a.m. on <i>Thursdays</i> . [R.B.—We	
40 " Hartley's Balled Plate	42d.	39	Fine Hard Church Oak	0	10	publish Tenders unless authenticated either by	
40 " "	42d.	39	Superior Hard-drying Oak, for seats of	0	10	architect or the building-owner; and in cases of	
40 " "	42d.	39	Churches	0	14	announcements of Tenders accepted by the	
40 " "	42d.	39	Fine Elastic Carriage	0	16	of the Tender stated, nor any list in which	
40 " "	42d.	39	Superior Pale Black Carriage	0	16	Tender is under 100£, unless in some exceptional	
40 " "	42d.	39	Fine Pale Maple	0	16	and for special reasons.]	
40 " "	42d.	39	Finest Pale Durable Copal	0	18	* Denotes accepted. † Denotes provisionally accepted.	
Raw Linseed Oil in pipes	per gallon	0 1 5d.	Extra Pale French	1	0	BILLINGSHEAD.—For new post-office, Billings-	
30 " in casks	30	0 10	Especially Selected Varnish	1	0	hurst. Mr. C. H. Burston, architect, Romney-	
30 " in drums	30	0 11	White Copal Enamel	1	4	W. Joyce	
30 " in pipes	30	0 11	Extra Pale Paper	0	13	£1,140 E. Wadsworth	
30 " in barrels	30	0 2 0	Best Japan Gold Size	0	10	G. Potten	
30 " in drums	30	0 2 3	Best Black Japan	0	10	Stowland Bank, 1,099 Radwicks	
30 " in barrels	30	0 2 3	Oak and Mahogany Stain	0	9	BRECEN.—For alterations, addition, &c.	
30 " in drums	30	0 3 11	Brunswick Black	0	8	Pfirrdgericht, for Mr. D. Evans. Mr. B. & P. P.	
Genuine Ground English White Lead	per ton	19 15 0	Berlin Black	0	16	architect, 22, Castle-street, Brecon	
Red Lead, dry	50	5 0	Best Black	0	10	B. Jenkins	
Red Lead, mixed with Oil	per cwt.	19 5 0	French and Brush Polish	0	10	£1,455 O. B. Williams	
Stockholm Tar	per barrel	1 12 0				Brecon	



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Thorp...	2,209	15	0	Bro.	1,613	13	6 1/2
Herland...				M. Blevitt	1,622	15	10
Walker...				A. Jewell...	1,613	10	6
Sons...	1,960	0	0	H. Ashley	1,583	0	0
arker...				W. G. Wil-			
Sharp...	1,915	19	0	mott....	1,498	0	0
we & Sons	1,905	0	0	Holmes...			
A. Merc-				Sons...	1,480	0	0
dith....	1,815	0	0	J. & T. War-			
meson...				ner, Mick-			
Sons...	1,813	6	6	over....	1,482	0	0
ebner...							
Sons...	1,809	0	0				



**LONDON.**—For the extension of Mile End Public Library, for the Stepney Borough Council:—  
 F. & P. Wood ..... £8,523 W. H. Hyde ..... 25,098  
 Martin, Wells, & Co., Ltd. .... 6,500 B. E. Nightingale ..... 5,691  
 J. Shelbourne & Co. .... 5,953 Patman & Potheringham, Ltd. ....  
 L. F. Lamplough ..... 5,900 Park-street, Islington, N.E. .... 5,653  
 G. Barker ..... 7,798 A. G. Crisp ..... 5,600  
 A. E. Symes ..... 5,745  
 S. E. Moss & Co. .... 5,700  
 [Borough Engineer's estimate, £5,900.]

**LONDON.**—For erecting the North Islington Branch Library, Manor Gardens, Upper Holloway, N., for the Public Libraries Committee of Islington Borough Council:—  
 General Builders, Ltd. .... £7,715 S. & Son, Ltd. .... £7,303  
 C. Wall, Ltd. .... 7,584 L. H. & R. Roberts ..... 7,144  
 J. & M. Patrick ..... 7,534 J. Grover & Son ..... 7,040  
 G. S. B. Williams & Son ..... 7,484 Patman & Potheringham, 100, Theobald's-road, W.C. .... 6,756  
 H. J. Williams, Ltd. .... 7,462  
 C. Deering & Son ..... 7,322  
 E. Lawrence & Sons ..... 7,310

**LONDON.**—For laying Norwegian granite sets and cross-stones, deal blocks, Rushey-green, High-street, Loompitt-vale, etc., Lewisham, for the Lewisham Borough Council. Mr. E. Van Patten, M.Inst.C.E., Borough Surveyor:—  
 Norwegian Granite Sets and Wood Paving.  
 Dick, Kerr, & Co., Cannon-street, E.C. .... £18,443 17 3

**LONDON.**—For kerbing, artificial stone paving, metalling, and channelling work, for the Lewisham Borough Council. Mr. E. Van Patten, M.Inst.C.E., Borough Surveyor:—

**Making-up Culverley-road.**  
 Fry Bros., Greenwich ..... £1,874  
**Artificial Stone Paving, Culverley-road.**  
 Granite Flag Co., Willesden ..... £828  
**Making-up Queenswood-road.**  
 B. Martin, Brockley ..... £977 12  
**Artificial Stone Paving, Queenswood-road.**  
 W. Pearce, Forest Hill ..... £370

**LONDON.**—For works at the London College of Music, 47, Great Marlborough-street, W. Mr. W. Leonard Downton, architect, 44, Theobald's-road, Bedford-row, W.C.:—

**Contract No. 1.—Painting and Decorating.**  
 Head & Thurlow ..... £285 0 0 C. Ansell ..... £258 0 0  
 Patman & Potheringham ..... 278 0 0 Co. .... 224 4 8  
 G. H. & A. Bywaters & Sons ..... 258 0 0 M. P. Shields ..... 221 15 0  
 W. T. Champion ..... 195 10 0 P. Dawes ..... 219 0 0  
**Contract No. 2.—Remodelling Two Rooms, Forming New Corridor, with W.C. and Lavatory, &c.**  
 Head & Thurlow ..... £350 0 0 G. H. & A. Bywaters & Sons ..... £297 0 0  
 Co. .... 334 13 8 F. Dawes ..... 287 0 0  
 Patman & Potheringham ..... 312 0 0 C. Ansell ..... 283 0 0  
 W. T. Champion ..... 280 10 0

**LONDON.**—For medical school and nurses' home, Gower-street, W.C. Mr. Paul Waterhouse, architect, New Cavendish-street, Portland-place, W.:—  
 Norman & Burdett ..... £28,300 Dove Bros. .... £77,360  
 W. Downs ..... £2,954 Higgs & Hill ..... 76,884  
 G. Parker ..... £2,360 F. Minter ..... 74,790  
 Hibberd Bros. .... £1,216 J. Greenwood, Ltd. .... 74,748  
 J. Simpson & Son ..... 73,456 Longden & Son ..... 74,592  
 Ford & Walton ..... 78,481 J. Carmichael ..... 73,475

**SOUTHWOLD.**—For sea defence works, for the Town Council. Mr. A. E. Carey, engineer, Westminster-chambers, 3, Victoria-street, Westminster, S.W.:—  
 A. G. Osenton ..... £3,000 0 0 A. Thorne ..... £2,120 0 0  
 A. Facey & Son ..... 2,657 16 0 J. C. True ..... 2,112 0 0  
 T. W. Pedretto ..... 2,645 0 0 Kirk & Ran ..... 2,667 4 0  
 Pedretto & Co. .... 2,571 18 0 J. H. Vickers ..... 2,098 0 0  
 W. Facey ..... 2,470 10 0 Pethick Bros. .... 1,975 0 0  
 W. Gradwell ..... 2,351 19 2 E. H. Page, Andrew's-buildings, Queen-street, Cardiff ..... 1,418 2 0  
 G. Double ..... 2,325 7 0  
 W. Rigby ..... 2,160 0 0  
 Campbell & Handman ..... 2,149 15 3  
 G. Wimpey & Co. .... 2,127 0 0

**SOUTH BRENT.**—For alterations and additions to Council school, for the Devon County Education Committee. Mr. P. Morris, Architect to the Committee:—  
 R. Veale & Son ..... £1,413 7 6 F. J. Badcock ..... £1,055 0 0  
 Reeves & Full ..... 1,196 0 0 E. A. A. Stacey ..... 1,050 0 0  
 Parker Bros. .... 1,190 0 0 P. Carwithan ..... 870 0 0  
 F. C. Francis ..... 1,096 0 0 G. P. Finch ..... 798 0 0  
 Johns & Son ..... 1,069 0 0  
 [Architect's estimate, £980.]

**TORQUAY.**—For erecting the Carnegie Library, for the Town Council. Mr. T. Davison, architect, 28, Great Ormond-street, London, W.C. Quantities by Messrs. C. Sewell, Appleton, & Vincent Catermole Brown, surveyors:—

Beer	Portland
J. Crockerell ..... £9,240	Stone ..... £9,494
H. Pharo ..... 8,936	..... 9,125
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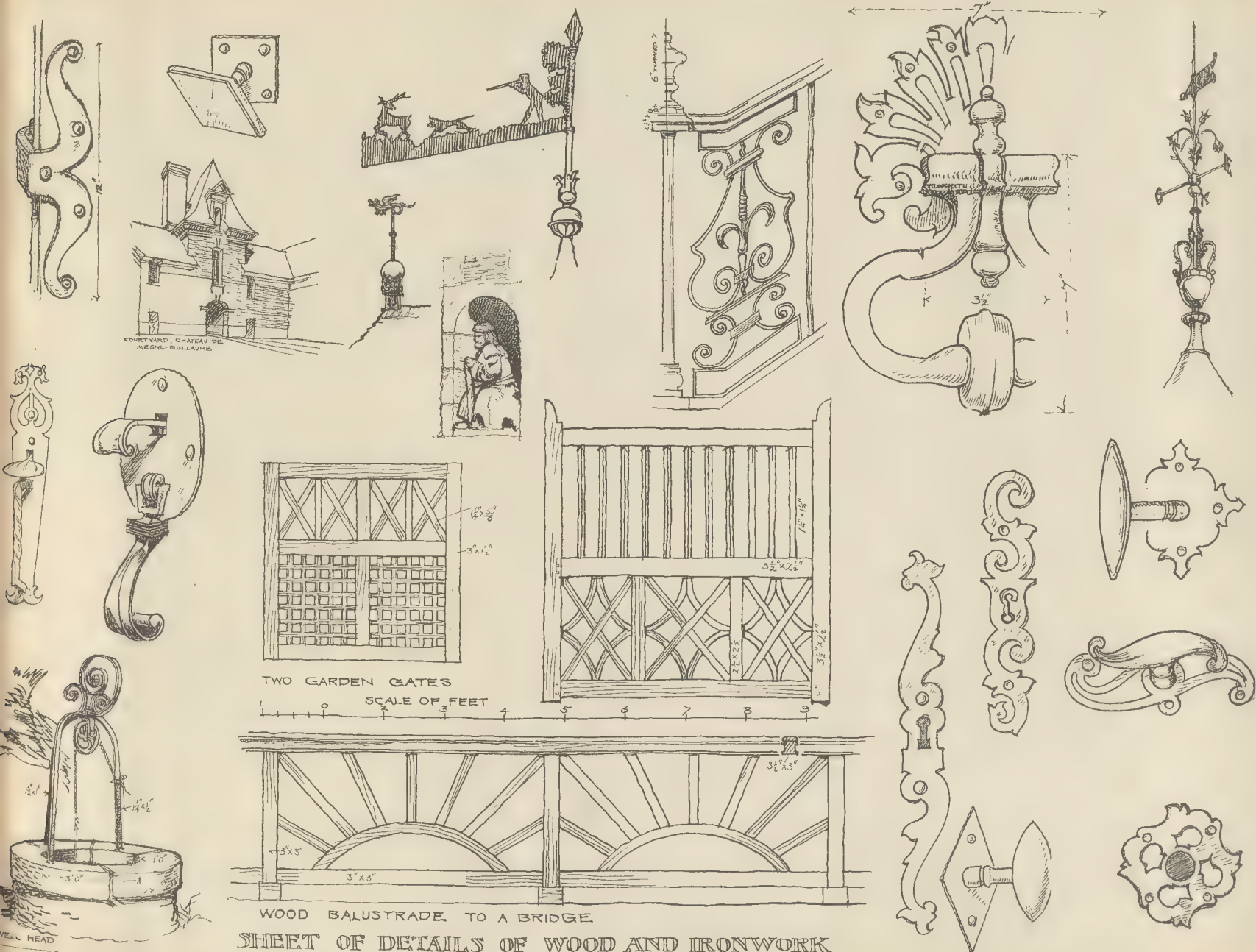
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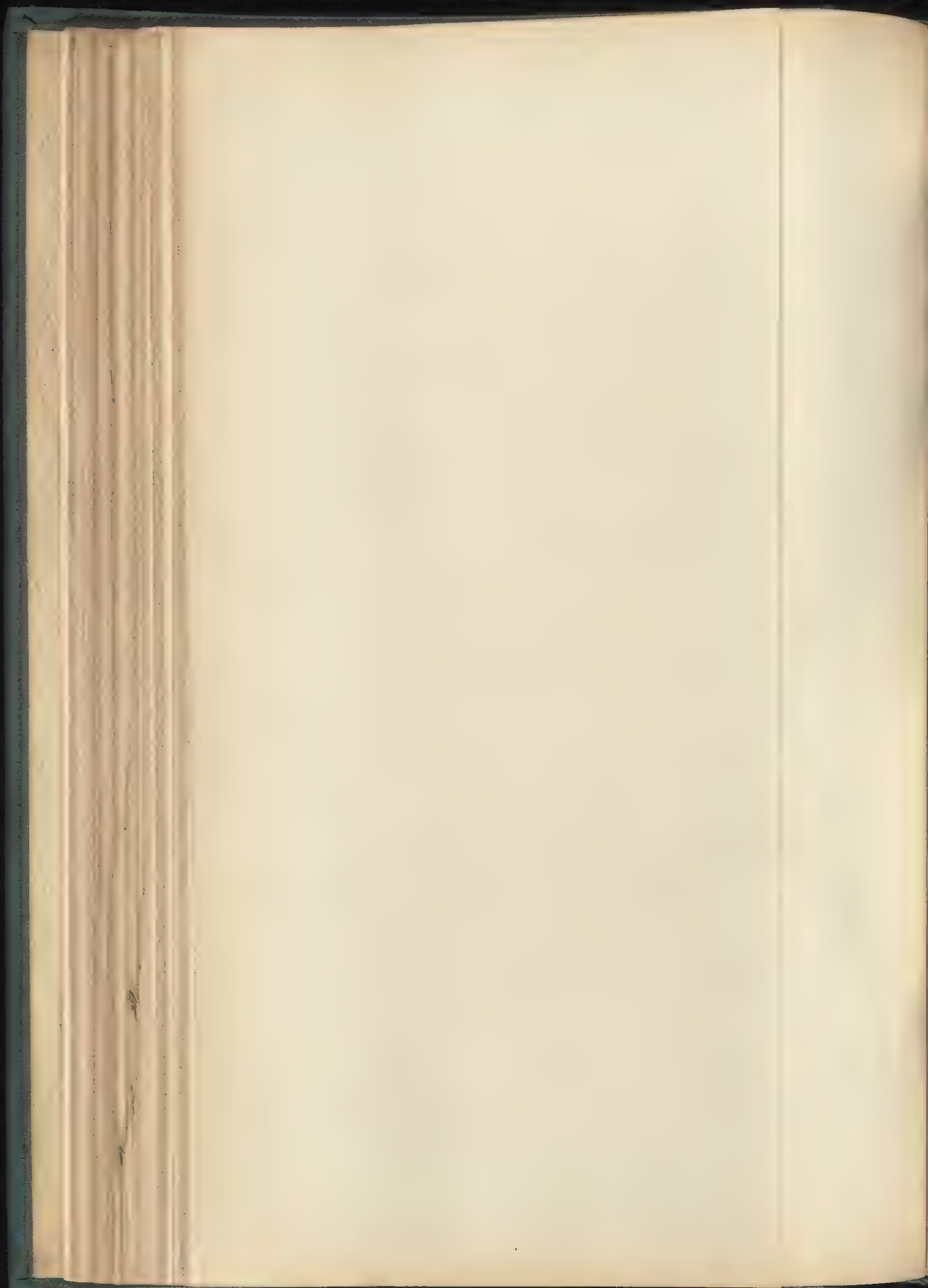
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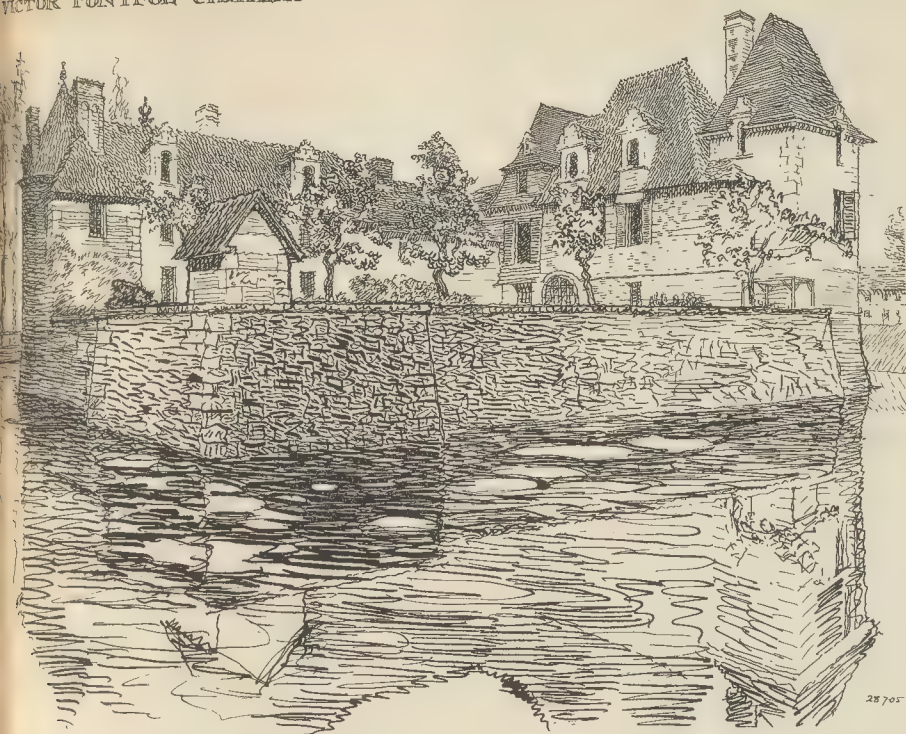
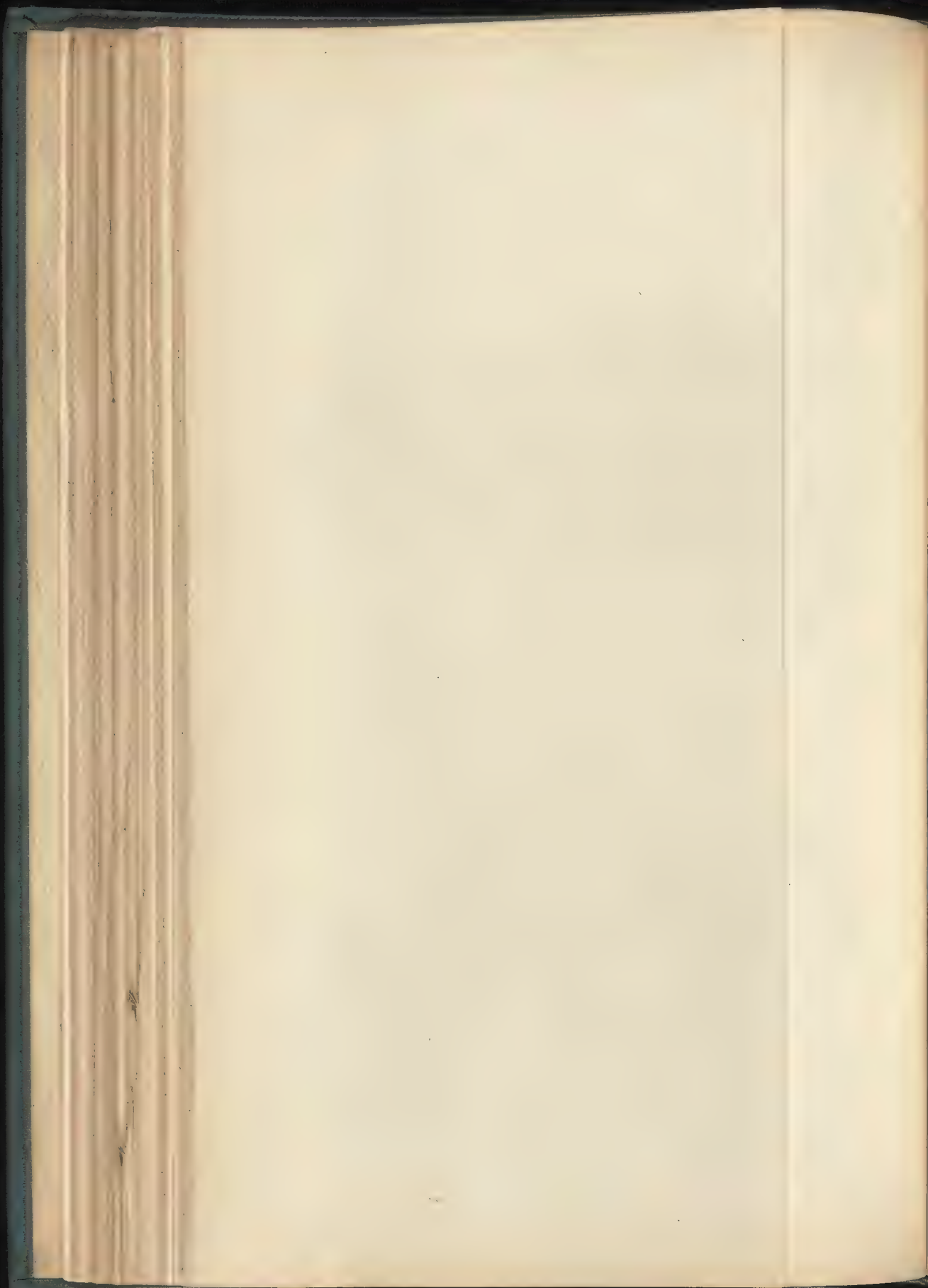


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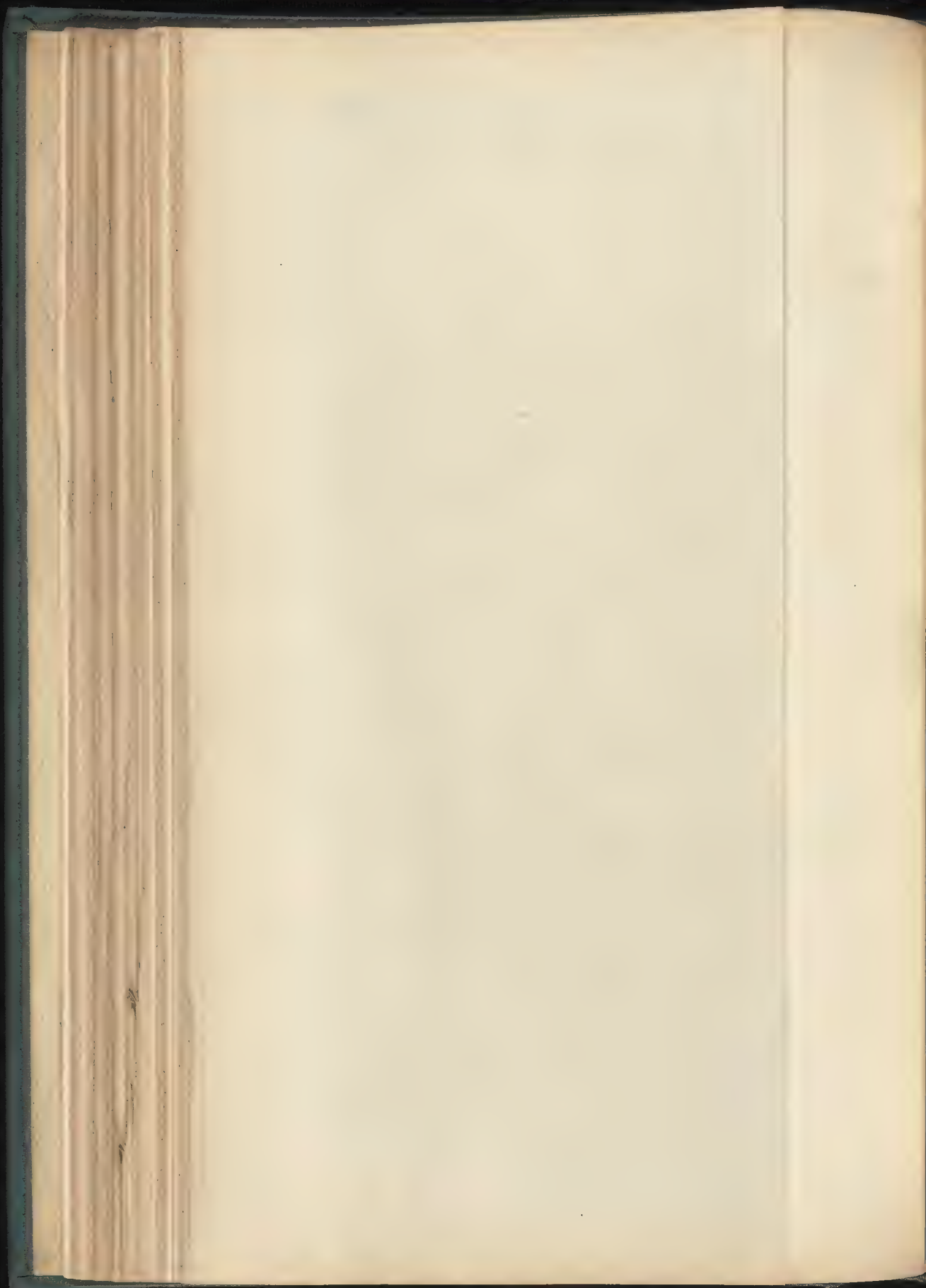


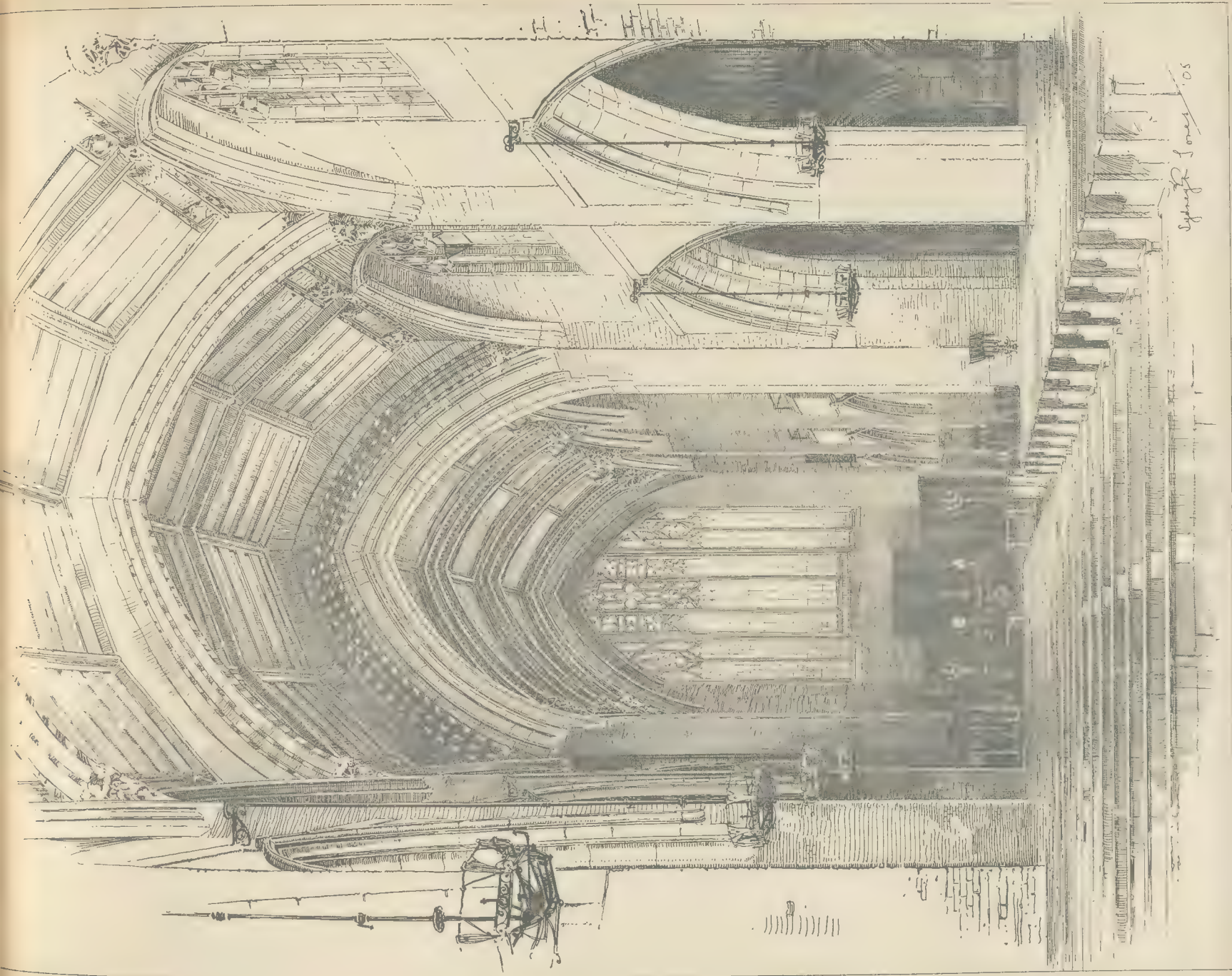
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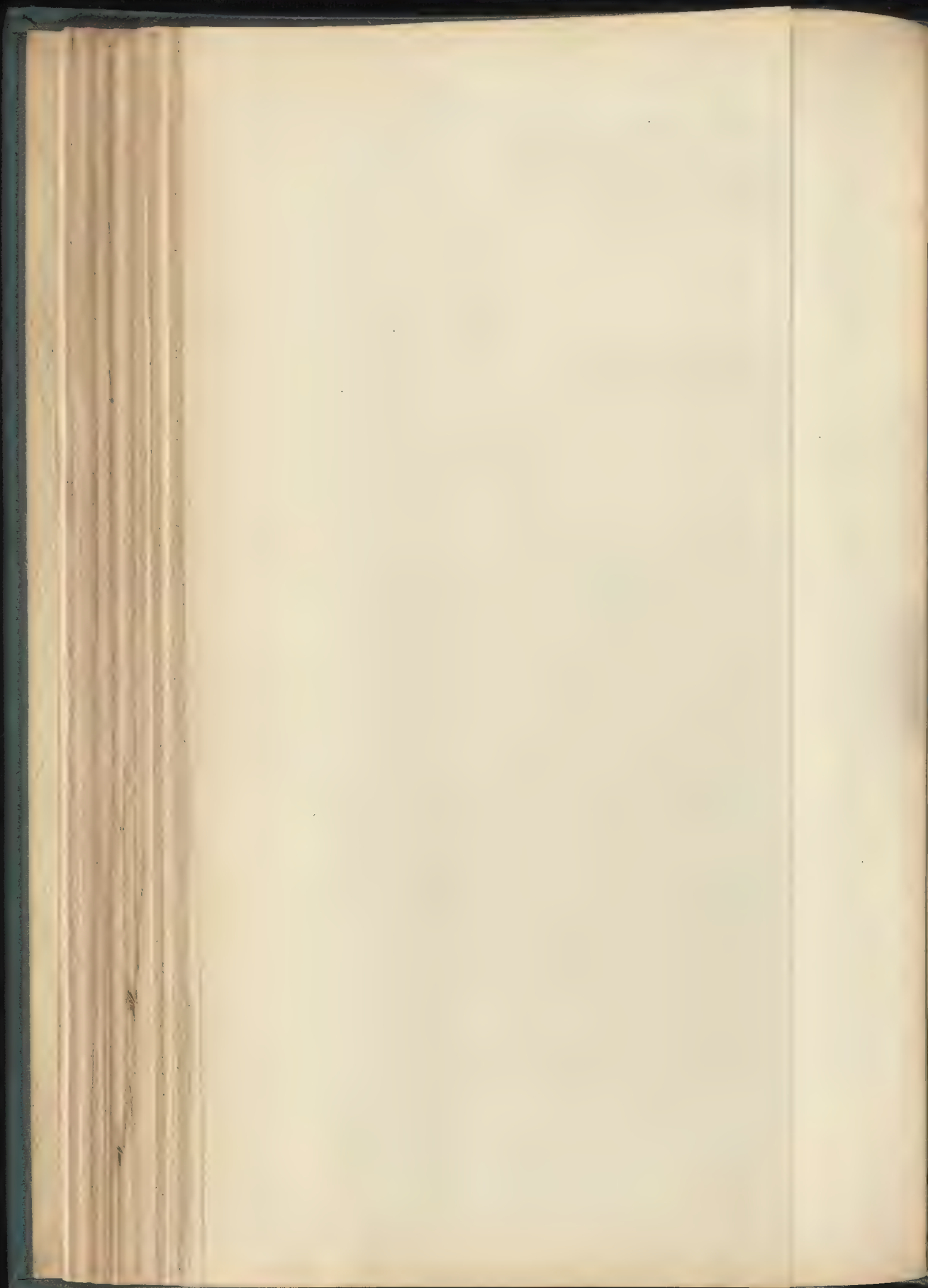






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Chancel Screen, Bristol Cathedral.....	The Late J. L. Pearson, R.A., Architect.
Public Library, Malvern.....	Mr. H. A. Crouch, Architect.
Free Library, Nelson.....	Messrs. J. R. Poyser and W. B. Savidge, Joint Architects.
Organ Case and Choir Stalls, Headingley Hill Church.....	The Late F. W. Bedford, Architect.
Brass of Sir Simon de Felbrig and Wife.....	From a Rubbing by Mr. E. Tennyson d'E. Jesse.

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### The Church of Hemel Hempstead.



HE interesting and picturesque old market town and borough of Hemel Hempstead possesses a church of considerable stateliness and antiquity. It has also

church on the old royal manor was rebuilt on a fine and imposing scale, after the later Norman style, about the middle of the XIIth century.

It is recorded that in 1140 the forfeited earldom of Cornwall was bestowed by King Stephen on Reginald de Dunstanville, a natural son of Henry I., to whom may probably be attributed the rebuilding of the church of Hemel Hempstead on a cruciform scale. The manor (apart from the possessions of the Abbey of St. Albans) was a valuable one, and the worth of the rectory considerably above the average of churches.

Towards the beginning of the reign of Edward I., Edmund Earl of Cornwall, the son of Richard King of the Normans, founded the College of Bons Hommes at Ashridge, Bucks, bestowing on it his manor of Hemel Hempstead, but excepting the advowson of the rectory. However, in 1290, when increasing the endowments of the rector and brethren of this college, he added the gift of the rectory with the advowson of the vicarage. From that date until the dissolution of the religious houses, in the reign of Henry VIII., the College of Ashridge held the appropriated rectory and presented the vicars. The Taxation of Pope Nicholas was drawn up the year after the church had become their property. The returns show that the College of Ashridge drew over 50*l.* a year from the manor and lands, whilst the rectory was worth to them 33*l.* 6*s.* 8*d.* a year. The vicar at that time only received an income of 5*l.*

The valuation of Henry VIII., drawn up about two and a half centuries later,

shows that the college then drew an income from the manor of 137*l.* 10*s.* 2*d.*, and from the rectory of 42*l.* 3*s.*, whilst the annual value of the vicarage had increased to 16*l.* 1*s.* 10*d.*

In its main features the church happily retains very much of the work of the XIIth century. The nave is separated from the aisles by massive Norman arcades, each of six arches. The pillars and pilasters are circular, with capitals, slightly varying, but of the usual cushion style. The hood-mouldings of the four centre arches on each side are ornamented with a plain billet pattern. The westernmost arch of the south arcade and the easternmost of the north arcade are more richly ornamented with a double dovetail effective moulding, after a pattern that appears in several parts of the cathedral church of Ely. The two other end arches have a two-fold zigzag moulding below the billet pattern. At the west end of the nave there is a horizontal string course of this billet moulding running along the wall and rising to surmount the large western doorway. Above the arcades are six large Norman clearstory windows, with slender jamb shafts at the edge of the splay, continued in a plain round moulding. Over the second clearstory window from the east on the south side is the head of a wider arch, which might readily puzzle any architectural student. It is in reality the remains of a much wider and larger window of later style inserted here to throw extra light on the XVth century Rood. The proportions of the other Norman clearstory windows were somewhat

and the good fortune to emerge comparatively scatheless from a long series of XIIIth century restorations.

The church of St. Mary consists of chancel with northern annexe and vestries, clearstoried nave of six bays with north and south aisles, north and south transepts, north and south porches, and central tower and spire.

Hemel Hempstead was a place of some importance in pre-Norman days, the manor or manors being divided between Saxon kings and the Abbey of St. Albans. The Abbey retained its section until the time of its dissolution. William the Conqueror bestowed the royal moiety, together with the manor of Great Berkhamstead, on his half-brother, Robert Earl Moreton, who was succeeded by his son William as Earl of Cornwall. There can be no doubt whatever that Hemel Hempstead was a place of sufficient importance to possess a church in the later Saxon days, which would stand on the site of the present church. The monks of St. Albans would, with almost equal certainty, have their own grange chapel. Of ecclesiastical buildings of that kind there are now no traces. The





Hemel Hempstead Church.

unfortunately renewed in this place during a restoration of 1885. The head of this debased arch was, however, left in position; possibly the restorers had some sense of humour, and left it in the hope that it might prove a pit-fall to future antiquaries. From such a blunder we were happily saved by the courteous information of Mr. J. Lawrence, who has been the worthy parish clerk of Hemel Hempstead for a period of forty years.

The great central tower is supported by four lofty horseshoe arches. The one facing the nave is richly moulded, though quite plain on its eastern face. The tower rises in two stages above the roofs of the body of the church, and is well proportioned. The lower stage is lighted by two plain circular-headed windows on each face. The bell-chamber stage is much enriched, having on each side a large pair of semi-circular-headed lights divided by shafts and surrounded with well-defined mouldings. Above each pair is a small circular light with zigzag mouldings; whilst on each side of it is a blank window or recess. Beneath the plain parapet is a bold corbel table.

Both transepts clearly retain their

original Norman proportions, and are unbuttressed. The south transept has a good-sized Norman window in the west wall, with zigzag mouldings above it. The corresponding window of the north transept has been built up. At the east and west angles of both transepts are corbel heads just below the spring of the roof. In the interior of the south transept may be noticed a string-course of billet moulding about 12 ft. from the floor level.

The finest external remains of the XIIth century church are at the west end of the nave. The large western entrance is a singularly good example of late Norman ornament. The head is enriched with five orders of mouldings, including the billeted hood-mould, and there are three slender jamb shafts on each side. The nature of the ornament can be better appreciated from the photographic illustration than from any mere verbal description. A good deal of the work of this doorway has been renewed during recent years; but that it has been executed with much faithful care is obvious by a comparison with the good engraving executed by Edward Blore in 1823, which appears as one of the plates in Vol. I. of Clutterbuck's "Hertfordshire."

Mr. Clutterbuck says that the doorway in question "exhibits the richest specimen of Saxon (?) architecture to be met with in this country."

The most interesting and exceptional work of this period yet remains to be described. The two bays of the chancel still retain their well-built roof of stone groining. This vaulting springs from semi-circular pilasters rising from the ground, with well-defined bases and diversely-enriched capitals. In the centre is a bold transverse rib, and from each side of this, crossing over to the east and west angles, are the diagonal ribs. There are very few parish churches that retain so fine an example of Norman ribbed groining. The roofing of this chancel may be compared with that of the chancel of Crondall, Hants, though the latter instance is nearer the end of the XIIth century. There is a highly exceptional, if not unique, feature attached to this chancel on the north side. From the east end of the north aisle of the nave is a small chamber or passage having an internal measurement of 13 ft. in length by 6 ft. 4 in. in width. It is vaulted with stone-ribbed groining of two bays, almost precisely like the chancel roof on a very small scale, and is, of course, of like age. A variety of vestry accommodation has from time to time been provided on this side of the chancel, of both pre-Reformation and modern date, so that it is difficult to say for certain whether this narrow chamber was complete in itself according to the original Norman plan, or whether it led to some more-extended building. On the whole it seems most probable that it was designed simply to serve as a sacristy. There would have been no extensive or high building on this side of the chancel in the XIIth century, as there is still remaining in the north chancel wall a large, widely-splayed Norman window, together with a shallow buttress and the remains of a double string-course of the like date. In the south wall of this vaulted passage are traces of a built-up low arch into the chancel; but its obtuse-angled head shows it to be of later date, and it was probably constructed to hold a tomb or effigy. High up in the north wall of the chancel, near the east end, is a wide, circular-headed opening, calculated to deceive and puzzle the unwary. It is over the vaulted passage, and communicates with what is now known as the upper vestry. This was in reality constructed in the second half of last century to serve as an organ chamber, and the wide opening was made for the due emission of the sound; but at a later date a larger organ was placed in the north transept.

The photographic illustration shows the upper part of a square-bowled font on the south side of the nave. It has now been moved to a more convenient place in the south aisle immediately to the west of the chief entrance. This font seems to be undoubtedly of XIIth century date, though much recut throughout, and the top covered with poorly-done Scriptural scenes and modern lettering. The substantial circular shaft is diagonally channelled, and the wide base is most richly carved. The "restoration," or rather the unhappy modernising, of this font was probably accomplished in 1846.

The walling of the chancel and the

transepts and of much of the nave retains most of its Norman characteristics, and consists of flints, dressed and undressed, with stone facings; the two outer lines of enriched stone string-courses, originally ornamented throughout with the billet moulding, can be readily noticed on the three sides of the chancel and on most of the south transept. In the walling of the nave and elsewhere pieces of roof tiling have been often inserted, whilst the edges of two or three thicker tiles apparently Roman, may also be noticed.

It is not surprising, when so good and well built a church was erected—*circa* 1150—to find that no repairs or additions seem to have been desired or required in the next century. At all events, the fabric shows no traces of any interference with its plan during the Early English period or the beginning of the somewhat vague period usually styled Decorated.

The first symptom of any change from the Norman occurs in the time of Edward III., probably in the second quarter of the XIVth century. This change manifested itself chiefly in the chancel. At that period two large three-light pointed windows were inserted in the south wall of the Norman chancel. The east gable of the chancel was at the same time rebuilt, a new three-light east window inserted, the pitch of the roof slightly raised, and a small light with a trefoil head placed in the gable over the east window. The tracery of this window was renewed in a later style, but the two south windows have obvious XIVth century tracery. A trefoil-headed, ogee-shaped piscina niche in the south wall of the chancel is of this period, and so, too, is another like piscina niche in the south wall of the south transept. This new work in the chancel, probably undertaken mainly for the greater display of the growing art of glass staining, would almost certainly be the work of the master and brethren of Ashridge as rectors. Gilbert de Bowelles (or Bowles) became master in 1346; it is by no means improbable that he contemplated a more thorough alteration of the chancel, and perhaps of the church at large, but was prevented by the catastrophe of the Black Death of 1348-9.

The next alteration in the church was apparently about the beginning of the XVth century, when the walls of the nave aisles were either reconstructed throughout or, at all events, pierced with new and larger windows and a porch added on each side. These aisle windows are similar on each side. There are three to the east of the porch and two to the west. They are all two-light, pointed windows with tracery early in the Perpendicular period. Those on the north side are comparatively untouched, but three of those on the south side have had their tracery renewed.

Towards the close of the XVth century, or in the beginning of the XVIth, there seems to have been further work at the church. The large windows of the transepts and the west window of the nave are of late Perpendicular style. At the same period a somewhat plain, nearly flat roof was given to the nave. The east bay of the nave roof, over the Rood, was, however, specially panelled, and still bears some remains of painting. The transept roofs are sometimes described as "very fine examples of XIVth century

roofs." This is quite a mistake. The south transept roof includes some carving that formed part of a Decorated roof; but this roof had been cut down into a later form at the time when the present roof was placed on the nave, and even when perfect was in no sense remarkable.

There is, however, one striking feature of the church, which is probably of early XIVth century date, and notable for many miles round, namely, the lofty octagonal spire of lead-covered timber. It may be compared with the sun-warped eccentric spire of Chesterfield Church, or with the fine example at Hadleigh, Suffolk; but of all the lead-covered spires in England that of Hemel Hempstead certainly presents the most graceful outline and is probably the highest. On the east face of the spire, about 12 ft. from the summit, is a square opening, where the diagonal arrangement of the lead ceases. This is covered by a sheet of lead stamped with eight roundels in two lines. A like opening in the Chesterfield spire is called the "crow-hole," and was designed and used for purposes of outside haulage of material when repairs were requisite. In a line with this closed "crow-hole" are a series of tiny dormered openings, on each of the other seven faces, for purposes of ventilation.

There seems to be a considerable dearth of early memorials in this church, as Hemel Hempstead was undoubtedly a town of some little importance in mediæval days; but this probably arose from both the chief manors being in conventual hands. There is, however, one early monument of considerable interest and value. Against the west wall of the south aisle is a large slab, removed some time ago from the top of an altar tomb, bearing two good brass effigies of a squire and his wife and their arms, with a partially-ventilated inscription plate. The Norman-French inscription read when perfect (it is engraved in Clutterbuck's "Hertfordshire") :—

"Robard Albyn gist icy Et Mergrete sa femme  
Oveke by deu de lez alm' eyt mercy. Amen."

In English this would run :—"Robert Albyn lies here and Margaret his wife with him, may God have mercy on their souls. Amen."

The squire is represented in plate armour with a conical helmet and gorget of chain mail; he wears a sword on his left hip and a dagger on his right, and his feet rest on a lion. The lady wears a girded dress with close-buttoned sleeves, and a mantle corded across the breast; the head rests on a tasselled cushion and the feet on a dog with a collar of bells. Above the squire is a shield bearing three lapwings



West Doorway, Hemel Hempstead Church.





Hemel Hempstead Church. Interior.

on a bend; above the wife is an impaled coat quarterly of four, a crescent for difference, with the impalement now blank. Various references to Robert Albyn have been found in the records of Edward III. His wife Margaret (Wothen) was a native of Hemel Hempstead. She outlived her husband, and, dying in 1390, directed that her body should be buried in this church near her husband, and left money for a monument to be erected over them.

There used to be an inscription in the chancel to the memory of Thomas Waterhouse, the last master of the house of Bons Hommes at Ashridge, who was buried here in 1557; but it has long ago disappeared.

The following remarkable inscription is on a stone in the vaulted chamber on the north of the chancel:—

"Heere lyeth interred the body of Thomas Deacon, the sonne of Thomas Deacon and Martha his wife, of Courerhall, bachelor of artes and student in physick, who by his extraordinary spare body in respect of breadth being long sick of a consumption and of his as extraordinary height, being in proportion to the length of this stone, might shew the desire he had to heaven and so departed Sept. 28 An. Do. 16—."

Clutterbuck, writing in 1815, gives the measurement of the stone bearing this inscription as 6 ft. by 2 ft., which does not appear to be anything exceptional. When it was removed from the chancel in 1846 it was cut down to 3 ft., so that the inscription now makes complete nonsense.

In the churchyard, on the south side of the nave, is a stone coffin; it has a hollow for the head and tapers considerably to the feet. This was found beneath an altar tomb in the north transept, which was swept away during the somewhat reckless changes of 1846.

Within the altar rails stand two well-carved oak coffin stools of Jacobean date; they do not appear to be now used for their original purpose. The present altar

rails are of the usual modern style—brass and cast iron—but acting as a fence to the font in its present position by the south door is a piece of handsome carved railing with twisted baluster shafts, which formed, we presume, part of the good discarded altar rails; they seem to be of late XVIIth century date.

In the modern vestry is a fair example of a late Jacobean altar table. It was disused about 1860, when Dr. Richard Temple West, for so many years vicar of St. Mary Magdalen's, Paddington, was curate of Hemel Hempstead. He gave to the church a handsome panelled altar-table of cedar wood to take the place of the one of Jacobean date.

In the upper vestry is a fine old iron-bound parish chest, having two ring-handles at each end; it is probably of early XIVth century date.

Considerable structural and internal repairs were done to this church, as has been already mentioned, in 1846. A general restoration of the nave and tower was undertaken in 1862-3, at a considerable cost, under the direction of the late Mr. Christian. In 1879 the same architect proceeded with a restoration of the chancel; the date appears on the heads of the water-shoots. The transept roofs were opened out under like direction in 1880, and the nave roof unceiled and restored in 1885. The groined roof and walls of the chancel were recoloured, with fairly good effect, in 1888, by Mr. Bodley, F.S.A., traces of the old designs being followed as much as possible. A striking picture of the Annunciation has been painted on the wall at the west end of the nave over the archway into the tower, as a memorial to the Misses Hamilton, of Marlowes. New vestries were built on the north side of the chancel in 1897. The last improvement in this well-cared-for church is the complete restoration and

repaving of the two porches of the nave in 1901, by the Misses Varney; the north porch, which is shallower than that on the south, is now happily again put to its proper use, after having long served as a receptacle for ladders and brooms and less slightly objects.

Looking back at this interesting fabric when leaving the town, the grace of the spire and the peculiarly winning colour of the dulled shimmer of the lead-covered spire, as it rose amid the early-budding foliage of a bright spring afternoon, made a lasting impression; it brought to mind the words of Hertfordshire's first historian, Sir Henry Chauncy, who wrote in 1700, of Hemel Hempstead Church that it had "a very fair and tall spire covered with lead, which is a great Ornament to the Town."

#### NOTES.

The Unemployed Bill. It is unnecessary to do more than chronicle shortly the passing into law of the Bill to aid unemployed workmen. It has been passed through Parliament in a manner which is shocking to serious observers. It includes a great local change, namely, the giving of aid to public bodies to men who are unemployed, such aid being outside the ordinary poor-law system. It is a one-sided statute because it takes account only of the unemployed manual labourer, and not of the man who is a clerk or a typewriter. It is true that the person who is to receive relief is to be entitled only because he has not lost his employment through a fault. But who can investigate the case of every applicant, and trace his life's history, as is necessary if one would ascertain if his want of employment arises from pure misfortune? The

misgivings of the Government as to the effect of the Act are shown by the fact that its operation is limited to three years, and that the bodies to distribute relief cannot get the money from the rates, but must depend on private subscriptions and donations. In other words, the Act recognises that relief should be given under certain circumstances, but does not provide the means of giving it. The change obviously cannot continue in its restricted form; it must be either enlarged or ended in three years' time.

**Standard Fire-Resisting Buildings.** THE new rules of the Fire Officers' Committee, which have recently been issued, include provisions for buildings of reinforced concrete or "ferro-concrete." The provisions are not unreasonable, and will probably lead to the more general adoption of this method of construction in Great Britain. The metal rods or bars must be spaced not less than 12 in. apart, and must be embedded in concrete, "so that no part of any rod or bar shall be nearer the face of the concrete than double the diameter; such thickness of concrete must be in no case less than 1 in., but need not be more than 2 in." This is not very clearly expressed, but, doubtless, what is meant by "such thickness of concrete" is the thickness of the concrete outside the bar or rod; it is not, however, obvious what is the "diameter" of a bar oblong in cross-section. Floors and roofs must not be less than 5 in. and 3 in. thick respectively, external walls not less than 6 in., and party walls not less than 13 in. thick in any part. The concrete must be of sand and gravel, or other suitable aggregate, that will pass through a 3-in. mesh, and good Portland cement, in the proportion of 6 cwt. of cement to each cubic yard of concrete. Other rules refer to flues, enclosures for hoists and stairs, etc. We may add that the rules for ferro-concrete construction must be read in connexion with the older rules for buildings of ordinary fire-resisting type, as some of these apply in both cases. Buildings which conform to the Associated Fire Officers' specifications are insured against fire at lower rates than other buildings, and the fact that ferro-concrete buildings are now accepted by the fire offices at these reduced rates is distinctly favourable to this modern type of construction.

**Buildings in Advance of Building Line.** THE case of Dowsett v. Ramuz raised an interesting question. The plaintiff was the owner of a house at Southend-on-Sea, and he sought to obtain an injunction preventing the defendant, the adjoining owner, from bringing his house forward of a certain building line. The land upon which the houses stood had been sold, subject to a covenant that no buildings should be erected in advance of a certain building line 35 ft. from the road. The defendant's predecessor, in title, had built a house which stood 35 ft. 6 in. from the road, but with bays to the windows only 32 ft. 5 in. from the road, and the plaintiff has subsequently erected his house with a similar frontage. The defendant now proposed to convert the original house, which he had since purchased, into shops, which would bring

the whole building forward to 32 ft. 4½ in. from the road, and the principal defence to this action was that the plaintiff himself, having broken the covenant by building the bay windows of his house forward of the building line, was no longer entitled to enforce it as against the defendant. The effect of the judgment delivered by the Court is that, had the plaintiff been trying to compel the defendant merely to set back the bay windows, he could not have succeeded, as he was in *pari delicto*, but the breach now complained of was a more serious matter, going beyond the breach committed by the plaintiff (which, having regard to what had been done in other houses adjoining, was a trivial matter), and the plaintiff was entitled, therefore, to restrain it by injunction.

**Householders and New Streets.** THE case of Elsdon v. Mayor, etc., of Hampstead, raised an important question as to liability of house-owners to contribute to the expenses of paving and making up new streets. The plaintiff was the owner of certain houses abutting on the east side of a new street called Gondar-gardens. Opposite to these houses was land belonging to certain trustees, upon which houses had been erected. These houses fronted on another road running parallel to Gondar-gardens, called Sarre-road, but they had gardens running down to the west side of Gondar-gardens, from which they were separated by a fence. The defendants, acting under the Metropolitan Local Management Acts of 1855 and 1862, resolved to pave Gondar-gardens, and apportioned the expenses upon the owners of the houses fronting the portion to be paved, including the houses facing Sarre-road. Subsequently the defendants rescinded this apportionment, and made another, which left out the owners of the houses in Sarre-road. As this increased the burden placed upon the owners of houses in Gondar-gardens, of which the plaintiff was one, the plaintiff in this action sought to set aside this last apportionment. It appeared that the reason that the defendants had rescinded the original apportionment and assessment was that they thought that the fence which separated the gardens of the houses in Sarre-road from Gondar-gardens was on a strip of land in other ownership, and that, therefore, the houses did not abut on Gondar-gardens at all. On the question of fact the Court held that there was no intervening strip of land in other ownership, and that if the houses in Sarre-road did not, within the words of Section 105 of the Act of 1855, "form the new street," yet within Section 77 of the Act of 1862 they did "bound" or "abut" upon it, and, therefore, the owners were liable to bear some portion of the expenses. The really important point in this case, however, appears to have been the contention set up by the local authority that, if there was difficulty in ascertaining the owners who were liable, the expenses might practically be apportioned on the rest who were known. It is to be observed that the Court emphatically negatived this proposition, and held that the owners liable must be included in the apportionment, and held the last apportionment to be illegal and invalid. The position of

house owners, with the heavy and annually increasing liabilities attached to them, is often not an enviable one, but if the local authorities could pick and choose who should be included and who excluded in such an apportionment of expenses, their lot would be little less than pitiable.

**House Property and Street Widening.** THE widening of Piccadilly has given rise to an interesting decision under the Act of Parliament known as Michael Angelo Taylor's Act (57 Geo. III., c. xxix.) under which the local authorities have powers to purchase houses, lands, etc., and lay the sites thereof, "or so much thereof as they shall think proper" into the streets. In the case in question, *Pescod v. Mayor, etc.*, of the City of Westminster, the plaintiff was the lessee for a term of about two and a half years unexpired of the basement, ground floor, and entresol of a house in Piccadilly. The defendants, under the above Act, claimed to take the whole house for the purpose of widening Piccadilly, but the plaintiff applied for an injunction restraining them from proceeding under their notice to treat on the ground that part of the house—that is to say, a strip 22 ft. 6 in. back from the Piccadilly front—was alone necessary for the street widening, and that he could not be compelled to sell the whole of his interest. It may be pointed out that it has been decided in the case of *Gordon v. Vestry of St. Mary Abbott's, Kensington*, that under this Act the owner has not the power to compel the local authority to take the whole, as would be the case under the Lands Clauses Consolidation Act, 1845. The Court held that the plaintiff had no right under the statute to restrain the defendants from taking more of the premises than it was intended to dedicate to the public, and (applying the test laid down in former cases) found on the facts of this case that the portion of the premises actually required was so connected with the whole building that it could not be removed without destroying the identity of the house as a house, and that the defendants were acting *bona fide* in claiming the whole. The Court commented on the difficulties that would result were the plaintiff's claim well founded, especially where the premises were leased, as in the present case, to different lessees in flats, some of whom might take opposite views, but it does not appear that this difficulty would in itself suffice to enable the local authority to claim the whole, and such a case may yet have to be considered in the Courts, the *ratio decidendi* in this case being that above stated, that this house as a house would for practical purposes cease to exist after the portion required had been removed.

**Concrete-Steel in India.** A SATISFACTORY indication of progress is given by the adoption of reinforced concrete in connexion with the construction of culverts and bridges in India. The flooring of the culverts and bridges on the Manupatti-Chinnar-road was erected over road carriers consisting of two-rolled steel beams spaced 7 ft. apart, the concrete slab overhanging the supporting girder 2 ft. at each side. As the



upper surface of the cantilever ends, as well as the lower surface of the central portion, are exposed to tension, suitable reinforcement is provided near the top and bottom of the slab, in the form of  $\frac{1}{2}$ -in. diameter mild steel-bars crossed by  $\frac{1}{4}$ -in. diameter bars, each series spaced at 3-in. centres. A good feature was the spreading of a  $\frac{3}{4}$ -in. layer of 1 to 2 cement mortar over the centring, so as to form a smooth and strong surface for the bottom of the slab. The remainder of the concrete was mixed in the proportions of 1 part cement, 2 parts sand, and 5 parts broken stone. Some slabs used for replacing wood platforms on the Ootacamund Ghaut-road were moulded at a station some distance away, so that they could be placed in position with a minimum interruption of traffic. This method of procedure is clearly advisable for alterations to culverts on existing roads. Another instance of concrete-steel construction is afforded by the Pálar bridge with four spans of 66 ft., lately floored with reinforced concrete jack arches of 5 ft. 6 in. span. The works to which we refer were executed under the direction of Major W. M. Ellis, R.E., of the Public Works Department. It would be pleasant to hear of more enterprise in the same direction at home.

**BEFORE** the Rapid Transit Subway of New York was opened the general expectation was that the atmosphere would be cooler in summer and warmer in winter than the outside air. So far as concerns the summer temperature, the designers evidently omitted to take into account the heat developed by electric motors to be used for traction purposes. From recent thermometric observations it appears that the temperature is about 6 deg. F. higher in the subway than in the street above, and if the ventilation were less efficient than at present, the excess of temperature would be considerably greater. By calculating the quantity of heat generated in the manner indicated, and the quantity that must be carried away by air to keep down the temperature to the observed limits, it becomes clear that, from the sanitary standpoint, the ventilation of the subway is quite satisfactory. The problem is to reduce the summer temperature by changing the air still more frequently, and it is proposed to effect this by means of electrically-driven fans installed at points where the greatest inconvenience occurs. From the foregoing it will be seen that the New York trouble is quite different from that which still confronts the management of our own electric subways.

**CHICAGO FOUNDATIONS.** OWING to the unstable character of the site upon which Chicago is built, the foundations of buildings in that city are of special interest to all architects and builders. The subject has been discussed recently by Mr. E. C. Shankland in a paper communicated to the engineering societies of the University of Illinois. As the height of Chicago buildings increased, it became necessary to improve upon the old form of spread footings, and the steel grillage foundation

became general. But even then the amount of settlement was considerable, and ranged from 8 in. to as much as 30 in. Although allowance is made for settlement when new buildings are erected, the trouble is that there does not seem to be any finality in the way of subsidence, which is largely due to the action of wind in reducing the load on the windward and increasing it on the leeward side. Within recent times, and especially since the construction of the Illinois tunnel system, some 40 ft. below street level, a very general practice is to use concrete well-foundations, carried down to solid rock. Wells of this kind do not settle themselves, but give rise to settlement in adjacent buildings, owing to the impossibility of guarding against spaces at the back of the lagging used during well construction. One very singular trouble arises in connexion with party wall foundations. For instance, at the east of the Great Northern Theatre and Hotel Building there is a party wall, and, to prevent injury from settlement of the footings, the architect inserted girders, supported on 30-ton jacks, which were screwed up as the foundations settled. The structure is now ten years old, and the jacks have still to be watched and adjusted. This is a striking example of the difficulties that have to be encountered by Chicago architects.

**St. Michael's Ch., Burleigh-street, W.C., and the Union of Beneficent Arts, London.** By an Order in Council a scheme has just been ratified for uniting the benefices of St. Michael, Burleigh-street, and St. Paul, Covent Garden, with the consent of the vestries and patrons concerned, under the name of the benefice of St. Paul, Covent Garden. The font, communion table, sacramental plate, and fittings of St. Michael's Church will be transferred to the church of a new ecclesiastical district within the limits of the metropolis, and the net proceeds of the sale of the site and materials of St. Michael's will be applied towards the site and the building of the new church, with its parsonage-house, a repair-fund for the present parsonage-house of St. Michael, and the augmentation of the income of the united benefice. A maximum amount of 8,000l. is set aside for the new church, to be dedicated to St. Michael, and the purchase of its site. The present church of St. Michael, of which the interior was renovated forty years ago, was erected after plans and designs by James Savage; the organ, by Gray, was restored in 1871 by Richardson. The church stands upon part of the site of Cecil, afterwards Exeter, House, the town-mansion of Sir William Cecil, Lord High Treasurer, which, Stow says, had been erected on the site of St. Martin's parsonage-house, and its close by Sir Thomas Palmer, temp. Edward VI. Queen Elizabeth gave the property to Lord Burghley, who enlarged the house, and there, on July 19, 1561, entertained his Sovereign.

**THE BRIDGE OF AYR.** GENERAL satisfaction will be felt that the Town Council of Ayr have, to some extent, at least, re-considered their resolution to rebuild the historic bridge of which

they are the custodians. Their decision resulted from a Report by the Burns Engineer to the effect that the structure was unsafe for traffic. The natural tendency for an engineer under such circumstances is to recommend the construction of a new bridge, rather than to propose remedial measures. In the case of a structure like this, which is sacred to lovers of Burns throughout the world, it is amazing that the idea of demolition should have been entertained for a moment. As Lord Rosebery very aptly said in a letter to the Governor of Ayrshire, "What the Town Council require is not a competent engineer to condemn, but a competent engineer to preserve." It is difficult to believe that a masonry bridge can well pass beyond the stage at which repairs become impossible, and we are glad to know that the Town Council are prepared to give facilities to any engineer of eminence to examine the bridge, and to consider his report. It is not quite clear, however, whether they are ready to pay the necessary fees, or if they expect the "engineer of eminence" to undertake the work gratuitously. Unless a direct invitation be issued, we are not certain that much good will result from the vague announcement that appears to have been made. The matter is one that cannot be allowed to drop, and it is to be hoped that the Town Council will prove themselves worthy of the trust reposed in their hands.

#### A VISIT TO THE MUSEUM OF SANITARY APPLIANCES, HORNSEY.

At the request of some of our readers, we have visited the Museum of Sanitary Appliances, which was established by the Hornsey Local Board about thirteen years ago in a corrugated-iron building at North Hill, Highgate. Mr. T. de Courcy Meade, who was at the time the Board's engineer and surveyor, appears to have been the originator of the scheme, and much of the early success of the museum must be credited to his enthusiasm. The building has a total floor space of nearly 5,000 sq. ft., and contains more than a thousand exhibits. One of the rooms is used as a classroom for the teaching of hygiene, plumbing, and kindred subjects, some of the classes being under the charge of teachers appointed by the Middlesex County Council. The idea of holding classes of this kind in a Museum of Sanitary Appliances is excellent; not only is the work of the teacher simplified, but the students also benefit, as more accurate and more useful knowledge can be obtained from inspection of the actual appliances than from illustrations and descriptions in books.

So much by way of introduction. Let us now turn to the exhibits themselves, and try to ascertain the real value of the museum as an educational institution, not only for students under the guidance of a teacher, but also for the man in the street. For sixpence we obtain a catalogue of 166 pages, of which eighty-four pages are occupied by a list of the exhibits in numerical order and the remainder by indices, advertisements, etc. The preface bears the date, "March, 1893." This is somewhat disconcerting. To every purchaser of the catalogue, however, a supplement is presented, and we turn to this in the hope that it will contain a list of all the most recent exhibits, so that with the catalogue and supplement in our hands we can, without very much trouble, make a comprehensive survey of the contents of the museum. Again we are disappointed: the supplement is dated "July, 1894." It bears on the title-page in red letters, the legend, indicative of early enthusiasm, "First Supplement." As far as we know, it has had no successor. Did all the enthusiasm go with Mr. Meade to Manchester?



We turn to the exhibits with the thought that either they or the catalogues must be somewhat out of date. Stand No. 1 supports the former alternative; it contains, among other things, a wash-out closet of the kind in vogue fifteen or twenty years ago, and an early type of wash-down closet with separate trap and small water area, the pan bearing obvious signs of old age. The next stand confirms this first impression; we find a valve-closet with the check out of order, and another in which the valve does not always close tightly against its seat. We assume that these exhibits have not been changed since the museum was founded, and it would not be fair to mention the names of the firms who, thirteen years ago, presented them to the Hornsey Local Board. Stand No. 3 has recently been brought up to date by Messrs. G. Parnice & Sons. The "Wave" and "Quaker" water-closets mentioned in the catalogue have been replaced by the "Wavelet" and "Carbula," which are of the wash-down type. The latter is well-shaped, and has a sufficient water area; the flushing arrangement is, however, the principal novelty. This consists of a regulating valve, operated by a push-button instead of the usual cistern. It is said that the valve can be regulated to give any desired amount of flush. The invention is of American origin, and is decidedly ingenious; but its use in this country will be restricted by the regulations of water companies. Neither the original catalogue nor the supplement contains any mention of these appliances. Nor do they correctly state the exhibits of Messrs. G. Skay & Co. (Tamworth) at No. 5; the "Swan," "Torrent," and "Sluice" closets mentioned in the catalogue have been replaced (since the date of the supplement, we presume) by the "Scientific," "Tame," and "Klondyke." It is useless to give additional proofs that the catalogue and supplement stand in need of revision. It is equally obvious that many of the exhibits are out of date, and, while some of these undoubtedly merit a place in a museum used by students under the guidance of a teacher, others might with advantage be discarded in favour of more modern appliances.

No useful purpose would be served by a detailed review of all the exhibits. Manufacturers would not thank us for drawing attention to their discarded inventions, and a wrong impression as to the present state of sanitary science would be given to the general reader by an account of an exhibition in which some of the best modern methods and appliances are not represented. On the other hand, it must be clearly understood that we do not regard the exhibition as without value merely because it is not in every respect up to date. To the student it furnishes a most useful object-lesson—both historically and practically—up to a certain point. It has a wide scope. There are old Roman drain-pipes, more modern drain-pipes with roots, etc., and various examples of stoneware pipes with special joints. Drain-traps of many kinds are shown, from the old siphon to the more recent interceptor. There are gullies and waste-water channels, manhole channels and covers, flushing tanks, smoke machines, and other drainage appliances. Baths, lavatories, sinks, water-closets, and urinals are all represented, as well as soil-pipes and waste-pipes, good and bad, and of traps, etc. All the common varieties of water-taps are exhibited, one interesting series having portions cut away to show the working parts. Ventilation is represented by models of air-inlets and extract-cowls, and also by a fan in operation. There are specimens of damp-courses of various kinds, paving slabs of artificial stone, two or three e-w-grates, machines for testing cement and drain-pipes (by external and internal pressure), artificial cesspits, manholes, glazed and enameled bricks, paving quarries, and other materials and appliances more or less germane to the subject of sanitation. Among the most interesting exhibits, two may be mentioned. One of these is a section of a house showing floors and drain, bath and waste-pipe, soil-pipe, and rain-intercepting chamber, etc., all the pipes and fittings being in section longitudinally. The other consists of a series of brickwork resting in a trench of iron, the pipes being without a damp-course, and the others having damp courses of various kinds. We may add that water

is laid on to a number of taps and sanitary fittings so that these can be seen in operation.

This short account of the contents shows that the exhibition is far from useless, but that there is room for improvement there can be no doubt whatever. According to the introductory note in the catalogue, the museum was established by the Hornsey Local Board for the purpose of "bringing together a few specimens of the most improved fittings for the guidance of builders and others interested," and also as a centre for "courses of instruction in sanitary science." Manufacturers and merchants were asked to send specimens of their goods, and it was stipulated that these should become the property of the Board. In the preface to the catalogue it is said that "the Board are desirous of making the museum as valuable and instructive as possible, and will, therefore, be glad to receive any suggestions or criticisms the public may wish to offer." Since the date of this preface the Hornsey Local Board has been superseded by the Hornsey Urban District Council, and this in turn by the Hornsey Corporation, for the district is now a flourishing borough. We shall be right in assuming that the public spirit of the Corporation will not be less than that of the Local Board, and will, therefore, venture to offer some suggestions (in response to the latter's public invitation) with the view of "making the museum as valuable and instructive as possible," but without unnecessary expense.

There are three classes of persons to be considered—first, students; second, "builders and others interested"; and third, manufacturers and merchants who have given, or who may give, specimens of their goods. Students under the immediate guidance of a capable teacher may not be seriously misled by being conducted through a museum containing sanitary appliances of all qualities, good, bad, and indifferent; but this cannot be said of students who have not the advantage of being personally conducted by such a teacher or of builders and others, who imagine that the museum contains nothing but "specimens of the most improved fittings"; and manufacturers and merchants, who have given such a large proportion of the contents of the museum, may fairly claim the right of deciding whether the appliances given by them thirteen years ago shall still be exhibited under their names. They cannot retract their gifts, but they ought to have the opportunity of obliterating their names from appliances which they do not now recommend or of substituting more recent inventions. It is no credit to a manufacturer to be represented by obsolete or imperfect specimens of his goods, and, from the business point of view, such an exhibition may be positively detrimental. The difficulty is to reconcile the somewhat conflicting interests of the three classes of persons whom we have mentioned.

To the student it would be an advantage if the good and bad appliances were separated, instead of being exhibited indiscriminately as at present, and such an arrangement would be even more useful to the general public. To effect this purpose adequately, one of the rooms ought to be set apart for appliances which are now known to be seriously defective and for those which are merely of historical interest. There are many things which might be exhibited in this room without offence to anyone, such as certain kinds of drain-siphons, "square" junctions, bell-traps, D-traps, pan-closets, etc., and examples might also be given of badly-laid drains, untrapped waste-pipes, defective joints in soil-pipes, and other faulty methods of executing drainage and plumbing work. Objects of historical interest, such as the Roman drain-pipes already mentioned and the triangular slate drain exhibited, might also be included, as well as the specimens of choked drain-pipes, furred water-pipes, etc. If existing exhibits are transferred to this room manufacturers and merchants whose names appear on them ought to be permitted to obliterate their names. As there are, in many cases, two or more appliances in which the same defects occur, it would be possible to weed out a large number of exhibits, and thus afford space for fittings of more modern type. To obtain these a circular letter might be sent to repre-

sentative manufacturers and merchants, including all who have already contributed to the museum, and we do not doubt that many would respond favourably as soon as they saw that an earnest effort was being made to bring the exhibition up to date. Unless an effort of some sort is made the exhibition will inevitably become more and more misleading as year after year passes.

#### ST. MARK'S, VENICE.

The following is a list of those who have signed the memorial in reference to St. Mark's. The English wording of the memorial, which has been forwarded to the Minister of Public Instruction in Italy, appeared in our issue for June 24 last:—

Edwin A. Abbey, R.A., F.S.A.  
 Sir L. Alma-Tadema, O.M., R.A., F.S.A.  
 H. H. Armistead, R.A.  
 Sir Walter Armstrong (Director of the National Gallery of Ireland).  
 The Earl of Altamont, F.S.A.  
 Right Hon. Lord Avebury, D.C.L., F.R.S. (President of the Society of Antiquaries).  
 John H. F. Bacon, A.R.A.  
 Sir Benjamin Baker, K.C.B., K.C.M.G., LL.D., F.R.S.  
 Lord Balcarras, M.P., F.S.A.  
 Alfred Baldwin, D.L., M.P.  
 Sir Squire Bancroft.  
 H. E. Barclay.  
 Sir Wyke Bayliss, P.R.B.A., F.S.A.  
 Sir Reginald W. P. Beauchamp, Bart.  
 John Belcher, A.R.A., P.R.I.B.A.  
 Reginald Blomfield, A.R.A., F.S.A.  
 Wilfrid Scawen Blunt.  
 Frank Bramley, A.R.A.  
 Right Rev. the Lord Bishop of Bristol.  
 Thomas Brock, R.A.  
 Arnesby Brown, A.R.A.  
 Professor G. Baldwin Brown, M.A.  
 Right Hon. James Bryce, M.P., D.C.L., LL.D., F.R.S.  
 E. A. Wallis Budge, M.A., Litt.D., F.S.A.  
 Lady Burne-Jones.  
 Sir Philip Burne-Jones.  
 Sir Edward H. Busk, M.A., LL.B.  
 Hall Caine.  
 Sir T. D. Gibson Carmichael, Bart., M.A., D.L.  
 Sir Charles D. Cave, Bart.  
 A. Bessley Chamberlain (Assistant Keeper, City of Birmingham Museum and Art Gallery).  
 Basil Champneys, B.A.  
 Sir William Chance, Bart., J.P.  
 Professor A. H. Church, D.Sc., F.R.S., F.S.A. (Professor of Chemistry, Royal Academy).  
 J. W. Clark, M.A., F.S.A. (Registrar of the University of Cambridge).  
 Sir Ernest Clarke, F.S.A.  
 Somers Clarke, F.S.A.  
 W. Robert Colton, A.R.A.  
 A. S. Cope, A.R.A.  
 W. J. Courthope, C.P. M.A.  
 Right Hon. Leonard Courtney.  
 Walter Crane, R.W.S. (Com., Royal Crown of Italy).  
 Eyre Crowe, A.R.A.  
 Andrew S. Currie.  
 Lionel Cust, M.A., M.V.O., F.S.A. (Director of National Portrait Gallery).  
 The Earl of Darlington.  
 Cyril Davenport, F.S.A.  
 Mabel Davis.  
 Professor W. Boyd Dawkins, D.Sc., F.R.S., F.S.A.  
 H.H. Prince Frederick Duple Singh, M.V.O., F.S.A.  
 Alfred East, A.R.A.  
 Right Hon. Earl Eberton of Tatton.  
 Sir John Evans, K.C.B., D.C.L., LL.D., F.R.S., F.S.A.  
 Joseph Farquharson, A.R.A.  
 His Grace the Duke of Fife, K.T., K.C.V.O.  
 Luke Fildes, R.A.  
 Hon. Dudley F. Fortescue.  
 George Frampton, R.A., F.S.A.  
 Right Hon. Sir Edward Fry, D.C.L., LL.D., F.R.S., F.S.A.  
 Right Hon. Lewis Fry, J.P., D.L.  
 J. Starkie Gardner, F.S.A.  
 Ernest George, F.R.I.B.A.  
 Rainald Wm. Knightley Goddard.  
 Edmund Gosse, LL.D.  
 Professor W. Gowland (Vice-President of the Society of Antiquaries).  
 Rev. Canon Greenwell, D.C.L., F.R.S., F.S.A.  
 Hubert J. Greenwood, F.S.A., L.C.C.  
 Edward J. Gregory, R.A.  
 Sir James Guthrie, P.R.B.A.  
 Arthur Hacker, A.R.A.  
 Professor John W. Hales, M.A., F.S.A.  
 The Earl of Harrowby.  
 C. Napier Hemy, A.R.A., R.W.S.  
 Professor Hubert von Herkomer, C.V.O., R.A.  
 J. P. Heseltine.  
 Thomas Hodgkin, D.C.L., Litt.D., F.S.A. (author of "Italy and her Invaders").  
 Right Hon. Jonathan Hogg, D.L.  
 Catherine Horne.  
 Constance Lucy Marie Horne.  
 Henry Percy Horne.  
 Kate Horne.  
 Mary Larkin Horne.  
 W. Holman Hunt, O.M.  
 Violet H. Hunter.  
 T. G. Jackson, R.A., M.A., F.S.A.  
 Fanny Jarvis.  
 W. Goscombe John, A.R.A.  
 Right Hon. William Kenrick (Chairman of the Birmingham Municipal School of Art and Museum).  
 Sir James Kitson, Bart., M.P.  
 Guy Francis Laking, M.V.O., F.S.A.  
 Lady Lawson.  
 B. W. Leader, R.A.  
 Professor W. R. Lethaby, F.S.A.  
 William Lugsdail.  
 G. B. Longstaff, M.A., M.D.



R. S. Lorimer, A.R.S.A.  
J. Seymour Lucas, R.A., F.S.A.  
Vernon Lushington, K.C.  
The Earl of Lytton  
Hon. Neville S. Lytton  
Robert W. Macbeth, R.A.  
J. W. Mackail, M.A., LL.D.  
George A. Macmillan, J.P.  
J. MacWhirter, R.A.  
Sir Theodore Martin, K.C.B., K.C.V.O., LL.D.  
A. Warton Matcham.  
Sir Herbert Maxwell, Bart., M.P.  
President of the Society of Antiquaries of Scotland.  
J. T. Micklethwaite, F.S.A.  
Viscount Midleton (President of the Surrey Archaeological Society).  
Edward Moon, M.P.  
Lady Ottoline Morrell.  
Sir Lewis Morris, M.A., J.P.  
A. H. Hallam Murray, F.S.A.  
John Murray, J.P., D.L.  
John L. Myres, M.A., F.S.A. (Lecturer in Classical Archaeology in the University of Oxford).  
Francis M. Nichols, M.A., F.S.A.  
His Grace the Duke of Norfolk, Earl Marshal, K.G.  
Philip Norman (Treasurer of the Society of Antiquaries).  
Alfred Parsons, A.R.A., R.W.S.  
Sir Henry Peto, Bart., D.L.  
John S. Phene, LL.D., F.S.A., F.R.I.B.A., M.R.I.  
Colonel G. T. Plunkett, C.B. (Director of the Science and Art Museum, Dublin).  
The Hon. Gerald Ponsonby.  
Sir Francis Powell (President Royal Scottish Society of Painters in Water-Colours).  
Sir W. H. Preece, K.C.B., F.R.S.  
G. Hilton Price, F.S.A., F.G.S. (Director of the Society of Antiquaries).  
G. W. Prothero, Litt D., LL.D. (Editor of "The Quarterly Review").  
Rev. Canon Rawnsley (Hon. Secretary of the National Trust).  
Charles Hercules Read (Keeper of Mediaeval Antiquities in the British Museum, and Secretary of the Society of Antiquaries of London).  
Professor Luigi Ricci (Founder of the Dante Society).  
John Richmond.  
Charles Ricketts.  
Briton Riviere, R.A., D.C.I.  
Sir J. C. Robinson, F.S.A.  
Edward Robert Robson, F.S.A., F.R.I.B.A. (late Government Architect).  
His Grace the Duke of Rutland, K.G., G.C.B.  
The Lady Margaret Sackville.  
John S. Sargent, R.A.  
Sir A. S. Scott-Gatty, F.S.A. (Garter Principal King of Arms of England).  
Arthur Severn, R.L., J.P.  
C. H. Shannon.  
G. Bernard Shaw.  
R. Norman Shaw, R.A.  
Cecil H. Smith, LL.D.  
Solomon J. Solomon, A.R.A.  
The Right Rev. the Lord Bishop of Southwark.  
Sir Isidore Spielmann, F.S.A.  
R. Phene Spiers, F.S.A., F.R.I.B.A.  
William Barclay Squire, M.A., F.S.A., F.R.G.S.

H. Heathcote Statham, F.R.I.B.A. (Editor of the Builder).  
The Lord Stavordale.  
John J. Stevenson, F.S.A., F.R.I.B.A.  
Sir John Stirling-Maxwell, Bart., M.P., F.S.A.  
Marcus Stone, R.A.  
G. A. Storey, A.R.A.  
His Grace the Duke of Sutherland, K.G.  
The Lord Ronald Sutherland Gower, F.S.A.  
A. G. Temple, F.S.A. (Director of the Guildhall Art Gallery, London).  
Sir Charles Tennant, Bart., J.P., D.L.  
The Right Hon. The Lord Tennyson, G.C.M.G.  
Henry S. Tate, A.R.A.  
Thackeray Turner, F.S.A.  
G. Harry Watts, F.S.A. (Art Director and Curator of Museum and Galleries of Art, Nottingham).  
Whitworth Wallis, F.S.A. (Director of the City of Birmingham Museum and Art Gallery).  
Sir Thomas Wardle, F.G.S., F.C.S., J.P.  
K. P. Warren, F.S.A.  
Sir Ernest A. Waterlow, P.R.W.S., R.A.  
R. H. Weyland.  
Sir Aston Webb, R.A., F.S.A., F.R.I.B.A.  
R. H. Wood, F.S.A., F.R.G.S.  
Hon. Percy Wyndham, J.P., D.L.  
Robert Yerburgh, M.P.

### OLD BEAUPRÉ, GLAMORGAN.

BEAUPRÉ MANOR HOUSE, which was originally the seat of the Cecil family, is pleasantly situated, and overlooks a charming valley, on the outskirts of the village of Cowbridge, about twelve miles from Cardiff. The buildings, the greater portion of which are in ruins, were erected about the year 1586, but the Renaissance porch, which is described in "Gwilt's Encyclopedia," was added in the year 1600, as inscribed on three panels containing the following—

Say: coward thou over fynd or ever heare or see, wofully wretche or coward prove a faythfull frynde to be, Ry. Charde Bassett having to wyte Katherine, daughter to Sir Thomas Johns Knight bywyt this porch, with the tonnes in Ano. 1600. His yeres 65, his wife 55.

The buildings are now owned by the Bassetts, and one or two rooms are in the occupation of a farmer; but very little remains of the stately structure, except the beautiful entrance-porch, the entrance-doorway, and the ivy-clad walls. W. EATON.

KETTERING CHURCH SCHOOLS.—The Boys' National School has just been reopened, after renovation and enlargement. The building has been transformed into a block, with central hall and class-rooms. The contract was carried out by Messrs. C. & F. Henson, and the architect was Mr. J. T. B. Blackwell.

### THE PROFESSIONAL AND THE AMATEUR.

FROM A CORRESPONDENT.

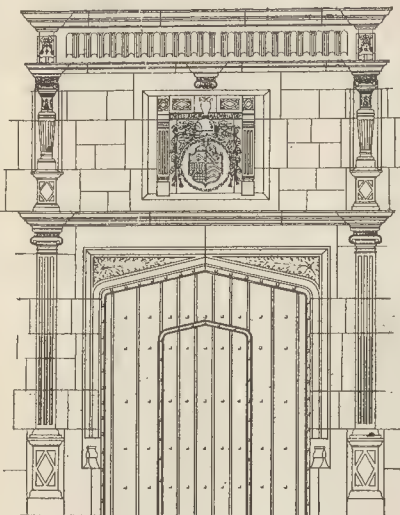
It is common knowledge that of those who are in a position to build for their own needs or amusement, or who are entrusted by clients with the disposal of funds for like purposes, the majority are profoundly ignorant of the science and of the art the exercise of which they are forced to criticise. In a word, they are not amateurs. We often find they were; but, alas, it is from the lips of amateurs that our greatest condemnation is to be heard. Unlike the professional in every other branch of life's work, we in no sense enjoy the confidence of the amateurs. In short, our relationship with the public, who must needs employ us, is distressingly paradoxical. We bewail the ignorance so noticeable in the majority of our clients, whilst the enlightened few we discover ourselves to be very generally repelled! When, moreover, the ignorant are called upon to take sides, which side do they take?

Let us, then, clear the ground for a discussion of the propositions implied by these sad facts by observing that there is but one sort of amateur whose existence is at all relevant to the points at issue. The presence of incompetent persons in the world, indeed (so long as there be at any rate some who are the reverse), proves no more than the reality of human frailty.

We may, then, altogether dismiss from our minds all such persons as attend University Extension Lectures for the sole purpose of learning the conventional nomenclature of Gothic enrichments; all who, by learning something of the archaeology of Canterbury Cathedral, really suppose that they are thereby fitted to criticise the complex plans and sections of some important municipal or national structure of to-day. Let us rather consider the position of men—and there are not a few—who for enthusiasm and for pleasure's sake alone, plan and sometimes actually build, their own houses; men who do so, moreover, without founding upon sand, without forgetting the staircase, or desecrating the country-side by the creation of a long-lived ugliness.

Suppose these men to have had the elements of what we call a professional training—not

### DETAILS OF OLD BEAUPRÉ Glamorganshire



Elevation of Front Entrance



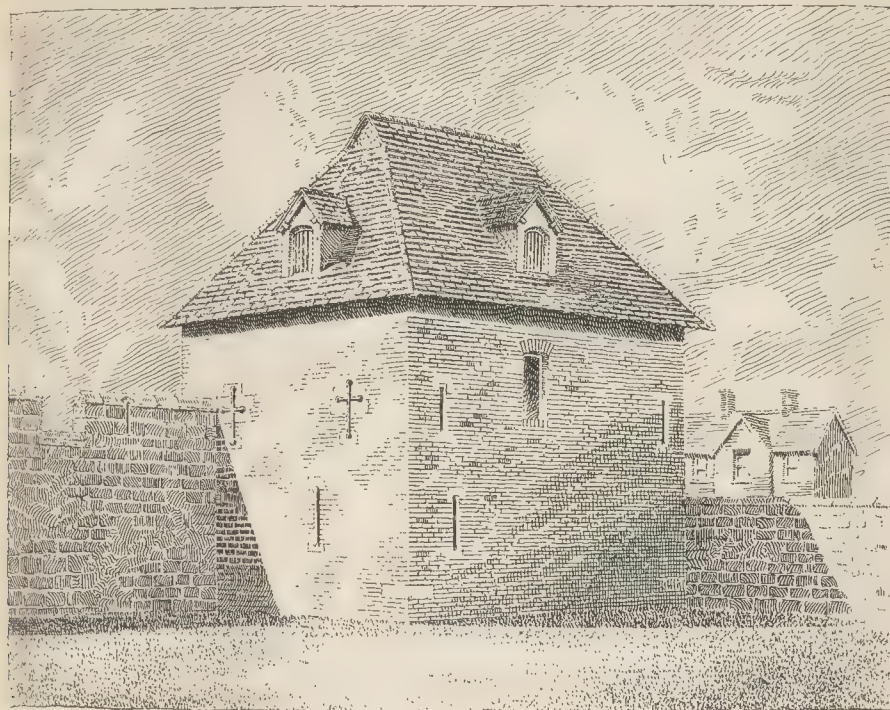
Panels to Porch



Elevation of Fireplace

Scale  
Inches 1 2 3 4 5 6 7 8 9 10





The Red Tower, York. From a Sketch by Mr. W. Eaton, A.R.I.B.A.

they are one of ourselves, and our talk is at an end. But they have not. On the contrary, they ridicule the results of our years of office work; they pooh-pooh the imitative accomplishments of our school of art studies; they rail at the examinations of our learned bodies; and they call upon us to explain away the career of that eminent astronomer and Oxford don, Sir Christopher Wren.

It need not be supposed that by adopting this attitude they are pretending to hold a brief for the work of an ignorant genius as against that of an accomplished man of moderate ability. The point at issue is, how rationally to account for the success as a designer of buildings of a man whose training has not only been different from, but is in many ways opposed to, that which is more or less laid down by the profession as proper for the architect of to-day.

In view of the fact that the public may shortly be called upon to decide what it really means by the term "architect," the following consideration regarding the views of a certain section of the public having the welfare of English architecture at heart may not altogether be out of place.

The successful amateur of to-day, as of yesterday, may be seen to acquire his skill in two ways: either, like Sir Christopher Wren, he is gifted with the eye of an artist, whose eye which travel and observation have refined, whilst he possesses a really sound knowledge of plain and solid geometry—in which case his enthusiasm is almost certain to be for the classic styles; or he possesses, in addition to the essentially artistic vision, a thorough mastery of some inevitable building material such as wood or stone.

The writer knows more than one or two instances of gentlemen thus qualified whose practical knowledge has enabled them to see the work of past ages the significance of every moulding. They have thus been able to do what it is indeed hard to do, to criticise—merely to admire—the works of their predecessors. The result, the inevitable result, upon their own labours has been a certain lack of what the moderns call "freedom"; and admiration for tradition is rendered perhaps too strong, and a contentment with old

forms becomes too deep-seated to admit of other than small and very personal manifestations of originality. But it may be maintained that after all such is the spirit which has always animated the real stylists of the world. Indeed, it is boldly asserted that originality in style must be, in a measure, unconscious if it is to be ultimately far-reaching.

So much, then, for the decorative ideals of many who are by nature and practice amateurs in a very real sense. In the midst of the somewhat motley array of architectural fashions with which we are to-day surrounded, these men are content to dedicate their labours to a just and living interpretation of some well-tried style from which it is their intention never to depart, believing that by such action alone, on the part of individuals, can we hope to set in motion again that healthy and gradual progress of evolution within the bounds of a consistent aesthetic system, which, after all, is the most any stylist can look for.

In this attitude of mind they perceive no bar to an understanding of the constructional and other building problems of the day.

They assert that to a man possessed of sound practical knowledge in a broad sense no latter-day constructional ingenuity will prove unintelligible. They deny that an architect of to-day need make himself familiar with all that the specialist who should work under him must needs know. They go further. They say that he cannot hope to do so without losing in exchange some of that vital artistic and comprehensive discretion which alone entitles him to supervise the whole scheme of the building.

The fault of our latter-day system may indeed be that too little is left to those who serve under the architect; that the latter strives when young to learn too much of what he could at any moment easily find out; that the first-rate architects of to-day are so in spite of a system of education only suitable for the production of draughtsmen, clerks, and, in some instances, theoretical builders.

The efforts made by academic bodies to induce such persons to undergo a course of semi-archaeological study, the results of which take the form of laborious measured draw-

ings, are held by many to be ineffective, since no amount of scholastic study can enable a man to design with that knowledge of material and style which practical work and a free-hand record of observation so easily and naturally gives him. It is maintained that the tendency of to-day is to become possessed of a heterogeneous mass of notions drawn from a rapid and superficial survey of the architecture of all ages—such, however, as to breed so great a confidence that there are not many modern architects who would hesitate to design in detail every part of their buildings. Upon the artistic vitality of the ancient and beautiful craft of the mason and of the carpenter this system has had a stultifying effect, without any gain to the consistency or wisdom of the master mind.

There are many within, as well as without, the profession to whom these views do in a large measure appeal, and they would vigorously oppose any scheme of Registration which should propose to restrict professional practice to those who have satisfied examiners in academic subjects, or which should declare a clerical apprenticeship of three years to be an essential part of an architectural training.

On the other hand, it would seem to them in every sense valuable that the title of architect should be restricted to those who have obtained the Fellowship of the Institute, or of some other recognised body, upon the submission of satisfactory original designs.

N. F. B.

#### THE RED TOWER, YORK.

The little red tower, Foss Island's-road, is a very good example of the few specimens of mediæval brickwork to be found in York.

Its brick walls and red-tiled roof present a pleasing contrast against the white stone walls of the city.

Its bricks, which are XVth century work, are 10 in. and 10½ in. long, 5 in. wide, and from 1½ in. to 2 in. in thickness.

W. EATON.

PREMISES, REGENT-STREET, S.W.—New premises are being erected on the site of St. Philip's Church, Regent-street (south), by Mr. J. W. Lorden, contractor, after plans and designs by Mr. Williams.



## ARCHITECTURAL SOCIETIES.

THE MANCHESTER SOCIETY OF ARCHITECTS. —Some members of this Society paid a three days' visit from August 4 to August 7, to study the stone buildings of the Cotswold district. Chipping Campden was chosen for the headquarters, and provided ample material for study. Unfortunately heavy rain restricted the choice of subjects for sketching to those where some shelter could be obtained; this made the sedilia in the church particularly valuable, while the Market Hall afforded a refuge from the rain. The workshops of the Guild of Handicraft were examined with great interest. Sunday, the one fine day, was spent in walking to Broadway. The Society has also made visits to Messrs. De Bugeue & Co.'s ironworks, and to the new Manchester Fire Station, Messrs. Woodhouse, Willoughby, & Langham, architects.

## Books.

*William Hogarth.* By G. BALDWIN BROWN, M.A. London: The Walter Scott Publishing Company. 1905.

THIS is one of the books of the "Makers of British Art" series. There could hardly be a better specimen of a short artistic biography; charming in literary style, and containing much sound and sensible artistic criticism. Professor Brown is not, like too many biographers, carried away by the desire to make out his subject an epitome in himself of all the excellencies of art; he can see Hogarth's shortcomings; but he also sees, what many people still cannot see, that Hogarth was an artist in his special quality of artistic execution, and not merely a satirist using pictorial representation as a vehicle of expression. The book is illustrated by twenty-one small plates from Hogarth's works, which enable the reader better to follow the author's comments on some of these.

No doubt, as Professor Brown admits, those engravings by Hogarth which can only be understood by a series of notes and explanations at the foot can hardly be reckoned as works of art; they are rather to be regarded as satirical documents. But in the several series to which he more especially owes his fame—the "Harlot's Progress," the "Rake's Progress," and more than all in what to our thinking is his masterpiece, the "Marriage à la Mode," he appeals not to any special satirical perception in regard to special events or characters, which for another generation have to be translated and annotated, but to feelings and perceptions which are common to all humanity. If the "Marriage à la Mode" had been painted in this generation, the dresses, the surroundings, and some of the incidents would be different, but what is at the root of the whole set of pictures would be there still, just as in Shakespeare we find our own feelings and passions expressed in the language and through the personages of Shakespeare's day or of his field of poetic creation. In the "Marriage à la Mode," indeed, Hogarth shows a genius rather analogous to that of Shakespeare. This series alone is sufficient to raise Hogarth far above the category of a mere moralist in painting. There is nothing more pathetic in art than the face of the dying mother in the last scene of the "Marriage."

The biography brings before us many characteristic traits of the "little man in the sky-blue coat" who was such a well-known figure in the London of his day: of his kindness of heart, his strong hatreds (especially of foreigners), his unabashed vanity, so naive and child-like in its expression, that it is rather amusing than offensive.

One example of Hogarth's power of intensifying a position by the significance of a single detail we should like to recall, because we do not find any reference to the picture in the biography. It is one that was exhibited a good many years ago at one of the loan exhibitions at Burlington House, under we forget what title, in which a young married lady has lost, in gambling with a young officer, all the money that her husband had sent that morning for some special purpose (the husband's letter lies on

the floor), and apparently all her jewellery, and is offered them all back by the winner as the price of their intensity to the picture is one real effect and intensity to the picture is one little detail—the single word *Nunc*, inscribed in capitals on the top of the timepiece in the room. That one pointed word, emphasising the all-importance of this moment's decision, is a wonderful stroke; it raises the picture from a mere scene of immoral bargain to a great moral lesson.

*Italian Architecture.* By J. WOOD BROWN, M.A. (A. Siegle.)

THIS little volume, eighty-five pages in length, forms a valuable addition to the Langham series of art monographs. It gives a clear, though somewhat brief, account of the principles and progress of architecture in Italy from Roman to modern times, and illustrates the account with numerous colour plates and photographs. The leading features of six distinct developments are touched upon, and the steps traced by which the four fundamental elements of architecture—the column, arch, vault, and dome—freed themselves from the cast construction of the Roman, and by successive combinations assumed new functions, and thereby formed new styles. The book is too short to give more than the barest outline of the subject, but each chapter is headed by a useful list of authorities on the particular period.

*Painters' Oils, Colours, and Varnishes.* Edited by PAUL N. HASLUCK. London: Cassell & Co. 1905.

THIS book is, according to its Preface, a digest of information contributed at various times by chemists and colour manufacturers, to the columns of a technical journal, which the Editor has arranged in convenient form for reference. But it has, perhaps inevitably, the shortcomings of its origin. Its scientific information could hardly suffice for any but an elementary student of chemistry; its description of manufacturing processes would not be of much assistance to the manufacturer, while its information to the architect or the builder is slight. It is, therefore, difficult to understand to what particular class of readers it is especially addressed. Having said this much, however, it must be allowed that the compiler has succeeded in weaving together the materials at his disposal clearly and interestingly, a merit not always found in popular digests.

The contents of the book are grouped under the headings of (1) Oils, (2) Pigments, (3) Driers, and (4) Gums, Resins, and Varnishes. In reference to oils it is explained that their value depends on their colour, the palest being the most expensive, and that the name, as ordinarily employed, includes two entirely different classes—(a) The volatile or essential oils, which include turpentine and distil unchanged on heating; and (b) the fixed or fatty oils, which contain carbon, hydrogen, and oxygen, and decompose on being heated to a high temperature. The chemical change which oils undergo in the process of drying is clearly explained, and a simple method of testing their properties in this respect is given, viz., by spreading a film on a piece of glass and heating in an oven to 212 degrees, when the resultant should cease to be "tacky."

The importance of age in connexion with linseed oil (and hence with white lead) is explained. The origin and mode of preparation of colours and pigments is fully described, and simple tests are given for the discovery of adulterants in white lead, a very important matter. The advantage of red lead over white as a covering coat for ironwork is accounted for by its greater elasticity. Information is not, however, given as to why zinc white, which is employed so universally on the Continent, and which is so valuable for the durability of its colour, is so little employed in this country.

The term "driers" or "drying oils" is, as is pointed out, somewhat of a misnomer, the process of hardening being one of absorption of the oxygen of the air, rather than of evaporation. Turpentine, it may be remembered, is not a drier but a diluent. Of all the chapters perhaps that on varnish is the most disappointing, as the difficulties met with in ordinary use are hardly touched upon. Everyone who is concerned with the employment of this material has probably met with disappointing results, even when the best quality has been specified,

and some simple tests and guide for use would have been of considerable assistance, and would have enabled the blame for any failure to be correctly apportioned between the manufacturer and the workman. However, when all is said, there is a great amount of useful information to be found in the some one hundred and sixty pages of the book.

*The Popular Handbook on House-Painting, Decorating, Varnishing, Graining, etc.* By HERBERT ARNOLD. Manchester: John H. Wood. 1905.

THIS is a useful little shilling book on the processes of painting, considered mainly in a practical sense, though there are occasional suggestions as to what produce the best effect, which, as far as we have observed, are sensible. The process of stencilling is also described; best methods of cleaning paint. As to graining, which is described and recommended for such things as the internal woodwork of the inferior portions of a house, it is needless to say that we disapprove of it altogether, and think the chapter on it had been better omitted. And the author had better also have let alone the subject of "how to harmonise colours," on which his ideas are very rudimentary. But the main object of the little book is purely practical, and in that sense it is well done and useful.

*Lynton, Lynmouth, and the Lorna Doone Country.* By JOSEPH E. MORRIS, B.A. London: The Homeland Association. 1904-5.

LYNTON and Lynmouth, connected as they now are by rail with Barnstaple, will no doubt become yearly better known, together with the romantic scenery which forms the setting of Blackmore's well-known novel. Architecturally, however, the district is poor, and where nothing of interest, except the church at Oare, and the two churches at Culbone and Porlock, both of which lie quite on the borders of the district treated. But this beautiful district may possibly be taken in many cases conjointly with a visit to the architecturally richer neighbourhood of Minehead. In any case, this little handbook will be useful, and its letterpress and illustrations are fully up to the standard of excellence reached by other handbooks of this series. There is also a very good map to a scale of 1 in. to the mile, reproduced from the Ordnance survey.

*Tools for Engineers and Woodworkers: Including Modern Instruments of Measurement.* By JOSEPH HANSEN, A.M.I.Mech.E. London: Crosby Lockwood & Son. 1905.

THOSE who are familiar with the previously published works of the author will not expect to find in this volume a severely scientific treatise for the guidance of the tool-maker including metallurgical data and mathematical solutions for such problems as are presented by certain aspects of tool design. Mr. Hansen confines his attention largely to plain, straightforward description of hand tools, and to such cutting and other instruments as are held in appliances of the kind known as "machine tools." He deals also with measuring instruments, which, it may be said, are not strictly tools but are really such if a broad definition be accepted, and ought not to be otherwise regarded in view of the direct relation they bear to modern systems of manufacture. Throughout this book the man at the bench is never far from the author's thoughts, the general principles underlying the types of tools described are sufficiently explained, and simple instructions for their employment are plentifully given. The classification adopted is excellent, and, although a certain amount of overlapping is unavoidable, a series of five main groups suffices for the inclusion of practically all the tools required by the engineer and woodworker—excepting, of course, those appliances which do not come within the scope of the manual. In Section I, five chapters are appertained to "The Chisel Group," including chisels and allied forms for wood and metal working planes, and shearing tools. "Scraping Tools," although admitted by the author to form a large group and to be of much importance, are accorded less than three pages, which constitute Section II. Section III, describes "Tools Related to both Chisels and Planes," and Section IV, various forms of saws, moulding, and miscellaneous tools; while some practical hints on hardening, tempering, and



grinding tools are given in Section V. The last section is the longest in the book, and, under the title of "Tools for Measurement and Test," contains much useful information relative to those appliances which are now indispensable adjuncts to the modern workshop, where the interchangeable system of manufacture is practised.

*Mechanical Appliances, Mechanical Movements, and Nostrities of Construction: An Encyclopedia of Mechanical Movements and Mechanical Appliances.* By GARDNER D. HISCOX, M.E. London: Archibald Constable & Co., Ltd. 1905.

Mr. Hiscox's work on "Mechanical Movements" is already well-known, and the book now published may be regarded as a second volume of that useful compendium. Comprising nearly one thousand illustrated paragraphs relating to mechanical appliances of almost every conceivable variety, this compilation brings home to the reflective mind the wonderful fertility of the human brain. The author wastes no words in description, makes no comments, and uses no diagrams, but such as help to make the printed descriptions still more clear. We must add, however, that a most useful series of formulae is given in the section for calculating the power of spiral springs. To give an idea of the universality of the work, we may mention the following as a rough summary of its principal contents:—The transmission and measurement of power; steam, gas, hydraulic, air, and electric-power devices; transport appliances; gear motion and controlling devices; mining, factory, engineering, and structural devices; miscellaneous devices; "drumming" devices; and perpetual motion. There is nothing stereotyped about the method of the author, and he seems to have included a good many of, if not all, the newest devices introduced. Exception may be taken to the inclusion of the section devoted to perpetual motion, and to the comparatively slight notice taken of internal combustion motors, and particularly to the omission of all reference to suction producer-gas generators and engines. Other omissions will no doubt be regretted by some who procure this book, and some readers will probably think the descriptions of oil-cooking stoves, potato-washing machines, and artificial limbs might have been omitted without disadvantage. Reason for criticism of the kind is unavoidable, however, in a book of this character, and, in spite of any little points of the kind, we feel sure that all architects, builders, and contractors will find this an invaluable book of reference.

*Elements of Mechanics: Forty Lessons for Beginners in Engineering.* By MARSHFIELD MERRIMAN, Professor of Civil Engineering in Lehigh University. First Edition. First Thousand. New York: John Wiley & Sons, London: Chapman & Hall, Ltd. 1905.

We are glad to find in the elementary volume written by Professor Merriman evidence that the movement inaugurated in this country for the teaching of mathematics in a simple manner extended to the United States. The author does not profess that his treatise will do more than enable the student to master the fundamental principles and methods of mechanics, but we feel sure that if its contents are thoroughly mastered they will constitute a solid foundation upon which further knowledge of the subject may be safely built. In the course of study here presented, the mathematics are not employed, and anyone who possesses a sufficient knowledge of geometry, algebra and trigonometry will find it possible to follow the treatment without difficulty.

*The Plenum or Propulsion System of Heating and Ventilation.* By HAROLD GRIFFITHS, A.R.I.B.A., F.S.I., etc. London: Simpkin, Marshall, Hamilton, Kent, & Co., 1905.

Very little information on this important subject can conveniently be obtained by architects, except from ventilating engineers more or less interested in the advocacy of certain types of apparatus, and Mr. Griffiths has done good service in writing the interesting book which lies before us. As he modestly states in the preface, he has "attempted" to bridge the gap between expert knowledge and no knowledge at all, and we have no hesitation in saying that he has succeeded admirably in his aim. The architect who reads the book

will not be enabled to design a scheme for mechanically heating and ventilating a building, but, if he assimilates the information contained in it, he will certainly be able to criticise any scheme which is put before him and to satisfy himself whether it is likely to prove effective or not. The book contains only three illustrations, and none of these shows a complete system of ventilation applied to a building; such an illustration indeed would be foreign to the author's purpose. The model specification, drawn up in the interest of architects, cannot fail to be of service, and the chapter on testing a system of plenum ventilation is also valuable. We need scarcely say that Mr. Griffiths is an ardent advocate of mechanical ventilation, but his advocacy does not prevent him from pointing out many defects in existing installations and also the greater cost of mechanical heating and ventilation, both initially and in maintenance, than of "natural" ventilation combined with other methods of heating. More might have been said about the size and kind of buildings for which an architect would be justified in recommending one system in preference to another. The division of the book, which runs only to 107 pages (including twelve pages of preliminary matter), into fourteen short chapters facilitates reference, but an index would have been still more useful.

*Small Destructors for Institutional and Trade Waste.* By W. FRANCIS GOODRICH, London: Archibald Constable & Co. 1904.

In this book the author has handled a somewhat delicate subject in a manner to which little, if any, exception can be taken. The subject is delicate, for the simple reason that the author is commercially interested in one particular type of the general class of apparatus to the discussion of which his work is devoted. Under such circumstances he must have felt it an invidious task to undertake a description and an enumeration of the relative merits of destructors made by his own and by rival firms. Careful perusal of the book shows very little evidence of personal bias, a result on which the author may be congratulated. The first two chapters are largely of persuasive character, being evidently intended to convince hospital and other authorities of the undoubted necessity for adopting scientific methods for the disposal of waste matter. Our own readers are probably at one with the author on this point, and consequently will find more serviceable material for study in the three succeeding chapters, wherein different types of institutional refuse destructors are described and illustrated. The four types of furnace described are Meldrum's, Warner's, Horsfall's, and Sargeant's, and, while all of these are illustrated, the number of blocks allotted to the first mentioned is noticeably predominant, and the casual reader will possibly conceive a more favourable opinion of this destructor than of the others, a conclusion that may be correct or not. Our advice to readers, as in all cases where specialities are involved, is that before making a final decision they should obtain full particulars from the respective makers, and inspect examples of the apparatus in actual use. In the last chapter, the author considers in an able manner the disposal of trade refuse, and makes out a clear case for the adoption of modern methods for this purpose. The book is well written, and as a convenient summary of the subject it deserves a place on the book-shelf of every architect who is interested in the design and equipment of public institutions.

*Gas Producers for Power Purposes.* By W. A. TOOKEY, London: Percival Marshall & Co. 1905. Price 1s. net.

This little book briefly describes in simple language the principal features of the plants commonly used for producing low-grade gas for power purposes. It is specially addressed to purchasers of power-producing machinery and to those who erect or have charge of such machinery.

The greater part of the book is devoted to a description of "Suction" plants. Producer gas is made by passing air (and usually also steam) through a bed of anthracite, coke, or other form of carbon heated to a very high temperature; and until recently it has been customary to force the current of air through the incandescent carbon by means of a "blower" or other device. In a suction plant, however, instead of forcing air into the producer, the air and steam are drawn or "sucked" into it by the gas engine itself upon its inspiration stroke. A suction plant is designed to generate gas

only at such rate as is demanded by the load upon the engine. We imagine, however, that the gas produced in any given plant under varying loads is far from uniform in composition throughout the day, and before recommending the general introduction of suction plants into small town workshops we require to have before us evidence to prove that they will not create a nuisance, and that the discharge of the foul waste waters into the public drains or sewers is permissible.

With a suction plant neither blower nor gas-holder is required; and the plant has, therefore, the advantages over ordinary producer plants of greater compactness and lower initial cost. In addition to describing both "pressure" and "suction" gas producers, the author briefly refers to the manufacture and properties of coal gas, carburetted water gas, and oil gas, but his knowledge of these latter subjects appears to be superficial. His statement that the cost of carburetted water gas production is less than that of coal gas requires modification, and he is in error when he states that the oil used for oil gas manufacture does not contain any sulphur.

*The Sanitary Inspector's Handbook.* By ALBERT TAYLOR, Sanitary Inspector, City of Westminster. Fourth edition. London: H. K. Lewis. 1905.

CONCISE, practical, and up to date, this book should commend itself to a wider public than that for which the introduction states it to be specially designed—namely, the sanitary inspectors of England and Scotland, or those engaged in preparing themselves for that profession. It is true that the pages devoted to the duties of an inspector of nuisances are specialist in character; but a considerable proportion of the contents consist of valuable information upon practical points of general utility to the householder and citizen. The useful "Alphabetical Synopsis of the Provisions of the Public Health and Other Acts," applicable to the Metropolis, England and Wales, and, in this edition, for the first time, to Scotland also, would alone entitle the little volume to a place on the writing-tables of professional men or others interested in or responsible for the public health. The sections quoted are arranged in parallel columns, which permit of ready reference and rapid comparison.

While the omissions from this last issue of what is now regarded as a standard book are unimportant, the additions justify the slight increase in bulk—notably that of the London County Council By-laws relating to the construction of drains, water-closets, and soil pipes. It is satisfactory to note the stress laid upon the water test for drains as being that upon which reliance must be placed; and the methods prescribed for the employment of disinfectants in general use are quite abreast of the times, though more space might with advantage have been devoted to consideration of the relative merits, in this connexion, of saturated and superheated, current and confined, steam. A somewhat more detailed treatment of the subject of mechanical ventilation would also prove helpful to those who may be required to recognise and surmount some of the working difficulties which frequently discredit the system. It would be advisable also in a future edition to condemn as inadmissible the employment of a cork, as an alternative to a glass stopper in the collection of water samples. Probably the perpetuation of this error is an oversight, for the book as a whole is as accurate as it is comprehensive, and entirely worthy of the position which the call for a fourth edition shows it to have attained.

*Modern Lightning Conductors.* By KILLINGWORTH HEDGES, M.Inst.C.E., etc. Crosby Lockwood & Son. London. 1905.

This book is an illustrated supplement to the Report of the Lightning Research Committee recently published in the *Journal of the Royal Institute of British Architects*. The illustrations are very interesting, and give one a clear idea of what is likely to happen when a building is struck by lightning. Mr. Hedges' suggestions of possible reasons why certain protected buildings were struck are instructive. He also explains the modern methods of fitting buildings with lightning conductors. To the ordinary reader who has to design a system for protecting a building from lightning strokes it will be helpful. It is satisfactory to note that, notwithstanding the



great progress made by physicists in extending our knowledge of the laws governing impulsive rushes of electricity, the recommendations of the Committee are not very different from those published by Sir W. Snow Harris sixty years ago.

**Arbitrations: A Text-book.** By the late Professor BANISTER FLETCHER. Third edition, revised and enlarged, and largely rewritten by Banister F. Fletcher, F.R.I.B.A., and H. Phillip Fletcher, F.R.I.B.A., Barrister-at-law. London: B. T. Batsford. 1904.

WHEN a book has reached a third edition it is clear that it meets a demand, and the concise and clear character of this book are good reasons for its consistent sale. It is as well written and revised as can be, and we doubt if it would be possible to find a more satisfactory handbook.

**Sanitary Law and Practice: a Handbook for Students.** By W. ROBERTSON, M.D., D.P.B., and CHARLES PORTER, M.D., M.R.C.P. London: The Sanitary Publishing Co., Ltd. 1905.

THIS is a comprehensive book divided into sections. Section II., for example, is "Appointment of Health Officials," and in it the several parts of the Acts by which the subject is regulated are inserted. The result is a great deal of information in a short space. The book is at once accurate and full, but we should, having regard to its scope, have liked a fuller index. An author knows where to find this or that information—the reader does not, and needs plenty of guidance.

### Illustrations.

#### CHANCEL SCREEN, BRISTOL CATHEDRAL.

**T**HE screen, which is executed in Bath stone, consists of five cusped arches, three of which are four centred and of equal width supported on four moulded shafts, while the two outer are much narrower, canted on plan, and abut on to the tower piers. On each shaft immediately below the springing line of the arches are four niches, with carved buttresses and canopies, containing sixteen figures of persons connected with the history of the cathedral fabric. The arches are elaborately moulded and carved, and the crocketed labels, which, on the west side of the screen spring from figures of angels, rise in an ogee form, and carry the five principal figures in the composition. Between the principal figures are traceried panels and groups of niches, containing fourteen figures of saints of the English church. The whole is finished with a cornice of angels and a traceried cresting, which is 21 ft. above the nave floor. The eastern side of the screen is simpler in character, and has only four figures, which represent Old Testament characters connected with the building of the Temple of Jerusalem.

#### MALVERN FREE LIBRARY.

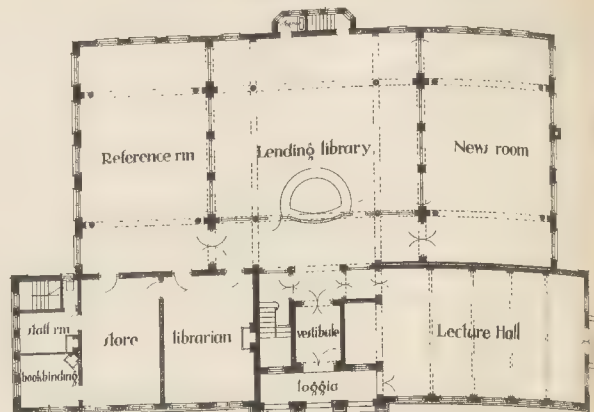
THIS building, the gift of Mr. Carnegie and Mr. Dyson Perrins to Malvern, is now being erected in the town on a site given by Sir Henry Lambert, Bart. The site is a large one, and the building is being kept at the back, while the forecourt is to be laid out as a public garden for the benefit of the town. The building is to be worked on the open-access system. A children's-reading-room has been provided in the basement, with ample book storage, while the caretaker's quarters are arranged in the roof over the librarian's room and store.

The architect is Mr. Henry A. Crouch, of Gray's Inn-square, whose designs were selected by Mr. Henry T. Hare, the assessor, in a recent open competition. Mr. James Herbert, of Wolverhampton, is the builder, and Mr. H. K. Applin the clerk of works.

#### NELSON FREE LIBRARY.

THE disposition of the plan has been governed by the limited size of the site at the disposal of the architects, and the plan has been arranged with a view to working the library with as small a staff as possible.

### MALVERN FREE LIBRARY



GROUND PLAN

The principal rooms are grouped round the entrance hall, which gives access to all parts, and all persons entering or leaving are under the observation of the staff at the delivery counter.

The building will be faced with Catlow stone and the roofs covered with green slates. Internally the walls of the principal rooms will, as far as possible, be panelled with wainscot oak, and the floors will be of pitch-pine wood blocks; the entrance hall and vestibule being paved with black and white marble paving in squares.

The building will be heated by low-pressure hot water, with ventilating radiators, and the lighting will be by means of electricity.

The estimated cost is 5,500l.

#### ORGAN CASE, HEADINGLEY HILL CONGREGATIONAL CHURCH, LEEDS.

THIS work was carried out last year. The organ case is constructed in Austrian oak, as is also the rostrum, communion table, and panelling; the shields are of white sycamore wood, carved and inlaid. The carving was executed by Mr. Milburn, of York; the joiner's work was carried out by Messrs. J. Tomlinson & Son, of Leeds; and the organ was constructed by Messrs. Abbott & Smith, of Leeds. The late Mr. Francis W. Bedford, F.R.I.B.A., of the firm of Bedford & Kitson, was the architect.

#### BRASS OF SIR SIMON DE FELBRIGG AND HIS WIFE.

THIS beautiful brass is to be found in Felbrigg, a lone village of Norfolk, three miles from the nearest post-office, about three miles south-west of Cromer.

It is one of the five which alone remain commemorating Knights of the Garter. Sir Simon was Standard-Bearer to Richard II. The standard shows the arms attributed to St. Edward, which form part of the arms of Westminster at the present time, which were, az., a cross fleury between five martlets or. These are impaled quarterly—one and four, France (ancient); two and three, England. These were used by Richard II. The arms, arg., an eagle displayed with two heads, sable (gules?), of Bohemia. The lion rampant is for Felbrigg. The fetterlock was the badge used by the House of York. Margaret "nacione et gen'roso sanguine Boana" was daughter and heiress of the Duke of Silesia and Theise, himself nephew of the King of Bohemia, cousin of Ann, Queen of Richard, to whom, as the epitaph proceeds to inform us, Margaret was lady-in-waiting. She died in 1416.

It is plain that Sir Simon, when he placed this monument over Margaret, had intended that he himself should be laid in the same

grave hence, the date of his own death left blank, and which has never been supplied, and for the following reason:—The disconsolate widower married again, his second wife being a widow, Catherine Green. He died in 1442-3, and was buried by her in the chapel of the Dominican Friars, in Norwich, now St. Andrew's Hall. Catherine, the second spouse, dying in 1459, was buried by his side. Hence, the absence of the date of his death on this monument and the cause why poor Margaret remains lonely.

The brass measures 96 in. by 50 in.; height of figures, 63 in.

E. TENNYSON D'E. JESSE, R.D.

**POLICE AND FIRE STATION, WINDSOR.**—By Royal Highness Prince Christian recently paid a visit to Windsor to lay the foundation-stone of a new police-station, to which also is to be attached the new central fire-station. Besides the proceedings connected with the police-station, His Royal Highness drove to the new extension of the Alexandra Gardens by the river side, and subsequently informally opened the new reception room converted from the "Shambles," as the old meat market beneath the Guildhall was called. The total length of the new buildings, including the fire-station, will be 200 ft., with a depth of 100 ft., and a yard behind 110 ft. in length by 63 ft. in width. In the basement will be a drill hall for the force, 104 ft. in length by 25 ft. in width, and adjoining will be the public lavatories, etc.; a workshop under the fire-engine house for engine repairs, etc., and a bell room for the firemen, while at the other end will be a number of necessary offices. On the ground floor will be the new police-court, 46 ft. in length by 25 ft. in width and 24 ft. high. Adjoining the court will be the magistrate's and solicitor's consulting-rooms. The court will be on the right-hand side of the principal entrance, and on the left will be the public waiting-room, day-room, head constable, and inspector's office. At the back will be the prisoners' cells, eight in number, two being for women and the remainder for men. On the first floor will be the Wages Committee's room, 30 ft. by 20 ft., with reading room adjoining, which will have a store-room for police purposes. The caretaker's room are also on this floor, quarters for six unmarried constables, a parade-room, recreation-room, and other offices. At the left, and facing St. Mark's place, will be the head constable's residence consisting of two floors. At the St. Mark's end will be the new fire-station, consisting of an engine house 34 ft. by 27 ft. and 15 ft. high, with self-opening doors on a lever being pulled by the driver of the steam engine. Over this will be the caretaker's residence. A yard 40 ft. by 30 ft. will be available for drill purposes. The buildings are faced with red brick and exhibit two wooden ventilating towers, covered with copper. The clerk of works to the Corporation is Mr. E. Avenne, by whom the plans were drawn under the direction of the Surveyor, and the clerk of works to the contractor is Mr. Philbourne.—Windsor and Eton Express.

## COMPETITION.

BAPTIST CHURCH AND SCHOOLS, CONSETT. - The designs submitted in a recent competition by Messrs. George Baines & Son, 5, Clements-street, Strand, London, for the new Baptist church and schools at Consett, Co. Durham, have been adopted.

## BOOKS RECEIVED.

FIRE TESTS WITH FLOORS (British Fire Prevention Committee's Report). (London: J. Waterloo-place, Pall Mall.)  
FIRE TESTS WITH DOORS (British Fire Prevention Committee's Report). (London: J. Waterloo-place, Pall Mall.)  
STANFORD'S NEW MAP OF THE COUNTY OF LONDON. Twenty sheets. (London: E. Stanford, 12-14, Long-acre, W.C.)

## TRADE CATALOGUES.

MR. F. GEERRE HOWARD sends us a book of illustrations of his electric-light fittings. They are mostly in good taste, though we do not like a candlestick in the form of a Corinthian column (No. 17). Time was when that was considered an artistic treatment; but these times are gone by. The brass candlesticks, Nos. 19 and 21, are good; so is the lantern in wrought iron, No. 62. The majority of the designs however, though well intended and fairly good, just miss the touch that an artist in metal-work would have given them.

The London Hydraulic Power Company send us a well-written pamphlet, entitled "Lifts: Hydraulic Power v. Electric Power," the object being to put the case for hydraulic lifts in such a form that the reasons for the claims in favour of hydraulic power may be readily appreciated by intending lift users. Since the application of electricity to machinery of the kind, the question as to the most desirable form of motive power has become distinctly controversial. So far as inherent safety is concerned, everything is in favour of the hydraulic direct ram lift, the hydraulic suspended lift comes next, and the electric lift last. Of course, in the two latter types, various safety devices are introduced, and, if these never get out of order and never fail to act in the manner intended, all classes of lift are equally safe. This pamphlet points out the complicated arrangements required to meet some risks involved by electric lifts which do not exist in a hydraulic lift. On the question of economy, it is contended that hydraulic lifts take far less power to do a given amount of work than electric lifts, this view being supported by a diagram taken from the Proceedings of the Institution of Civil Engineers. Statements expressing a diametrically opposite opinion have been widely published, and those who desire to investigate their validity will find some useful help in the pamphlet to which we refer, although all the arguments it contains are necessarily of an *ex parte* character. One important advantage claimed for the hydraulic lift has certainly operated as a disadvantage. We refer to its durability. There are numerous old hydraulic lifts in use to-day, in good condition, but of such obsolete type that they constitute object lessons which distinctly assist those who argue in favour of electrically operated lifting machinery.

Mr. J. L. Mensch, of Chicago, sends us his latest catalogue of reinforced concrete construction, a pamphlet consisting of photographic views representing various examples of structural work executed in accordance with the system of the author. The views show the great adaptability of concrete-steel to buildings of all classes, and as several of the photographs reproduced were taken at different stages during the erection of the buildings, the reader is able to form a very fair idea of the methods of construction adopted.

Moston Church, Pontnewynydd. - Lady Lechbridge laid the corner foundation-stone of a new mission church which is being erected at a cost of 1,500l. in Hanbury-road, Pontnewynydd, in connexion with St. Luke's Church, on the 4th inst. The building will provide accommodation for about 250 people. It will be a stone building, with terra-cotta and red brick dressings, with chancel, nave, organ chamber, and apse. Mr. D. J. Loughor, of Pontypool, is the architect.

## The Student's Column.

## STEAM BOILERS AND PIPES.—VII.

## BOILER SETTING (continued).

HAVING settled the arrangement and dimensions of the flues around the boiler, the blow-off pit, with a recess for the blow-off outlet and elbow, and the main flue remain for attention.

When only one boiler is in question the blow-off pit is generally made square in plan, the dimensions depending mainly upon the size of the blow-off cock and pipe. If two or more boilers are being laid down, the pit should extend continuously along the front of the series, so as to provide accommodation for the common blow-off pipe. An average inside width for the blow-off pit is 3 ft., measured from the front cross wall of the boiler brick-work to the outer wall of the pit. This gives ample space for getting at pipe-joints and for the reception of boiler feed pipes, should it be decided to run them along the pit.

The recess for the blow-off outlet must be adapted to the requirements of the boiler to be fixed. It may be built semi-circular or angular in plan, as shown in Figs. 13, 14, and 15, *ante*. Here, again, care should be

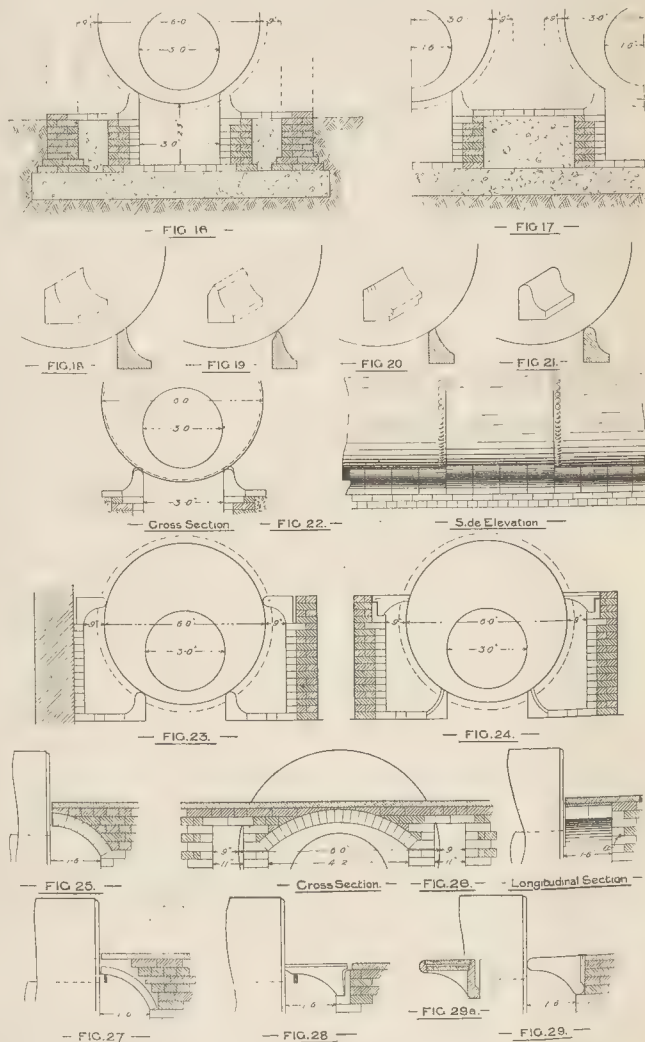
taken to give sufficient room for attention to the joints of the blow-off fittings.

The dimensions of the main flue behind the boiler depend on the size and number of boilers to be served. It usually extends from the level of the bottom flue floor up to within a few inches of the top of the boiler brick-work. Its width should never be less than 1 ft. 6 in. for the smallest boiler, and may be 4 ft. or more for a battery of the largest-sized boilers. A good general rule is to make the flue width equal to half the diameter of the boiler for a series of two or three boilers. For a single boiler the width may be about 20 per cent. less.

The general concrete foundation for the boiler brick-work should be continued in full thickness below the main flue, and in reduced thickness the blow-off pit.

In commencing to build the flues, the first part of the brick-work to be undertaken is that constituting the side walls of the bottom flue. Then, if the outer walls are to be built up from the foundation-slab, they must be finished to the level of the bottom flue walls, and the intervening spaces filled with brick-work or concrete, as shown in Fig. 16.

An alternative method of construction is shown in Fig. 17, where the walls and floor of the side flues are supported on concrete carried up from the foundation bed.



Illustrations to Student's Column.







## GENERAL BUILDING NEWS.

**BARRIS TAPPAHAGE, BARKING.**—This building is being entirely remodelled internally and elevations are being introduced. The contract is let to Messrs. Sande & Burley, of Walthamstow, the amount being £1,744. Messrs. George Baines & Son, Clements-inn, Strand, W.C., are the architects.

**LIBRARIES FOR THE KING'S NORTON DISTRICT.**—Owing to the gift of £2,500, made by Mr. Andrew Carnegie, for the purpose of erecting libraries and reading-rooms in the urban district of the King's Norton and Northfield Council, it has been found possible to provide seven such institutions in the various centres of population. Mosley and King's Heath, in combination, will be provided with a library and reading-rooms; a similar institution will be built at Stirchley, and also at Selly Oak. The amount allocated for each of these buildings was £3,000. In addition to these three buildings, branch libraries are to be provided at King's Norton and Northfield; and three reading-rooms at Barby Green, Beoley, Nodul and Rubery. The King's Heath Library (from the designs of Mr. Latham) has a stone facade, the entrance and vestibule leading to the reading-room and the lending library; and, at the rear, to the reference library. The reading-room has a length of 36 ft. by 24 ft., and there is an annex for newspapers and periodicals. The offices are also provided for librarians. The buildings at Selly Oak and Stirchley (to the plans of Mr. J. P. Osborne), will be of red brick with stone dressings. The accommodation will be somewhat similar to that at King's Heath. A reading-room for women is situated on the second floor. Messrs. Webb & Crowder are the architects.

**LYSTON DISEASES HOSPITAL, STRICHEN, N.B.**—The new hospital, which has been built by the Deer District Committee for the treatment of infectious diseases arising within the district, and to supersede the cottage hospitals at Old Deer and Crimand, was opened on the 2nd inst. The building, which stands on a site north of the village of Strichen, occupies an area of 24 acres. It is on the villa principle, has an elevated southerly exposure, and consists of five blocks of buildings. The scarlet fever ward, which is built on the north-east boundary of the site, contains male and female wards with four beds in each, of the prescribed area of 2,000 cubic ft. In connexion with each of these wards are two isolated wards for special cases. The nurses' room is between the male and female wards and the isolated wards. The entrance door enters into a broad passage from the lobby, from which access to the male and female wards and also the nurses' room is obtained. At the end of each ward hall-room and lavatory accommodation is provided. Other two blocks are erected near the western boundary of the site, and in which are to be treated typhoid fever, diphtheria, and other cases. Each of these blocks contains male and female wards with two beds in each, while a room for the nurses and bath-room accommodation is between. The administration block, in the centre of the feu, is a two-story building containing the following accommodation.—On the ground floor there is the matron's room, nurses' sitting-room, doctor's room, discharge room, with the necessary bath and lavatory accommodation, kitchen, scullery, etc., while on the ground floor there is provision for the nurses' bedrooms, four nurses' bedrooms, bath-room accommodation, servants' bedroom, and a room for napers. There is also a laundry block, built along the north boundary, and to the rear of the administration block. This is a one-story building, with a drying loft above, and contains a wash-house, laundry, rooms for infected and disinfected clothing, nurses' ambulance shed, tool-house, mortuary, etc. In connexion with the arrangements of the various blocks, which are prepared according to plans by Messrs. Walker & Duncan, C.E., all the requirements of the Local Government Board have been complied with. The buildings are erected with rubble got in the vicinity, with dressings from New Pitligo. The stinging arrangements are wholly by fire-places and glazed-ware stoves; and the buildings are well supplied to replace the administration block and the various ward blocks and outbuildings. The water supply is derived from springs upon the farm of Braemar. This water is gathered into a storage reservoir near the offices of Braemar, which has a capacity of 50,000 gallons. The head of water between the reservoir and the hospital buildings is between 60 ft. and 70 ft., and from the reservoir the water is delivered to the hospital by a 3-in. cast-iron main, which will be sufficient not only for the requirements of the hospital, but also for the purposes of fire-fighting. The grounds are laid out to provide a ring ground for the patients. The total cost of the hospital, with its eighteen beds, amounts to £7,000. The contractors for the work were Messrs. George Cooper & Son, Boyndlie, Fraserburgh; carpenters, Edwards & Rae, Dyce; slaters, McIntosh & Connors, Peterhead; plasterers, James Scott & Son, Aberdeen; plumber and waterworks, William Leask, Alford; painter and glazier work, J. A. Ogilvie, New Pitligo.

**CANNON FREE LIBRARY, PORTADOWN.**—The library which has been erected in Portadown

was opened on the 1st inst. The building has been erected by Mr. Robert Cullen, from plans prepared by Mr. J. W. Walby. It is built with brick, and faced with red compressed brick and red sandstone dressings. The roof, a portion of which is flat surrounded by an iron railing, is covered with green Cumberland slates. The building occupies 60 ft. frontage. On the first floor the following accommodation is provided:—A vestibule entrance on the left, 14 ft. by 9 ft., with lantern light and panelled ceiling; a hall, communicating with the last and with reading-room through swinging door; reading-room, 30 ft. by 21 ft. by 14 ft. high. The staircase hall is 17 ft. by 12 ft., and the staircase is in three flights 4 ft. wide. The building will be heated with hot-water pipes from the heating-chamber under the lavatory. On the first floor is the reference library, ladies' room, and librarian's room. The reference library measures 27 ft. by 17 ft., with an additional part 15 ft. by 12 ft. Each room is provided with fresh-air inlet tubes, and shafts for the extraction of foul air are provided to all the rooms and carried through the roof to one of Boyle's patent air-pump ventilators.

**PUBLIC LIBRARY, MANOR PARK.**—The opening of the new Carnegie Public Library in the Romford-road by the Right Hon. James Bryce, M.P., took place on the 3rd inst. The building comprises a new room, having space for forty newspapers; a magazine-room, with seating accommodation for forty-two readers; and a lending library, with space for 12,000 volumes. There is also the lecture hall, which will hold 250 people. The building itself has cost £4,000, the furnishing, 500*l.*, and sundries, 150*l.*; making a total of 5,550*l.* The plans and designs were prepared by Mr. A. H. Campbell, the Borough Surveyor.

**COUNTY COURT, CROYDON.**—The new County Court which has been erected at Croydon is situated on Scarbrook-lane. The building is composed of red brick with stone dressings. The architects are Messrs. James Smith & Sons, of South Norwood, and the architect Mr. Hawks, of His Majesty's Office of Works. The estimated cost of the work is 8,000*l.* In the basement are rooms for the bailiffs. On the ground floor there are the usual offices for the staff, and at the rear of the building, on the same level as the offices, is the registrar's court, the size of which is 50 ft. by 30 ft. The flooring is composed of maple-wood blocks, and the fittings generally will be of oak. The corridors and entrance-hall are paved with mosaic. Rooms on the ground floor are also provided for the registrar, and another as a women's waiting-room. The judge's court is on the first floor. Its dimensions are 36 ft. by 27 ft. On the same level is the judge's private room, and others for the barristers and solicitors. The caretaker's apartments are at the top of the building. The structure throughout will be lighted with electricity, while in the winter months the heating will be provided by means of hot-water pipes. The wall decoration will be plaster, with a dado. The stone carving of the building is by Messrs. Daimond, of Vauxhall Bridge-road.

**NEW COUNTY AND GRAND STAND, STOCKTON RACECOURSE.**—The building operations for the alterations and additions to the county stand and the new grand stand to replace the old structure were started in May this year, and have been completed for the August meeting. The architects for the structures are Messrs. Mangnall & Littlewood, Manchester, and the contractors are Messrs. R. Neill & Sons, Strangeways, Manchester. The size of the county stand is 85 ft. by 50 ft., and it accommodates about 1,000 people. The grand stand is 175 ft. by 50 ft., and accommodates more than 2,000 people. Slated roofs entirely cover the whole area of both stands, so that everyone would be protected from inclement weather. The new grand stand is built of local bricks. Under this stand is situated a large general refreshment-room, 63 ft. by 35 ft. (in which is an island bar), telegraph office, a dining-room, 52 ft. by 35 ft., with kitchen and store-rooms for food, wines, etc. The alterations and additions to the county stand include a new club lunch-room, kitchen, and stewards' retiring-rooms. The upper story outer walls of this building are of rough cast. The natural difficulties of the site, owing to its marshy nature, have been overcome by erecting the stand on a large concrete raft, which extends all over the site covered by the building; the raft is nearly 2 ft. thick, reinforced with expanded metal and rolled steel joists.

**ROYAL MUSIC HALL, HIGH HOLBORN.**—The Royal (formerly Weston's) Music Hall, High Holborn, is being entirely reconstructed by Messrs. Kirk & Kirk, contractors, under the directions and superintendence of Messrs. Frank Matcham & Co.

**WORKHOUSE EXTENSION, MILE END.**—The additions which have been made to the workhouse at Mile End have just been opened. The work has been carried out by Mr. W. Barker, builder, from plans prepared by Mr. J. M. Knight, architect, at a cost of 12,399*l.*

**HYDRO, TORQUAY.**—The Villa Syracuse, at Torquay, has been converted into a hydro after being enlarged and improved. The work, which included the erection of a new wing, has been carried out by Messrs. R. F. Yeo & Sons. The decorations have been executed by Messrs. Parker & Sons and Mr. W. Cole Watson. Radiators heat the principal rooms and the corridors. A 14 horse-power boiler fixed on the garden level and steam calorifiers, have been supplied and fixed by Messrs. Beynon & Son, who have also provided a complete system of electric bells and speaking tubes. The hydro is lit throughout by electricity. The installation is the work of Mr. T. L. Harding. The architects were Messrs. Johnson & Webber.

## APPOINTMENTS.

**NEWCASTLE-ON-TYNE.**—A meeting of the Special Committee of Newcastle Corporation, to go through the list of applicants for the post of City Engineer was held on the 11th inst. There were upwards of sixty applications, and the following seven were selected to be submitted to the City Council for their final selection:—Messrs. K. T. Campbell, Huddersfield; A. E. Collins, Norwich; A. D. Greston, West Bromwich; C. R. S. Kirkpatrick, Newcastle; James Paton, Plymouth; W. J. Steele, Bristol, and F. Wood, Fulham.

**LEEDS CITY ENGINEERSHIP.**—The Improvement Committee of the Leeds Corporation, which met on the 15th inst. under the presidency of Mr. Pickersgill, had under consideration the applications for the position of city engineer, for which a salary of 600*l.* per annum is offered. The number of applications was ninety-seven. The Committee selected the following six candidates, who will be asked to appear before the Committee:—Mr. Thomas Hewson, jun., deputy city engineer, Leeds; Mr. E. B. Martin, deputy city engineer, Leeds; Mr. A. D. Greston, borough engineer, West Bromwich; Mr. Robert J. Angel, borough engineer, Bournemouth, S.E.; Mr. W. J. Steele, deputy city engineer, Bristol; Mr. W. T. Lancashire, deputy city engineer, Sheffield.

## SANITARY AND ENGINEERING NEWS.

**LITTLETON BRIDGE, MANCHESTER.**—This new bridge over the river Irwell was opened and dedicated to the public use on the 9th inst. by the Mayor of Salford. It is constructed of Runcorn stone, with Portland stone dressings, and spans the river with four arches. The engineer is Mr. L. B. Wells, and the cost is 11,000*l.*

## FOREIGN.

**FRANCE.**—A new asylum for the aged is to be built at Villejuif, in the Department of the Seine.

—The municipality of St. Germain intend to rebuild their theatre. Unless there is open competition decided on, the work will be carried out by M. Henri Chores, the city architect. The cost is estimated at 280,000 francs.—The jury in the competition for a new savings bank at Virly-le-François have awarded the first premium to M. Jossier, of Châlons-sur-Marne.—The Municipal Council of Lille have voted 209,000 francs for the construction of a campanile, with a carillon, in connexion with the Palais du Commerce. A new Hôtel de Sous-Préfecture is to be built at Béthune.—The jury in the competition for a new Prefecture at Agen have awarded the first premium to M. Payen, of that town.—Works to the extent of nearly 450,000 francs are to be undertaken shortly for the enlargement of the railway station at St. Malo.—A competition is to be opened for the building of a new hospital at Perpignan.—The completion of the inner port at l'Alga (Algiers) is to be proceeded with, at a cost of about 8,000,000 francs; and a sum of nearly 18,000,000 francs is to be expended on the enlargement of the port of Oran.—M. Louis Bernier has been appointed chief professor in the atelier of architecture at the Ecole des Beaux-Arts, in place of the late M. Soulier de Gisors.—The new post and telegraph office at Vichy has been officially opened.—A competition is advertised for a new hospital at Saint-Dizier.—The municipal council of Mar-seilles has voted a sum of six million francs towards the construction of a canal from Marseilles to the Rhône.—A new post and telegraph office is to be built at Orange.—At Paris important operations are shortly to be undertaken with the object of enlarging the Halles and improving the approaches to them. The Rue Berger is in the first place to be prolonged to the side of the Rue du Louvre, whence it will be continued by an enlargement of the Rue des Prouvaires. At the same time a sanitary improvement is to be carried out in the block of old houses comprised between Rue Prouvaires and Rue Mondétour.—The works have been commenced for the rebuilding of the Hospital "de la Pitié," which was founded in 1613, and is now in a very dilapidated condition. The new hospital will be built in the large gardens of the Sal-pêtrière.—The Gobelins manufacture are



occupied with four tapestries, from cartoons by M. Toudouze, intended for the decoration of the Palais de Justice at Rennes. The subjects are: The Marriage of Anne of Brittany; Jeanne Darc and the Comtesse de Richemont; the death of Duguesclin; and the crowning of Nominé, first King of Brittany. The Conseil d'Etat has authorised the Government to accept the legacy left by M. Léon Dru of the historic château of Vez, and the splendid collection of works of art which it contains. The château will be, according to the will of the testator, classed among the "Monuments Historiques," and is to be opened to the public on at least three days in the week.

The Société des Artistes Français has under consideration the establishment of a "Maison de Retraite" for painters, sculptors, architects, and engravers. The cost of the proposed building is estimated at a million francs. An "Ecole des Musées" is to be created at Paris, with the object of educating and preparing candidates for filling the office of Curator in national museums in Paris and in the provinces. The death is announced, at Paris, of Camille, Government architect and architect also to the office of "Administration de l'Enregistrement et des Domaines." He was a member of the Société Centrale des Architectes, and a Chevalier of the Legion of Honour.

GERMANY.—The Cathedral at Bamberg is to be restored under the direction of Dr. Fritz Traugott Schulz, of the Germanic Museum, Nürnberg. A new concert hall is to be built at Frankfurt, which will accommodate 25,000 persons, and the building of which will cost about 5,000,000 francs; this will be the largest hall of the kind in Germany. The Society of German Architects and Engineers will meet at Heilbronn shortly. An historical exhibition of clocks took place in July at Nürnberg, on which occasion the statue of Peter Heintz, the inventor of the first pocket watch, was unveiled. The new "Maximilian" Bridge at Munich was opened in June; the bridge was built by the firm of Sager & Wörner, at a cost of 1,000,000 marks. A memorial to the poet Gottfried Schwan has been executed by Professor Ludwig Schwan, and erected in Darmstadt. A new Court Theatre is to be built at Weimar by the firm Heilmann & Littmann, on the site of the old theatre.

AUSTRIA.—In the competition for designs for a kursal and baths to be erected at Teplitz Schöna, the first premium, of 4,000 kronas each, was awarded to Herr Gustav Jirsch, Herr Edmund Armin, and Herr Marzall Kammerer. The large tower of the Church of St. Maurice, at Olmütz, is to be restored; plans are being designed for this by Professor Hauberisser, of Munich. A new evangelical church is to be built in Vienna at a cost of more than 150,000 kronas.

SWITZERLAND.—The Art Gallery at Zurich is to be rebuilt from plans by the architect, Herr Karl Moser, at a cost of 1,000,000 francs. New schools are to be built at Arbon by the firm of Ott & Keller, at a cost of 270,000 francs.

SOUTH AFRICA.—Speaking at the meeting of the Master Builders' Association in Pretoria, the Mayor said that the municipality was about to enter on large public works, including water drainage and permanent water schemes, plans for which were complete. Official figures show that considerable building is still in progress in Johannesburg. For the quarter just ended plans were passed for 2,002 buildings, representing a value of 890,402. Since January last plans have been approved for 10,745 separate buildings, representing a total value of 3,371,196. A new township is to be laid out at Embabaa in Swaziland. The Mayor of Kroonstad has been authorised to sign an agreement with Mr. E. G. White, of Port Elizabeth, for the erection of the local Town Hall, at a cost of 9,540,18s. The central portion of the Boksburg Public Library is nearly finished. The building is in the old Dutch style. Mr. Fowle is the contractor, and Mr. P. S. Stewart the architect.

New buildings about to be erected include the Victoria Memorial Cottage, in King Williams-town, a boys' school at Lady Smith, Natal, and Government offices at Livingstone, Rhodesia. The new German Club in Johannesburg has been handed over by the contractors, Messrs. Schluter & Doerig. The building is a two-storied one, and has been erected on three stands at a cost of about 11,500l., exclusive of the value of the stands. It has been built from the designs of Mr. Theophile Schaerer.

During July the Cape Town City Council passed twenty-nine building plans, the carrying out of which will involve the expenditures of 71,000l.

A dispute has arisen in Pretoria between the master-builders and the carpenters consequent on the former having served a notice of reduction of wages to 2s. 6d. per hour. A fortnight's notice to this effect was given some time ago, and the masters maintain that the new rate is now in force owing to the failure of the carpenters to arrange for the appointment of an arbitration board, which it was understood would be done when the notice was first given. The men deny any failure on their part to keep this undertaking, and a mass meeting is being called to consider the situation.

## MISCELLANEOUS.

### PROFESSIONAL AND BUSINESS ANNOUNCEMENT.

Mr. James Patteson, of the Marble, Granite, &c., Works, Oxford-street, Manchester, has acquired his late brother's interest in the firm of Messrs. J. & H. Patteson, and has opened an office and showroom at 7, Bayley-street, Bedford-square, London, W.C.

CHOIR STALLS. THORNEY ARREY, CAMBS.—New choir stalls have been presented to the old Abbey church by His Grace the Duke of Bedford, K.G., and were used for the first time on the 16th ult. They were executed by Messrs. Jno. Thompson & Co., of Peterborough, from designs prepared by Mr. J. C. Traylen, of Stamford.

OPEN SPACES.—Mr. Cameron Corbett, M.P., has informed the Corporation of Glasgow that he will present to the City three of the farm situated between Loch Goil and Loch Long, covering about 9,000 acres in all, and distant about thirty-five miles from Glasgow. The property will be preserved in its natural state, and the income derived therefrom is to be applied in rendering it more accessible to the townfolk.

Miss Octavia Hill, in appealing for contributions towards the acquisition by the National Trust of the beautiful tract of land on the Lake of Ullswater, states that of the sum of 12,000l., which is required to complete the purchase the amount already obtained is now 7,776l. On August 7 was dedicated to the public an open space known as Mountfield, consisting of thirteen acres, at Hither Green, Lewisham, which has been secured by the joint efforts of the Borough of Lewisham and the London County Council, and have been laid out, at an expenditure of 3,115l., by Colonel Sexby, chief officer of the Parks Department, L.C.C. On August 5 was opened Springfield Park, Upper Clapton, consisting of thirty-two acres, with an island in the river Lea, which have been bought from Mr. T. K. Bros, the owner of the estate (who subscribed 1,000l.), at a total outlay of some 40,000l., contributed by the London County Council (20,000l.), the Hackney Borough Council (15,000l.), the Bethnal Green Borough Council (2500l.), the Stoke Newington Borough Council (1,000l.), and private subscribers. The park has many natural beauties, is well timbered, and presents a fine prospect of the Lea valley. Up to the present time an aggregate of 1,923 acres have been secured to the public and vested in the London County Council since they were first appointed. One Tree Hill, Peckham Rye, was opened on August 7, after an agitation for its acquisition which began nine years ago. The land has been bought by the Cambs. Hill Borough Council for 4,100l., upon terms of compulsory sale, the owner having at the outset offered to sell the land for 16,000l.

ECCLESIASTICAL PROPERTIES.—Orders in Council have been made for giving effect to recommendations framed by the Ecclesiastical Commissioners to apply 16,000l. out of the proceeds of the sale of Addington Park, Surrey, to the purchase and upkeep of a suitable and convenient residence for the Bishop of Rochester; and to appropriate the present Bishop's House, Kennington, for uses of the Bishop of Southwark. Addington Park, a residence of the Archbishops of Canterbury, was sold three years ago for 45,000l., and a further amount of 2,371l. was paid to the Ecclesiastical Commissioners by the Archbishop in respect of dilapidations which had accrued before the sale. The total net proceeds realised by the Commissioners amounted to 46,007l., through the discharge of a small mortgage created in respect of some structural improvements at Addington. The new archiepiscopal palace and its site at Canterbury have cost 29,176l. 11s. 1d. The old episcopal palace at Rochester has of late years been sub-divided into private houses, and the Bishop of Rochester has occupied the house in Kennington Park-road, S.E.

BIRMINGHAM'S ANCIENT WELLS.—Considerable interest attaches to the discovery of an ancient well in Birmingham, says Mr. Joseph Hill, the well-known antiquarian, and yet within the memory of persons still living the whole water supply of the town was derived from wells and Edgbaston-street, St. Martin's-lane, Digbeth, Park-street, Moor-street, and the Bull Ring, or Corn Cheaping, were all honeycombed with wells. In some parts wells existed in the cellars, whilst in the streets, notably around St. Martin's Church and Ladywell, pumps were set up for the free use of the public. In fact, the present site of the church end of Digbeth was Well-street. The Cock well, which was near the Cock Tavern in this Well-street, must have been of great antiquity. Another public well, probably as ancient, was discovered when the old Lamb House at the bottom of Crooked-lane (known as Snuffield's) was destroyed some dozen years ago. The great stones of this well, like those at the Old Crown House, unearthed some fifty years since, were the work of a very early date. The public well in Lamb-yard was known to our forefathers as the well at the Welsh End, and was maintained at the public expense; as also was another, probably still more ancient, near the Swan Tavern in New-street, behind the public toll-booth. This last-named well was undoubtedly the origin of the

thoroughfare, which has been called New-street since the days of Richard II., when the former and very old by-road or pathway was digested and being made into a street, and the Guildhall was built in it. But the well remained in existence until the end of the XVIIIth century, and consequently enough, still remains under the path it was laid bare a few years since, and has been covered over. It is not surprising that wells have been discovered of late years. The one in Bennett's-hill has a greater interest, on account of its age than any found for some years. The one at the back of the Old Royal Hotel, the one under notice was, there is small doubt, made in 1680, when Colmore-row was New Hall-lane and New Hall itself was a comparatively modern mansion.—*Birmingham Mail.*

FINLAND TIMBER SUPPLY.—Reporting on the trade of the Grand Duchy of Finland for the year 1904, Mr. Consul Cooke points out that whilst Finland is not blessed with coal, and other metals to any appreciable extent, the vast expanse of her Government forests—more than half in the far north—only requires to be generally known to be better utilised, the more as these timber supplies are of a very slow growth, many of the trees being of a great size, and sure of being carefully hewed and stacked. This supply of trees, it can safely be said, will last for centuries, whereas the forests in private hands are rapidly to be disappearing. The sparse population, too, is a powerful factor in ensuring the timber supply, as vast tracts of land are annually brought into cultivation. The exports from Finland chiefly consist of timber of various kinds (from 45 to 60 per cent.), dairy produce, wood-pulp, paper, and cardboard. It is an obvious disadvantage for Finland that on a large scale, the timber has such an influence on the export trade, the more so as the prices often vary considerably. The spring of 1904 showed good prices for timber, whereas in the autumn prices fell, causing a corresponding decrease towards the end of the year. For instance, the price per cubic metre for battens fell 4s. and for planks 10s. from 1903 to 1904. The quantity of timber exported in 1904 was as follows, in cubic metres:—Masts, spars, &c., 221,121; props, 1,391,860; paper-wood, 633,792; rafters, 123,519; sleepers, 60,840; laths, 108,682; firewood, 1,144,360; planks, 340,266; battens, 847,345; boards, 1,245,167; deal ends, 149,005. Owing to the South African market being overstocked, a glut in the larger deal sizes occurred and still continues. In spite of this large export, the prices have reduced the value of the whole to about 340,000l., i.e., 4,900,000, in 1904 against 5,240,000l. in 1903 and 4,640,000l. in 1902. The export values of the most important kinds of timber in 1904 were:—Masts, spars, &c., 132,680l.; props, 429,840l.; paper-wood, 180,120l.; firewood, 48,520l.; birch wood, 79,680l.; rafters, 111,160l.; laths, 43,480l.; planks, 612,480l.; battens, 1,156,280l.; boards, 1,563,800l.; deal ends, 53,640l. The largest reduction of value was in sawn goods.

GLASS BRICKS AND TILES.—In previous issues we have referred to the use of glass bricks for the internal partitions of a hospital building and as the construction of pavement lights for an apartment house. It may interest our readers to know that glass bricks and tiles of glass are being made under the Glasgow patents, and are being employed in several continental countries. In France tiles have been used for the walls, floors and stairways of various stations on the Paris Metropolitan Railway, but on stairs they seem to become too slippery to be safe. Two streets in Paris have been paved with similar bricks laid on concrete, but these bricks do not wear so well as stone. Part of the Rue de la République in Lyons, was paved with glass tiles in 1888. Germany glass bricks are occasionally employed in building construction; they are made in dovetailed joints, so that very little cement is required. In Holland opaque bricks are used for ordinary building purposes, and transparent bricks for the walls of workshops, conservatories and other structures where light is a desideratum. In the manufacture of the bricks, molten glass is granulated by being thrown into cold water; it is then placed in moulds, heated until plastic, and shaped by hydraulic pressure, the bricks being cooled in ovens of special construction.

THE ESBOULT ARBITRATION.—Arbitration proceedings were commenced at the Sanitary Institution, London, on the 17th inst., between the Bradford Corporation and the Misses Shawfield and Mrs. McCall, from whom the former is taking 1,700 acres of land in Yeadon, Rawdon, Idle, Ecolshill, and Guiseley, for the purpose of outfall works for the city sewage. The property includes also twenty houses, eighty cottages, dairy farms, and two public-houses. Sir John Hill, M.P., was the umpire, and Mr. Walter Middleton was arbitrator for the claimants, and Mr. Chas. Gott for the Corporation of Bradford. The total claim has been variously stated at between 350,000l. and 380,000l. The counsel for



claimants were Mr. Tindal Atkinson, K.C., Mr. Horatius Lloyd, K.C., and Mr. Longstaffe; and the Corporation of Bradford were represented by Mr. Balfour Browne, K.C., Mr. Waugh, K.C., and Mr. Jewes.

## Legal.

### ROBERTS AND ANOTHER v. STYTHE.

APPEARS as the full judgment of the Court of Appeal (briefly reported in our last week's issue) in the appeal of the plaintiffs, a firm of builders, from an order of the judge in chambers affirming the order of the Master and staying the action on the ground that there was an arbitration clause in the contract between the plaintiff and the defendant, the building owner, referring all issues to the architect, Mr. Rowland Lloyd Jones.

The Master of the Rolls, in giving judgment, said the contract provided that all matters arising under it were to be dealt with by the architect, and there was also a provision which enabled the parties to refer any matters in dispute to the architect, who was to be the judge between them. Up to this point the contract had been carried out, and they had, therefore, deliberately elected to have him for their arbitrator during the course of the execution of the contract upon the very matters in connexion with which he was afterwards invited to deal as arbitrator. As very frequently arose under these contracts, certain questions had become the subject matter of discussion because the two posts of architect and arbitrator were posts that were incompatible. It was a principle of our law that a man could not sit in judgment upon his own cause. But the parties here had deliberately elected that the person who was concerned in these matters should also be the person to be chosen as arbitrator, and they could not now take an exception to his exercising that function because of his being employed in two capacities. It had been laid down by the late Lord Justice Bowen that they were not to expect the icy impartiality of a Rhadamanthus in such a case. Therefore in this case, knowing full well that the architect was acting in a double capacity, the plaintiffs agreed by the contract to abide by the decision of the particular arbitrator, sought to set it aside by throwing mud at the architect and seeking to expose his character. A more reckless charge he had never himself seen in an affidavit. The plaintiffs had not scrupled to charge the architect with fraud and collusion with the building owner, and when they gave the basis on which the charge might be founded, the Court found there was practically no shadow of foundation for it. It rested simply upon "I am informed and believe," and when they came to examine the matter of the information and belief it resolved itself into one of two matters which were capable of explanation and which had been explained fully and to the satisfaction of the Court by the architect. First of all, the builders relied upon the fact that in the course of the contract, as not uncommonly happened, they were in need of money, and they trusted some assurance from the architect as to what would be the money due to them upon the execution of the contract, and they wanted that assurance in order that they might borrow money from the bank. Accordingly, Mr. Roberts saw the architect in the circumstances which had been described to the Court by the architect himself, supported by his clerk, as to what actually happened on that occasion. It would have been worse if the architect had acted differently, but the result was that the architect, without making an exact examination of the time and labour and the precise conditions of the account, formed a rough estimate, which turned out to be wrong, in which he came to the conclusion that a much larger sum would be payable to the builders as the result of the execution of the work than was in fact the case. The architect wrote a letter indicating that something like 300*l.* for extras might be due to the builders. But supposing he had done all that, what effect would it have, he is likely to have, on the mind of the architect? Can he afterwards come to look into the matter? It appeared to his lordship that it would have been much more likely to have had this effect, that the architect would have desired to bring out his decision as justifying the previous estimate he had given. But what had he done in point of fact? On going into the figures he found that nothing like what he thought would become so was in fact due. In fact, he had had to admit that the previous estimate was incorrect, subject to the explanation that he had not taken sufficient time to investigate and find out what he had given. What effect had that on the mind of the Court? It indicated nothing so grand or collusion on the part of the architect. He had honestly changed his opinion, the opinion which he had expressed before, and he explained the reasons why he did so. So far from that being anything like evidence of fraud or dishonesty, it was evidence strongly in favour of the architect's honesty. In the next case it was said, in

regard to the footings, the case showed fraud, or misconduct, or collusion, or something of that kind. What were the circumstances? There appeared to be a discrepancy between the dimensions named in the specifications and the dimensions on the plans. The builders had contracted on the specifications to make footings of much larger depth. They were relieved by the architect from making them of that depth, and made them of very much smaller dimensions, and in that view the architect, looking at that fact, made a deduction by reason of the fact of footings of the smaller depth being used, and gave the defendant the benefit of that deduction. He thought the evidence showed that there was no foundation for the suggestion that he had done that improperly. And yet, absolutely, the plaintiffs had found an imputation of fraud and collusion against the architect. Again, there was a suggestion that the architect, although he had taken up a position contrary to the building owner's view and in favour of the builders to a certain extent, was pressed by threats, and even intimidation, in the shape of threats of litigation, to give way to the building owner in order to curry favour with him, and had pressure put upon him to decide adversely to the builders. What did all that come to? To his mind, a complete and satisfactory denial was given on the part of the architect to anything of that sort. There was just a sufficient shadow of foundation, which explained how the change came about. The building owner was pressing for the completion of the contract. He was dissatisfied with the fact that it was dragging on, and consulted a solicitor to see what pressure could, through the architect, be put upon the builders to hurry on the completion of the work. The result was that he saw the architect, and the latter pushed the thing on as well as he could. That was the whole foundation for the charge of undue influence brought to bear on the architect by pressure of threats or litigation. In his opinion there was no shadow of foundation for the imputations on the architect in this case, and therefore the appeal must be dismissed with costs.

Lord Justice Romer said he was also satisfied on the evidence that there was no ground whatever for the accusations brought by the plaintiffs against the architect. He regretted to be obliged to say that, in his opinion, the charges against the architect were brought by the plaintiffs most recklessly, and, in his opinion, merely with the object of trying to defeat the application by the defendant that the matters in dispute between the plaintiffs and him should be referred to arbitration, as agreed to in the contract between the parties. He desired to say that, in his opinion, no shadow of ground whatever had been shown to justify any charge of misconduct against the architect. Nothing had been shown which would justify that Court in refusing to refer the matters in dispute between the plaintiffs and the defendant to the arbitration of this gentleman, the architect, according to the agreement. There was no ground, to his mind, shown to justify the appeal, and he thought it should be dismissed with costs.

The appeal was accordingly dismissed, with costs.

### SOUTHEAD BUILDING DISPUTE.

THE case of Dowsett v. Ramuz came before Mr. Justice Phillimore in the King's Bench Division last week—an action by the plaintiff for an injunction to restrain the defendant from building in Victoria-avenue, Southend-on-Sea, beyond the building line mentioned in a deed of conveyance, dated October 26, 1878, and in alleged breach of covenants contained therein.

The defence was a denial that the plaintiff was entitled to an injunction. The plaintiff's case was that on October 26, 1878, certain property, part of the Milton Hall estate, Southend-on-Sea, was conveyed to a Mr. Hudson, the conveyance containing a covenant by the purchaser that no buildings should be erected on the land conveyed between the building line 35 ft. from the road and the roadway shown on the plan, except fences. Hudson subsequently erected a house, called Eton House, upon the land, the main part of which stood back 35 ft. 6 in. on each side of the bays and the bays 32 ft. 5 in. from the road. In 1881 the plaintiff built a house on the adjoining piece of land, the frontage being the same distance from the road. The plaintiff alleged that it was the custom at Southend to permit owners to bring forward their bay windows slightly beyond the stipulated building line. The defendant in 1904 purchased Eton House, and purported to convert the house on the ground floor into shops, and deposited plans, which were passed, showing that the building line of the house would be brought forward to 32 ft. 4 in. from the road. The plaintiff's case was that this would be prejudicial to all the other purchasers who had bought on the same conditions.

On behalf of the defendant, it was argued that Hudson bought the land on which his house was erected on the footing that there was a building

line, and when the plaintiff broke the stipulation he deprived Hudson of the benefit stipulated for. It was also contended that there was no case in the books where a plaintiff was held to be entitled to enforce a covenant which he had himself broken.

In the result his lordship, in giving judgment, said the defendant's house was the first to be built, and the bay windows were infringements of the building line. The plaintiff then built, and had infringed by building bay windows. That fact prevented the plaintiff from compelling the defendant to pull down the bay windows, but it did not entitle the defendant further to infringe the building line. If the defendant's infringement was an equivalent to that of the plaintiff's the plaintiff could not recover. In this case the plaintiff and defendant had been equal sinners, and the defendant proposed to add to his breach in the same way as he had already committed a breach. Upon the whole, he thought it was not only an excess, but so great an excess that it ought to be restrained. He accordingly granted an injunction restraining the defendant from building as shown in the plans deposited by him with the Town Council and passed by them.

Mr. Acland, K.C., and Mr. C. Herbert Smith appeared for the plaintiff; and Mr. W. H. Upjohn, K.C., and Mr. Edward Ford for the defendant.

### CASE UNDER THE PUBLIC HEALTH ACT.

THE case of Rippin v. The Isle of Thanet Rural District Council came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Lawrance and Ridley, on the 4th inst., on the appeal of Mr. A. J. Rippin against a decision of the justices of Margate. The case came before the Court in the form of a special case.

The case stated that a complaint was preferred by the Council against Mr. Rippin, auctioneer, of No. 33, Cheapside, Mr. F. H. Rake, and Messrs. Rippin & Rake, Limited, that they, being persons who intended to lay out a street on the Park estate, Birchington-on-Sea, to be known as Brunswick-road, had failed to give to the Council notice in writing of such intention, or to forward plans and sections to the Council's surveyors, contrary to by-law 91 (with respect to new streets and buildings), and contrary to the provisions of the Public Health Act, 1875. At the hearing Mr. Rake and Messrs. Rippin & Rake were dismissed from the complaint, and the summons was only pressed against the appellant. On his behalf it was contended that the summons was bad in law, but the justices held that the case must proceed as against him. The justices after hearing the case found that an offence had been committed by the appellant under the by-law, but that the appellant had since complied with it, and they imposed a fine of 2*l.* and costs for such breach. The questions for the opinion of the Court were—(1) Whether under the circumstances the justices were right in hearing the complaint against the appellant, after the respondents had decided to offer no evidence against Mr. Rake and Messrs. Rippin & Rake, Limited, and they had accordingly dismissed the case against them; (2) whether by-law 91 applied to a street as distinguished from a new street; (3) whether the road was a street or new street within the meaning of the Public Health Act, 1875, and by-law 91 of the Council; (4) whether there was any evidence of any intention to lay out a street or new street; (5) whether the justices were right in deciding that the work done on the road immediately prior to the information amounted to evidence of an intention to lay out the road at that time; and (6) whether the complaint was not barred under Section 11 of the Summary Jurisdiction Act.

Mr. R. W. Turner appeared for the appellant, and Mr. Thorn Drury for the respondents.

Mr. Turner argued that the by-law applied only to new streets, that it was *ultra vires*, that the road was not a street or new street within the meaning of the by-law, and that there was no evidence of any intention to lay out a new street.

In the result their lordships, without calling upon counsel for the respondents, affirmed the decision of the justices, and dismissed the appeal with costs.

### ACTION AGAINST LANDLORD FOR DEFECTIVE FLOORING.

JUDGMENT was given in the Court of Appeal, composed of the Master of the Rolls and Lord Justices Romer and Mathew, on the 10th inst., in the case of Cavalier and another v. Pope, on the application of the defendant for judgment or alternatively for a new trial or appeal from verdict and judgment at trial before Mr. Justice Phillimore and a common jury in the King's Bench Division.

The action was brought by Mr. and Mrs. Cavalier to recover damages from the defendant for personal injuries sustained by Mrs. Cavalier owing to the omission of the defendant's agent to carry out an agreement to do certain repairs in a house known as 18, Bridport-place, Hoxton, of which Mr. Cavalier was tenant to the defendant. Mr. Cavalier also claimed from the defendant the



expenses he had incurred in consequence of the accident to Mrs. Cavalier.

The facts of the case were as follows:—Mr. Cavalier, in December, 1901, entered into a verbal agreement with the defendant's agent for the tenancy of three rooms in the house in question at a monthly rent. The plaintiffs during the tenancy repeatedly called the agent's attention to the fact that the kitchen floor required repairing, and on December 9, 1902, the agent (according to the plaintiffs' case) agreed to do the necessary repairs if Mr. Cavalier stayed on as tenant. The repairs, however, were not carried out, and on October 21, 1903, while Mrs. Cavalier was standing on a chair in the kitchen, the back legs of the chair went through the floor, and the result was that Mrs. Cavalier was thrown to the ground and sustained serious injuries. At the trial the jury found, in answer to specific questions left to them, by the learned judge, that the agent had notice or knowledge that the kitchen floor was in a defective state; that the agent promised to repair it; and that in so doing he was acting within the scope of his authority. They assessed the damages at 75*l.* for the wife and 26*l.* for the husband, and judgment was entered accordingly with costs. Mr. Justice Phillimore holding that the wife was entitled to recover because, although the defendant was not liable to her in contract, he was liable to her in tort. The defendant now moved for judgment against the wife, or, in the alternative, for a new trial.

The Master of the Rolls and Lord Justice Romer held that as Mrs. Cavalier had no contract with the defendant on which she could sue, to succeed she must establish that her injury was caused by the defendant's neglect of some private duty he owed towards her in reference to the dilapidated condition of the flooring. In their opinion the agreement to repair did not bring the landlord within that class of case where the owner or occupier of dangerous premises was held liable for inviting an unsuspecting guest or stranger to come upon the premises. The contract with Mr. Cavalier to repair could not create a special private duty on the part of the landlord to the wife, which would have had no existence in the absence of the contract. If any invitation to the wife could be implied at all, it was an invitation by the husband, which the wife accepted, knowing all the facts. Their lordships thought, therefore, that the appeal should be allowed, and judgment entered for the defendant as against Mrs. Cavalier.

Lord Justice Mathew dissented. He thought that Mrs. Cavalier was entitled to a remedy at law for the injury she had sustained. It was true that the plaintiffs knew of the condition of the premises, but they did not willingly incur the risk to which they were exposed by the conduct of the landlord. He thought that the decision in the case of "Langridge v. Levy" was an authority for the position taken on behalf of the wife.

By a majority, therefore, the appeal was allowed, and judgment entered for the defendant as against the wife, with costs.

Mr. Montague Lush, K.C., and Mr. Lilley appeared for the appellant; and Mr. Wilshire for the respondents.

#### HAMPSTEAD PAVING APPORTIONMENT DISPUTE.

MR. JUSTICE JOYCE, in the Chancery Division on the 11th inst., delivered a considered judgment in the case of *Elidon v. the Mayor, etc.*, of Hampstead, an action by the plaintiff, the owner of certain houses abutting upon Gondar-gardens, Hampstead, for a declaration that an apportionment by the defendants, dated April 14, 1904, was invalid.

The material facts of the case were shortly as follows:—On the west side of Gondar-gardens (which was a new street), about 200 yds. away, was land belonging to the trustees of one Cotton, deceased. On this land houses were erected fronting upon the Sarre-road, and which had gardens running down to Gondar-gardens, from which they were separated by a fence. On October 10, 1901, the defendants, acting under their statutory powers, passed a resolution that a portion of Gondar-gardens should be paved, and that the estimated expenses should be apportioned to and charged upon the owners of the houses and premises abutting on such portion as mentioned in the resolution, including all the houses fronting on Sarre-road, the apportionment being at the rate of 1*l.* 3*s.* per ft. of frontage. The defendants rescinded that resolution and apportionment on March 3, 1904, and on April 14, 1904, passed a fresh resolution apportioning the expenses among the owners of the houses and land abutting on the portion paved, but excluding from the apportionment the owners of the houses fronting Sarre-road, and purporting to apportion the nominal sum of 1*l.* 8*s.* in regard to the strip of land on which stood the fence which separated the Sarre-road premises from Gondar-gardens. The result of the later apportionment was to increase the amount payable by the plaintiff and the remaining owners to 1*l.* 18*s.* per foot frontage, and the present action was accordingly commenced.

The defence was that the apportionment of April 14, 1904, properly apportioned the expenses.

Mr. Justice Joyce, in giving judgment, said that no one questioned that if an apportionment made by the authority were determined to be invalid a fresh one could be made. The new apportionment omitted all mention of the houses in the Sarre-road and inserted instead "land upon which old fence stands," purporting to charge the owners or owner of the land, whatever it might be, so referred to with the nominal sum of 1*l.* 8*s.* The difference between this and the aggregate sum of more than 500*l.*, charged by the original apportionment on the houses in Sarre-road was thus thrown upon the owners of the houses in Gondar-gardens, some of which belonged to the plaintiff, who naturally objected to have the assessment upon his property materially increased in that manner. Upon investigation, he was satisfied that there was no foundation in fact for the theory that the gardens or grounds of the houses in Sarre-road were cut off from the new street, Gondar-gardens, by any intervening strip of land whatsoever belonging to any person other than the owners of the houses in Sarre-road. He found as a fact that if the houses in Sarre-road were not houses forming the new street, still the lands of the Cotton trustees demised to the lessees of the houses in Sarre-road did, within the meaning of the term in the statute, bound or abut upon the new street, and so were liable to have, and ought to have, some portion of the expenses of the paving apportioned upon them in common with the other owners in the new street. If the properties of the lessees in Sarre-road abutted upon the new street, as in his opinion they did, some portion of the expense must be apportioned upon them. In his opinion, the last apportionment was illegal and invalid, and he made a declaration to that effect. If the defendants sought to enforce the apportionment the plaintiff would have liberty to apply for an injunction.

Judgment was accordingly entered for the plaintiff, with costs.

Mr. Younger, K.C., and Mr. Martell appeared for the plaintiff; and Mr. Macmorran, K.C., and Mr. Courthorpe-Munroe for the defendants.

#### LIMITATION OF POWERS OF A DISTRICT COUNCIL.

IN the Chancery Division, on the 11th inst., Mr. Justice Farwell concluded the hearing of the case of the *Attorney-General v. the Pontypridd Urban District Council*.

The action was brought by the Attorney-General, at the relation of the present trustees of the Baroness Llanover, deceased, against the defendants to restrain them, their contractors, servants, and workmen, from erecting or permitting to remain upon any portion of the land at Gwynerywryn, Treforest, near Pontypridd, which was purchased from the trustees in 1902, any building or works not required or intended for the purposes of the defendants' electric lighting undertaking, and from permanently using the land, or any part of it, for any other purpose than that for which it was acquired, viz., the production and supply of electricity. The relator trustees, on their own behalf, claimed an injunction to restrain the defendants from using any part of the land or any building on it in such a manner as to create a nuisance or cause damage to the Llanover estate.

It appeared that after the purchase of the land the defendants, in April, 1903, applied to the Local Government Board for permission to use a part of the land for the purpose of a refuse destructor, but were told that the Board had no power to sanction the use of the land for any other purpose than that for which it had been acquired. In the following April the trustees were applied to to accept a re-conveyance of the part of the land on which it was proposed to erect the destructor and then to convey it back again to the defendants, the latter paying the costs, but the trustees declined to entertain the application. Failing in both quarters, the defendants went through the form of conveying this part of the land to a Mr. Davis and taking a re-conveyance from him, the undertaking to re-convey being a condition of the conveyance to Davis, and although informed by the trustees that they objected to the refuse destructor being built there, the defendants had commenced the construction of the destructor, although no sanction had been obtained for it from the Local Government Board.

The trustees' view was that the destruction of dust and refuse on any portion of the land in question would cause a serious nuisance, and would seriously diminish the value of the trust property in the neighbourhood, which was being developed for building.

The nature of the defence was that the scheme of the Council for establishing their works for generating electrical energy included a scheme which was not uncommon in practice for utilising the heat derived from a refuse destructor for working the electric generating machinery. This plan they had, for reasons of economy, adopted as long ago as 1901, on the advice of their electrical engineer.

In the result his lordship, in giving judgment,

said that the proposition put forward by the defendants, that the defendants had the power to use over the land as suggested, was of a wide-reaching nature, and it was entirely contrary to the powers given to the Council in regard to the supply of electricity. He did not apply that principle to the present case. Defendants acquired powers to take and use the purpose of supplying electricity to the city, and nothing else. Subsequently the defendants had powers under the Electric Lighting Act, and they now sought to set up a case claiming that whether the land was acquired under the Electric Lighting Act or under the Public Health Act, in his opinion it was under the Electric Lighting Act, and for the purpose of electric lighting. Defendants had powers under the Public Health Act to erect a dust destructor. Could they then create if he gave the defendants a portion of the decisions on record. The powers obtained by the defendants must be treated as given unconditionally, and the defendants were constrained to say that the injunction would be granted, with costs.

Mr. W. H. Upjohn, K.C., and Mr. Hensell appeared for the Attorney-General; and Mr. Danckwerts, K.C., and Mr. R. J. Parker for the defendants.

#### PATENTS OF THE WEEK.

##### APPLICATIONS PUBLISHED.

18,837 of 1904.—S. SAUNDERS: Means for Draining Tiles, and the like.

This relates to means for sheltering bricks from rain. According to the invention, between the two rows of bricks a series of rigid poles are placed of suitable height. Between these poles sections of roof are interposed, which may be of wood, and which are secured to shafts extending longitudinally between the poles and passing through them in such a manner that each section of roof is capable of angular motion about the axis of said shafts. To each section of roof on either side of the poles is attached a cord, each cord being led up over pulleys or guides and secured to a main rope, extending at right angles to the smaller cords—that is to say, in the direction of the brick row and in such manner that by pulling at one end of this main rope all the sections of roofs on the racks may be raised simultaneously and again on releasing the rope they may all descend into their sheltering position, means being also provided for protecting the brick from side rain, consisting of freely swinging lateral flaps attached to each section of roof and adapted for preventing said flaps from blowing inward.

19,684 of 1904.—G. P. CAMPBELL: Machines for Making Building Blocks.

A machine for making building blocks of cement, concrete, or the like, consisting in the combination of a mould or box into which the concrete or the like is introduced, said mould or box having hinged sides, a bed or base, extending bearing parts by which the supports or bearings which carry the hinges of the sides may be moved and hinged at different points laterally, and removable bottom plate resting on the bed for varying the depth of the stone to be made.

19,994 of 1904.—W. P. MORGAN: Ventilation of Buildings and the like.

A system of ventilating buildings or rooms consisting of a pipe passing horizontally through the building from side to side over the said room, and having a communication with the said room through a downward orifice entering into an upward duct of the said horizontal pipe.

20,025 of 1904.—H. W. PARKINSON, A. C. PARKINSON, and E. C. ROE: Construction of Bolt Fastenings.

This relates to the manufacture of a sliding bolt for a door, comprising three separately constructed portions, namely, a nose portion and a socket, wherein it is adapted to be slidably guided, a second portion composed of a handle and a socket, wherein it is also adapted to be slidably guided, and a third portion adapted to be interposed between the nose and handle parts and to connect them rigidly together, the latter portion being provided with a separate socket within which it also is slidably guided, a striking plate, the engaging surface of which is so inclined to the line of slide of the bolt that the engagement commences with slight pressure thereon of the nose of the bolt, and which pressure increases when the bolt is thrust into further engagement with the striking plate, a head formed on the frame of the door, and its counterpart formed on the frame of the opening to be closed by the door, whereby the air tightness of the closed aperture is adapted to be increased.

\* All these applications are in the stage in which opposition to the grant of Patents upon them may be made.



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## PRICES CURRENT OF MATERIALS.

\* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

## BRICKS, &amp;c.

Hard Stocks	£ s. d.	1 8 0	per 1000	alongside, in river.
Bought Stocks	1 8 0			
Grizzles	1 4 0			
Facing Stocks	2 0 0			
Shutters	2 0 0			
Flintings	1 7 0			at railway dep't.
Red Wire Cuts	1 14 0			
Best Fareham Red	3 12 0			
Best Red Pressed	5 0 0			
Runon Facing	5 0 0			
Best Blue Pressed	4 2 6			
Stourbridge	4 7 6			
Best Stourbridge	4 0 0			
Fire Bricks	4 0 0			
GLAZED BRICKS.				
Best White and				
Ivory Glazed				
Stretchers	12 0 0			
Quoins, Bullnoses,	11 0 0			
and Flats	16 0 0			
Double Stretchers	19 0 0			
Double Headers	16 0 0			
One Side and two	19 0 0			
Ends	20 0 0			
Two Sides and	20 0 0			
one End	20 0 0			
Splays, Cham-	20 0 0			
ferred, Squints	20 0 0			
Best Dipped Salt				
Glazed Stretch-				
ers, and Header	12 0 0			
Quoins, Bullnoses,				
and Flats	14 0 0			
Double Stretchers	15 0 0			
Double Headers	14 0 0			
One Side and two				
Ends	15 0 0			
Two Sides and				
one End	15 0 0			
Splays, Cham-				
ferred, Squints	14 0 0			
Second Quality				
White and				
Dipped Salt				
Glazed	2 0 0			less than best.

Thames and Pit Sand	s. d.	7 0	per yard, delivered.
Thames Ballast	5 9		
Best Portland Cement	27 0		per ton, "
Best Ground Blue Lime	20 0		"

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Way Stone Lime	12s. 0d.	per yard, delivered.
Sturbridge Fireclay in sacks	27s. 0d.	per ton at rly. dep't.

## STONE.

BATH STONE—delivered on road wag-	s. d.	1 6 3	per ft. cube.
gons, Paddington Depot			
Do. do. delivered on road wag-			
gons, Nine Elms Depot	1 8 3		" "
PORTLAND STONE (20 ft. average)—			
Brown Whitbed, delivered on road			
wagons, Paddington depot, Nine			
Elms depot, or Pimlico Wharf	2 1		" "
White Bashed, delivered on road			
wagons, Paddington depot, Nine			
Elms depot, or Pimlico Wharf	2 2 3		" "
ANCIENT IN BLOCKS	s. d.	1 1	per ft. cube, del'd. rly. dep't.
Bees	1 6		" "
Greenshill	1 10		" "
Darley Dale in blocks	2 4		" "
Bed Corsehill	2 5		" "
Cleworth Freestone	2 0		" "
Bed Manshill	2		" "

YORK STONE—Robin Hood Quality,			
Scrapped random blocks 2 10			" "
6 in. sawn two sides			" "
landings to sizes			" "
(under 40 ft. super.) 2 3			per ft. super.
6 in. rubbed two sides			" "
ditto, ditto	2 6		" "
8 in. sawn two sides			" "
slabs (random sizes) 0 11 3			" "
2 in. to 2 3/4 in. sawn one			" "
side slabs (random			" "
sizes) 0 7 3			" "
1 1/2 in. to 2 in. ditto	0 6		" "

HARD YORK—			
Scrapped random blocks 3 0			per ft. cube.
6 in. sawn two sides,			" "
landings to sizes			" "
(under 40 ft. super.) 2 8			per ft. super.
6 in. rubbed two sides			" "
ditto	3 0		" "
8 in. sawn two sides			" "
(slabs random sizes) 1 2			" "
2 in. self-faced random			" "
flags	0 5		" "

## STONE (continued).

## HARD YORK (continued).—

Hopton Wood (Hard Bed) in blocks 2 0	s. d.	2 0	per ft. cube, del'd. rly. dep't.
6 in. sawn both			" "
sides landings 2 7			per ft. super, del'd. rly. dep't.
3 in. sawn both			" "
sides random			" "
slabs	1 0		" "
2 in. do.	0 8 3		" "

## SLATES.

in. in.	£ s. d.		
20 x 10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.	
20 x 12	13 17 6	"	"
20 x 10 first quality	50 0	per 1000	"
20 x 12	13 15 0	"	"
18 x 8	7 5 0	"	"
20 x 10 best blue Port-	12 12 6	"	"
madoc	6 12 6	"	"
18 x 8	6 12 6	"	"
20 x 10 best Eureka un-	15 17 6	"	"
fading green	13 7 6	"	"
18 x 12	13 5 0	"	"
18 x 10	10 5 0	"	"
20 x 10 permanent green	11 12 6	"	"
18 x 10	9 12 6	"	"
18 x 8	6 12 6	"	"

## TILES.

Best plain red roofing tiles	42 0	per 1000 at rly. dep't.
Hip and Valley tiles	3 7	per doz.
Best Glossy tiles	50 0	per 1000
Do. Ornamental tiles	52 6	"
Hip and Valley tiles	4 0	per doz.
Best Runon red, brown, or		"
brindled do. (Edwards)	57 8	per 1000
Do. Ornamental do.	59 0	"
Hip tiles	4 0	per doz.
"Hay" tiles	51 0	"
Best Red or Mottled Stafford-		"
shire do. (Peasbros)	51 9	per 1000
Do. Ornamental do.	54 6	"
Hip tiles	4 1	per doz.
Valley tiles	3 8	"
Best "Rosemary" brand		"
plain tiles	48 0	per 1000
Best Ornamental tiles	50 0	"
Hip tiles	4 0	per doz.
Valley tiles	3 8	"
Best "Hartshill" brand		"
plain tiles, sand faced	50 0	per 1000
Do. pressed	47 6	"
Do. Ornamental do.	50 0	"
Hip tiles	4 0	per doz.
Valley tiles	3 6	"

## WOOD.

BUILDING WOOD.	At per standard.	£ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in.	23 10 0	15 0 0	
by 9 in. and 11 in.	23 10 0	14 0 0	
Deals: best 3 by 9.	23 10 0	14 0 0	
Battens: best 2 1/2 in. by 7 in.	11 0 0	12 0 0	
8 in. and 3 in. by 7 in. and 8 in.	11 0 0	12 0 0	
Battens: best 2 1/2 by 6 and 3 by 6.	10 0 0	less than 7 in. and 8 in.	
Deals: seconds	1 0	0 less than best.	
Battens: seconds	0 10 0	" "	
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	10 0 0	
2 in. by 4 in. and 2 in. by 5 in.	8 10 0	9 10 0	
Foreign Sawed Boards—			
1 in. and 1 1/2 in. by 7 in.	0 10 0	more than battens.	
3 in.	1 0 0		
At per load of 50 ft.			

Fir timber: best middling Danzig	4 10 0	5 0 0
or Memel (average specification)	4 0 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	3 10 0
Swedish balks	2 10 0	3 0 0
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0

## JOINERS' WOOD.

White Sea: first yellow deals,	At per standard.	£ s. d.	£ s. d.
3 in. by 11 in.	24 0 0	25 0 0	
3 in. by 9 in.	22 0 0	23 0 0	
Battens, 2 1/2 in. and 3 in. by 7 in.	16 0 0	18 0 0	
Second yellow deals, 3 in. by			
11 in.	18 10 0	20 0 0	
" 3 in. by 9 in.	17 10 0	19 0 0	
Battens, 2 1/2 in. and 3 in. by 7 in.	13 10 0	14 10 0	
Third yellow deals, 3 in. by 11 in.			
and 9 in.	13 10 0	15 0 0	
Battens, 2 1/2 in. and 3 in. by 7 in.	11 0 0	12 0 0	
Petersburg: first yellow deals,			
3 in. by 11 in.	21 0 0	22 10 0	
Do. 3 in. by 9 in.	18 0 0	19 10 0	
Battens	13 10 0	15 0 0	
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0	
Do. 3 in. by 9 in.	14 10 0	16 0 0	
Battens	11 0 0	12 10 0	
Third yellow deals, 3 in. by			
11 in.	13 0 0	14 0 0	
Do. 3 in. by 9 in.	12 10 0	14 0 0	
Battens	10 0 0	11 0 0	
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	14 10 0	15 10 0	
" 3 in. by 9 in.	13 10 0	14 10 0	
Battens	11 0 0	12 0 0	
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0	
" 3 in. by 9 in.	12 10 0	13 10 0	
Battens	10 0 0	11 0 0	
Pitch-pine: deals	16 10 0	20 0 0	
Under 2 in. thick extra	0 10 0	0 0 0	
Yellow Pine—First, regular sizes	44 0 0	upwards,	
addments	32 0 0		
Seconds, regular sizes	33 0 0	"	
Yellow Pine addments	23 0 0	"	
Sauri Pine—Planks, per ft. cube	0 8 6	0 5 0	
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	0 3 6	
Small	0 2 6	0 2 3	
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. sup. as			
inch	0 8 3	0 9 0	
3 in. do.	0 7 0		

PRICES CURRENT.—Continued on page 218.

2110 of 1904.—C. V. CHILDS: Concrete Walls, Hollow Shafts, and Chimneys.

A chimney or other shaft made of concrete, cast round a number of vertical bars having a number of ribs or projections on their lower ends in one direction, so as to be horizontal and embedded in the foundations, and similar bars bent in the other direction within the foundations, so that the whole structure is reinforced.

2119 of 1904.—C. LINFORD: Combined Bath and Sink.

The invention consists of a combined bath and sink made so that either may be available for use or will. The combined bath and sink may be made from hard or soft wood, cast or sheet metal, enameled or painted, and it has trunnions at either end, which suspend it pivotally in bracket ranges and which hold it clear of the floor. The bath on the under side it has a tip provided all round to form a sink. Means are provided for tipping the combined bath and sink steady for use. A covering board may be made to slide on either bath or sink for use as a table.

2122 of 1904.—F. JOHNSON.—Machine for Cutting and Delivering Bricks from Brick-making Machines.

According to the invention, the clay is fed into the pugmill and forced through a brick die fixed at one end of said pugmill, and passes out of the die in a continuous column, on to a cutting-off table, provided with a wire frame, with wires arranged to suit the thickness of bricks to be cut. A portion of the moving column is, in the first instance, cut by a separate wire of sufficient length for cutting the required number of bricks. The said wire is fixed vertically to a horizontal sliding bar, and is manipulated by an attendant who, as soon as the column is separated, quickly places the same in front of the wire frame, another attendant, at the same time operates the lever placed at the extreme front end of the table and moves the separated part of the column through the wire frame, and delivers the cut bricks on to a moving pallet placed behind the wire frame. The pallet containing the cut bricks is then lifted a barrow.

4245 of 1905.—E. SCHIMATOLLA: Kilns for Burning Limestone, Dolomite, and the like.

A kiln for burning limestone, dolomite, and the like with the gases from a generator furnace, containing in the combination with a gas passage in the base of the kiln, lateral communicating channels leading to gas ducts, gas inlets opening into such ducts into the kiln, air ducts outside each gas duct and provided with regenerative passages, air inlets opening from the air ducts into the kiln above the gas inlets, and a projecting air distributing ring arranged at the base of the kiln shaft.

4246 of 1905.—A. W. LAWDER and M. N. RIDLEY: Ventilating Valves, Sluice Traps, or other Similar Apparatus.

This relates to valves, sluice traps, or the like having two or more valves arranged at different heights, and consists in constructing one valve so that it overhangs the other valve, the overhanging portion being connected by a straight or radiused diaphragm.

## SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.	
August 2.—By MADISON, MILES, & MADISON (at Yarmouth).	
Clutton, Norfolk.—A freehold and copyhold tenements, 5 a. 2 r. 6 p. ....	£650
Clutton, Norfolk.—Freehold house and street gdn., 11 a. 8 r. 3 p. ....	650
August 3.—By REWELL & SYMONS (at Newton Abbot).	
Newton, Devon.—Water Estate, 308 a. ....	4,600
August 5.—By C. R. MORRIS, SOHS, & PHARO (at Hounslow).	
Blomley, Devon.—"Blamphayne Farm," 69 a. 2 r. 35 p. ....	1,300

Contractions used in these lists.—F.g.t. for freehold or leasehold; l.g.t. for leasehold ground-rent; l.g.t. for leasehold ground-rent; g.t. for ground-rent; r. for rent; p. for purchase; e.t. for estimated rental; w.t. for weekly rental; q.t. for quarterly rental; p.a. for per annum; y.m. for years; p. for place; t. for terrace; c. for crescent; g.t. for garden; y.d. for yard; g. for garden; p.h. for public-house; c. for close; &c. for &c.

## MEETINGS.

SATURDAY, AUGUST 19.  
British Architectural Association.—An Excursion to the Members to assemble at Sunderland Railway Station, 1 p.m. upon the arrival of the 2.50 p.m. train from Newcastle.  
SATURDAY, SEPTEMBER 2.  
London Association of Municipal and County Councils.—Midland District Meeting to be held at Birmingham.



# COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.	Designs to be sent to
*SECONDARY SCHOOL FOR GIRLS .....	County Borough of Preston .....	50L, 80L, and 20L .....	Oct. 19

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be sent to
Foreign Animals Wharf and Carriages .....	Glasgow Corporation .....	Master of Works, 64, Cochrane-street, Glasgow .....	Aug. 2
Plate Girder Spans .....	Sec. of State for Indian Council .....	Director General of Stores, India Office, Whitehall, S.W. .....	Aug. 22
Scavenging .....	Rhondda U.D.C. .....	W. T. Jones, Surveyor, Public Offices, Penryn, Rhonda .....	do.
Additions and Sanitary Work, West-st. Infant's School .....	Crewe Education Committee .....	H. D. Struthers, Technical Institute, Crewe .....	do.
Additions and Sanitary Work, Edleslow-road Schools .....	do. .....	do. .....	do.
House at Capocch, near Aberdeen .....	do. .....	do. .....	do.
Scarfing and Rolling .....	Capocch Building Club .....	T. Roderick, Architect, Ashbrook House, Aberdeen .....	do.
Making Apparatus, Prim. Meth. Ch., Wheatley Hill .....	Bectles Corporation .....	T. O. Cudbird, Borough Surveyor, Bectles .....	do.
Making Streets and Passages .....	Wallasey U.D.C. .....	W. Smith, 23, Walmerhouse st., Wheatley Hill, Thornby, R.R.O. .....	do.
Water Main at Glenageary, Kingsdown .....	Kingstown U.D.C. .....	District Surveyor to Council, Public Offices, Eglamont .....	Aug. 21
Ten Cells for Vagrants at Workhouse .....	Roughington-le-Springs Guardians .....	Town Surveyor, Town Hall, Kingsdown, Ireland .....	do.
Rebuilding Hare and Hounds Inn, Coventry .....	Messrs. Atkinson's Brewery .....	Workhouse Master .....	do.
Painting at Foreign Animals Wharf, Trafford Wharf .....	Manchester Markets Committee .....	Harrison & Hatherly, Architects, 28, Bedford-street, Coventry .....	do.
Inter. Fittings, Central Drapery Stores, Commercial-st. .....	Bayley Co-operative Society .....	P. H. Buckley, Architect, 85, Commercial-street, Batley .....	Aug. 21
900 tons of Broken Granite .....	Stowmarket U.D.C. .....	R. C. Hayward, Clerk, Old Bank, Butter Market, Stowmarket .....	do.
Two Houses, Burley-in-Wharfedale .....	Prescot Guardians .....	W. J. Taylor, County Surveyor, The Castle, Winchester .....	do.
Alterations to No. 57, Hardshaw-street, St. Helens .....	Mr. J. Wiper .....	J. Gandy, Architect, St. Helens .....	do.
Cleaning & Paint. Premises, Hardshaw-st., St. Helens .....	Receiver Gen. of Contracts, Valletta .....	W. Levens, Highfield, Kendal .....	do.
Dwelling House, Horn Cop, Kendal .....	Bradford Education Committee .....	Crown Agents for Colonies, Whitehall-gardens, S.W. .....	Aug. 25
Refuse Destructor for Pouchness .....	Rt. Hon. Viscount Palmouth .....	Architect's Department, Education Office, Manor-row, Bradford .....	do.
Wrought-iron Casements for Windows of Workshops .....	West Riding Education Committee .....	K. Millard, Fishery-street, H.C. .....	do.
Carpenter & Joiner Work, new Depots, Hanson Sch. .....	Oswaldtwistle U.D.C. .....	G. Gow, Treacraft Office, Truro .....	Aug. 24
*100' FT. OF ROAD, ETC., AT HIGHGATE .....	Ely U.D.C. .....	J. Vickers Edwards, County Architect, County Hall, Wakefield .....	do.
Playway, Iron Roof to Barn at Bosfrankan, St. Buryan .....	South Shields Town Council .....	B. J. Westwell, Clerk to Council .....	do.
Heating, etc. Orley North Parade Provided School .....	Grange-over-Sands U.D.C. .....	Borough Engineer, Chapter-row, South Shields .....	do.
550 tons of Granite-dressed Setts .....	Narberth U.D.C. .....	T. Ruddleson, Surveyor, Council Offices, Grange-over-Sands .....	Aug. 23
*ERECT. OF CARSHEDES FOR ELEC. TRAMWAYS .....	Southampton C.C. .....	G. E. Morris, Clerk, High-street, Narberth .....	do.
Private Street Works, Kenilworth-road, Kents-bank .....	Runcorn U.D.C. .....	Surveyor's Office, Town Hall, Runcorn .....	do.
Cement Concrete Paving, etc., Narberth .....	do. .....	W. J. Taylor, County Surveyor, The Castle, Winchester .....	do.
Additions to Tadley Council School .....	Llantrisant Parish Council .....	W. J. Morley & Son, Architects, Craven House, Kingsway, W.C. .....	Aug. 2
Revering and Walling at Cemetery .....	Woodford U.D.C. .....	W. Farrington, Surveyor, Council Offices, Woodford Green .....	do.
220 yds. of Pipe Sewer, Westfield-road .....	Treherne Building Co., Ltd. .....	W. Dowdeswell, Architect, John-street, Treherne .....	do.
Additions to Bumbleton Mixed Schools .....	Beckle Corporation .....	Borough Engineer's Office .....	do.
Westley Church, Barnes .....	Commissioners of H.M. Works .....	Sir Aston Webb, 19, Queen Anne's-gate, S.W. .....	do.
Broken Granite .....	Sutton (Surrey) U.D.C. .....	C. Chambers Smith, Surveyor, Municipal Offices, Sutton .....	Aug. 24
Steam Boiling and Scarfing .....	do. .....	J. Dixon, Engineer, 217, St. Vincent-street, Glasgow .....	do.
Forty Houses at Edwardsville, Treherne .....	Batley Co-operative Society .....	H. B. Buckley, Architect, 35, Commercial-street, Batley .....	Aug. 1
Private Improvement Works .....	Bradford Corporation .....	W. J. Lodge, Clerk, Sedgfield, Ferryhill, Durham .....	do.
*ADMIRALTY EXTEN. BLOCK IV. (SUBSTRUCT.) .....	Sedgfield E.D.C. .....	W. E. Putnam, Borough Engineer, Town Hall, Morley .....	do.
Roadworks (Sewering and Paving) .....	do. .....	do. .....	do.
Two Lanes, Boilers, Motherwell Middle Wd. Hospital .....	Portgillad U.D.C. .....	R. P. Wilson, Consulting Engineer, 66, Victoria-st., Westminster .....	Sept. 2
Steam & Feed Pipes, Pumps, Motherwell Hospital .....	Margan U.D.C. .....	J. Cox, Surveyor to Council, Port Talbot .....	do.
Inter. Fittings, Central Grocery Stores, Commercial-st. .....	N.E. Railway Co. .....	A. W. Kyle, Architect and Surveyor, Burnfield .....	do.
*ELEMENTARY SCHOOLS AT WOLVERTON .....	Sunderland Corporation .....	W. J. Cudworth, Engineer Co. Company, York .....	do.
Stores .....	Steyning West E.D.C. .....	Borough Engineer, Town Hall, Sunderland .....	do.
Main Sewer & Sewage Disposal, Ferryhill, Chilton, etc. .....	Trustees .....	F. Slaughter, Surveyor, High-street, Steyning .....	do.
Laying Pipes .....	Crook U.D.C. .....	T. E. Jones, Architect, 1, St. Julian's-street, Birmingham .....	do.
Permanent Way .....	Great Northern Railway Co., Ireland .....	Surveyor's Office, Council Office, Crook, Durham .....	do.
Council Offices, Tabach .....	do. .....	W. H. Mills, Engineer, Amien's-street, Terminus, Dublin .....	do.
Wesleyan Sunday School, Burnopfield .....	Right Hon. Lord Kensington .....	J. Barbour & Bowl, Architects, Dumfries, N.B. .....	do.
Steel Bridge, Manor-road, Bearborough .....	Sawbridgeworth U.D.C. .....	Council Offices, Bell-street, Sawbridgeworth .....	do.
Widening Southwick-road Bridge, etc. .....	H.M. Office of Works .....	H.M. Office of Works, Storey's Gate, Westminster, S.W. .....	Sept. 1
Paving and Kerbing, Railway Hotel Front, Lanchester .....	Mr. & Mrs. Tabesh James .....	A. T. James, Iwerthorne House, Gloucester-terrace, Aberdeen .....	do.
Alterations to Ebenezer Calvinist Chapel, Twynccarno .....	Metropolitan Asylums Board .....	Office of the Board, Embankment, E.C. .....	do.
Drainage Works, West Roddymoor .....	Great Western Railway Co. .....	Office of the Engineer, Wolverhampton Station .....	do.
Station-master's House at Castletown .....	Croydon Education Committee .....	C. Law-Green, Surveyor, Wigan-road, Ormakirk .....	Sept. 1
Station-master's House at Portadown .....	Edinburgh Corporation .....	Education Office, Keshington-street, Croydon .....	do.
Station-master's House at Smithborough .....	Gloucester Education Committee .....	Civil Engineer, H.M. Dockyard, Pembroke Dock .....	Sept. 1
Improvements, Mansion Ho., St. Brides, Farnbrook .....	Herne Bay U.D.C. .....	F. A. Newington, Engineer, Dewar-place, Edinburgh .....	do.
*ERECTOR OF FIRE STATION .....	Bishop's Stortford U.D.C. .....	M. H. Medland, County Architect, 15, Clarence-street, Gloucester .....	Sept. 1
*POST OFFICE AT BLACKBURN .....	Barnet Chancel Estate Trustees .....	F. W. J. Palmer, Surveyor, Town Hall, Herne Bay .....	do.
Twenty Houses Outside of Abercrombie Brewery .....	Bombay Port Trust .....	T. Swarbrick, Engineer, Council Offices, 7, North-st., Bishop's Stortford .....	Sept. 1
*DIAMOND, ETC. B.L.K. PD. PMFS, ETC. TOOTING .....	Credit District Committee .....	E. Dalton, 35, Wood-street, Barnet .....	Sept. 2
*EXTENSION OF GOODS SHED AT LYE .....	Leeds E.D.C. .....	Sir J. Wolfe Barry & A. J. Barry, 7, The Sanctuary, Westminster .....	Sept. 2
*ERECTOR OF SCHOOL, THORNTON HEATH .....	War Office .....	Superintendent Architect's Dept., 15, Pall Mall East, S.W. .....	Sept. 2
*FOOTGUARD BLDGS., NELLY'S POINT, BARRY .....	do. .....	Manager, Bryncestin, Bridgend .....	do.
Electric Lighting, Mortuary Bldgs., High Scho. Yards .....	do. .....	J. Young & Co., Architects, 62, Market-street, Bradford .....	do.
Elementary School at Lydney .....	do. .....	H. H. Hodgson, Oakwood Offices, Wetherby-road, Roundhay, Leeds .....	do.
Timber for Pies, etc. .....	do. .....	F. P. Bowman, Architect, 5, Groat-street, Leeds .....	do.
*ERECTOR OF CHURCH HOUSE AT BARNET .....	do. .....	Deacon & Horsburgh, Architects, 12, St. George's-crescent, Liverpool .....	do.
BLKS. OF BLDG. AT WESTMINST. TECH. INST. .....	do. .....	R. Anderson, C.E., 39, Victoria-street, Westminster .....	do.
Railway Siding, 600 yds. long .....	do. .....	War Office, Atterbury-street, Grosvenor-road, S.W. .....	do.
Detached Residence at Thornbury .....	do. .....	do. .....	do.
Street Lamps in Roundway .....	do. .....	do. .....	do.
Houses and Shops, Waterloo-road, Hunslet, Leeds .....	do. .....	do. .....	do.
Library, Mesborough .....	do. .....	do. .....	do.
Forming and Sewering Two Miles of Roads .....	do. .....	do. .....	do.
*PAINTING ROYAL VICTORIA HOS., NETLEY .....	do. .....	do. .....	do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be sent to
*BUILDING INSPECTOR .....	Northamptonshire C.C. .....	150L. per annum .....	Sept. 1
*TEACHER OF METAL WK., SHOTCH. TECH. IN. .....	London C.C. .....	15s. an attendance .....	Sept. 1

Those marked with an asterisk (\*) are advertised in this number.

Competitions, &c.

Contracts, &c. v. viii. &c.

Public Appointments, &c.







**LLANGATTOCK-JUNTA-USE.**—For alterations and additions to rectory house, for the Rev. H. G. Corner. Mr. W. H. Dashwood Caple, architect, Church-street-chambers, Cardiff:—  
J. H. Load-  
ester .... £5,097 0 0  
G w a t k i n  
Bros. .... 1,653 19 11  
J. Y. Thomas  
& Sons .... 995 0 0

**LONDON.**—For re-decorating Grosvenor Chapel, South Audley-street, W. Mr. William Pywell, architect:—  
F. G. Minter .. £347 0 0  
Phillips & Son 313 10 0  
W. Wallis .... 298 0 0  
Dallry & Son .. 280 0 0  
Harrod's Ltd. 288 0 0

**LONDON.**—For additions and alterations to the offices, etc., at the Borough Electricity Works, No. 85, Fulham Palace-road, for the Borough Council of Hammersmith. Mr. H. Mair, Borough Surveyor, Town Hall, Broadway, Hammersmith. Quantities by Messrs. C. Stanger & Son, F.S.I.:—  
S. Foulden .. £2,279 0 0  
E. Wayland .. 2,267 9 2  
J. G. Baker .. 2,213 16 4  
Patna & Co. .... 2,164 0 0  
V. Co. .... 2,143 17 3  
Sheffield Bros. 2,131 0 0  
S p e n c e r,  
Sanks,  
& Co., Ltd. 2,123 0 0  
J. McManus & Co. .... 2,096 0 0  
Spens & Son .. 2,089 17 0  
D e a r i n g &  
Son .... 1,973 10 4  
H. Kent .... 1,968 0 0  
H. Lovatt .. 1,947 0 0  
J. C. Richards & Co. .... 1,931 0 0  
Appleby & Sons .... 1,895 0 0  
Lole & Co. .... 1,892 0 0  
B. E. Nightingale .. 1,888 0 0  
C o w l e y &  
Drake .... 1,885 13 2

**LOWESTOFT.**—For painting and redecoration at the technical schools, for the Education Committee. Mr. G. W. Leighton, Architect, Ipswich:—  
Bedwell & Parker .. £139  
T. Curtis .... 238  
G. E. Hawes .... 197

**NEW SHILDON.**—For kerbing and flagging in Redworth-road, for the Shildon and East Thickley Urban District Council. Mr. C. Heslop, Surveyor:—  
L. Bell .... £230 14 4  
G. Bell .... 189 3 11  
W. Coates .... 187 2 7  
W. Burdon .. 165 18 11

**NEWTON ABBOT.**—For erecting a nursery, etc., at the Workhouse, for the Guardians. Mr. S. Segar, architect, Union-street, Newton Abbot:—  
Wilkins & Sons .... £1,989 0 0  
Parker Bros. 1,975 0 0  
E. Pike .... 1,935 0 0  
W. E. Blake 1,890 0 0  
F. J. Zealley 1,840 0 0  
B. E. Narra-  
cott .... 1,827 12 6

**SHANGHAI.**—For a terrace of seventeen residences at Shanghai, for Mr. J. R. Twentymann. Mr. W. M. Dowdall, architect:—

Shanghai Building & Investment Co., Ltd. 200,150  
Yang Tse Ta .. 208,500  
Wong Fah Kee .. 195,800  
Zoon Yung Chong .. 194,988  
Oriental Construction Co. .... 190,850  
Zee Kuen Kee .. 178,500

[All of Shanghai.]  
(The present value of the tael is about 2s. 8d. sterling.)

**OVERSEAL.**—For the construction of sewers, tanks, and filter at Shortheath, for the Heartsbury & Seals Rural District Council. Mr. A. Lewis, Surveyor, 2, Packington-road, Ashby-de-la-Zouch:—  
Edwin Clarke .. £345 0 0  
Slater & Harrison, Overseal,  
Ashby-de-la-Zouch .. 381 2 6  
Orton & Son .. 323 10 0

**SKIPTON.**—For the construction of about 3,300 lineal yds. of 6 in., 9 in., and 12 in. earthenware pipes sewers, with manholes and lamp-holes; also sewage tanks and for bacterial filters and other necessary works for the sewerage and sewage disposal works of Skipton, for the Rural District Council. Mr. R. A. Johnson, engineer, 15, The Exchange, Bradford; and Mr. A. Rodwell, surveyor, Skipton:—  
Greaves & Wheaton, Calverley .. £2430 15 7

**SKIPTON.**—For the construction of sewage tanks, bacterial filters, storm-water filter, engine-house and other works for the extension of the Early Sewage Disposal Works, for the Rural District Council. Mr. R. A. Johnson, engineer, 15, The Exchange, Bradford; Mr. A. Rodwell, surveyor, Skipton:—  
G. Read & Sons, Burnley .. £3,852 5 11

**WALSALL.**—For re-making, Eastbourne-street, for the Corporation:—  
J. Owens, St. Mark's-road, Wolverhampton £324

**WALTHAMSTOW.**—For supplying low pressure heating apparatus to the Mission-grove School, for the Walthamstow Education Committee. Mr. H. Prosser, Architect:—  
J. Grundy & Co. £447 0  
Palowkar & Son .. 418 0  
Musgrave & Co. .... 415 0  
Russell & Co. .... 414 0  
Price, Lea, & Co. 388 0  
W. J. Fox .. 388 0

**WALTHAMSTOW.**—For the erection and completion of the Prospect Hill Presbyterian Church, for the Building Committee. Mr. J. Williams Dugford, architect, 1006 Queen Victoria-street, London, E.C.:—  
Sands & Bailey, Cannon-road, Walthamstow £5,240

**WALTHAMSTOW.**—For an addition to No. 181, Wood-street, for Mr. Thomas Davey. Mr. J. Williams Dugford, architect, 1006, Queen Victoria-street, London, E.C.:—  
G. M. Page, Church Hill-road, Walthamstow £197

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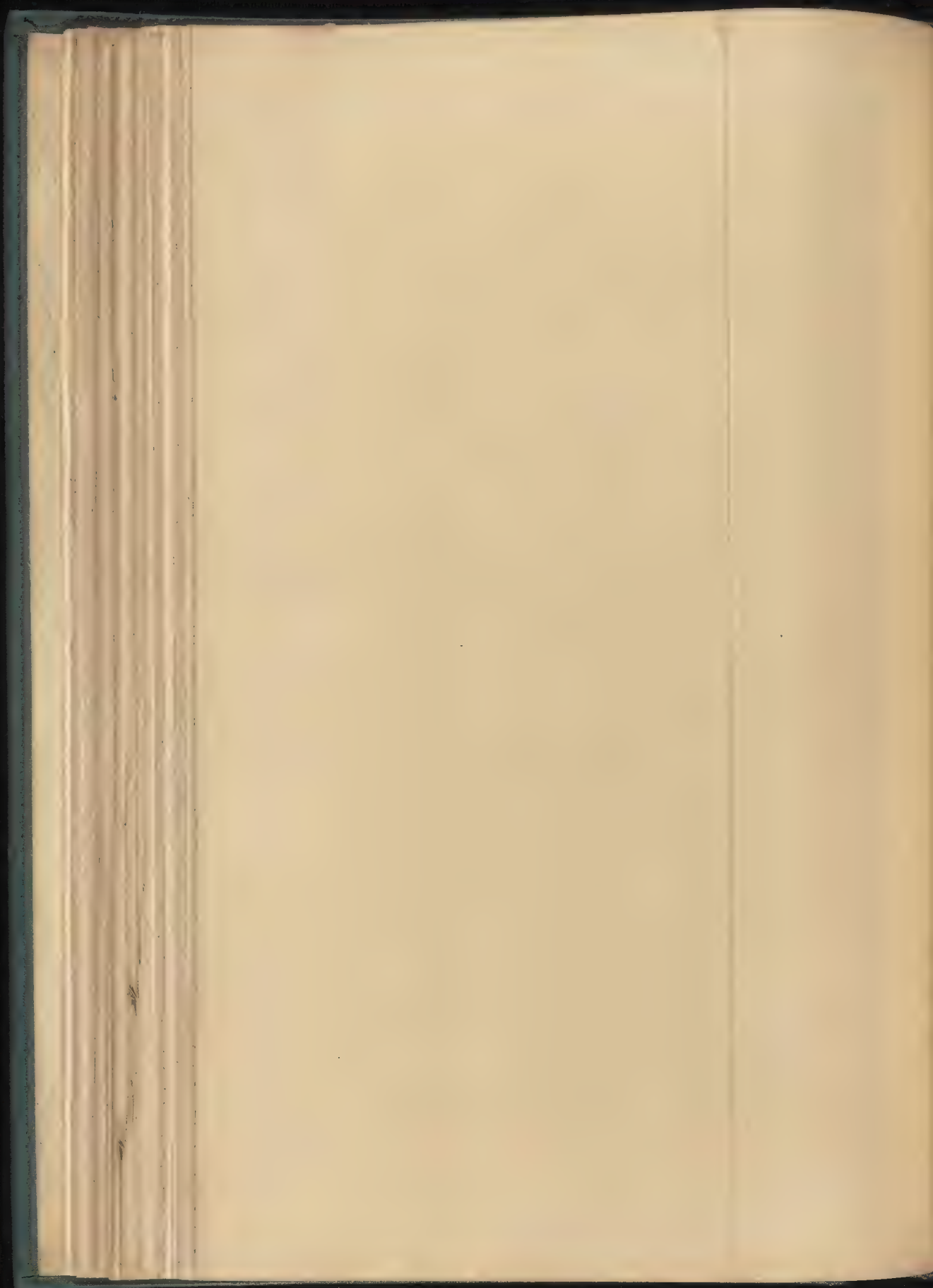
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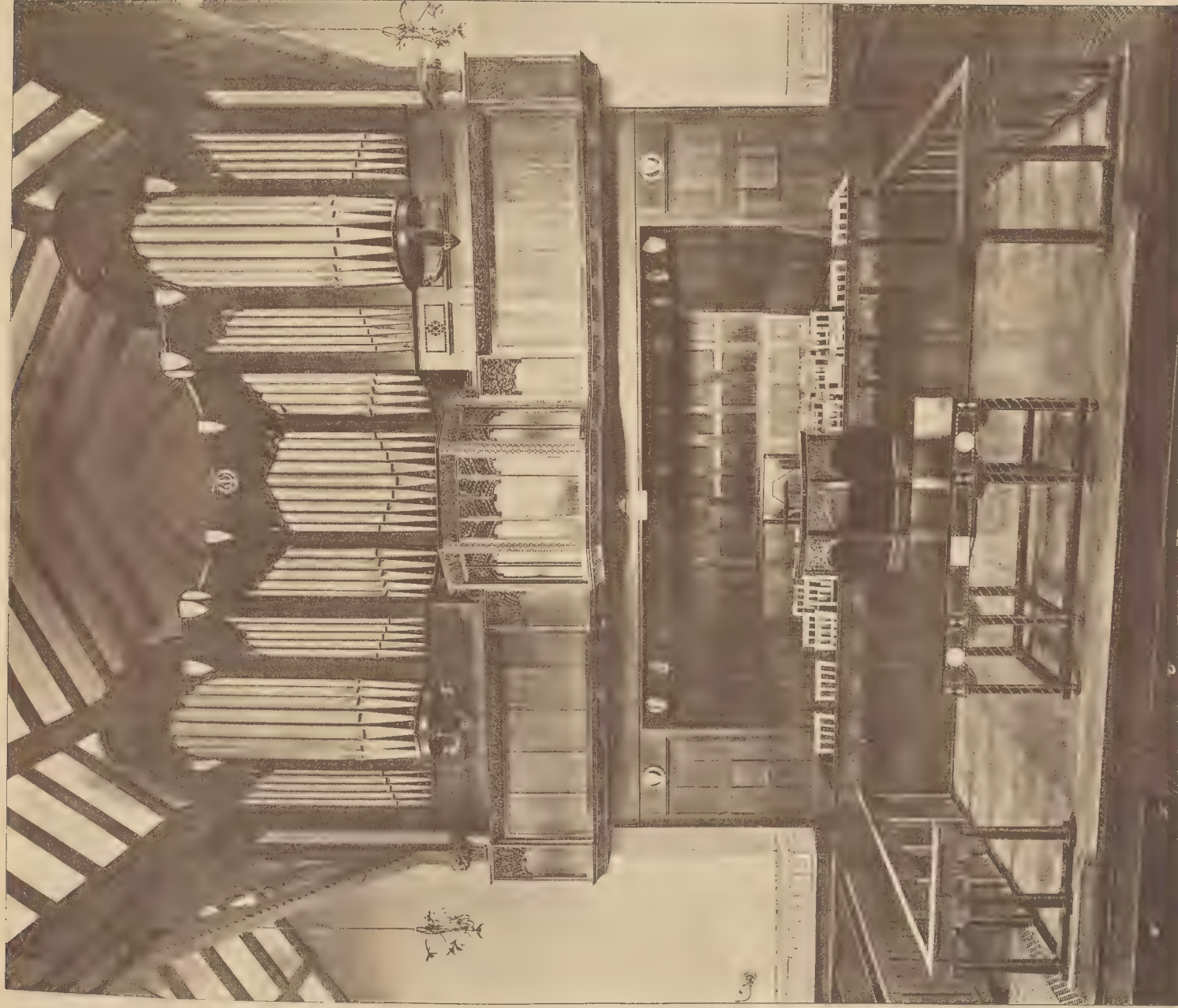
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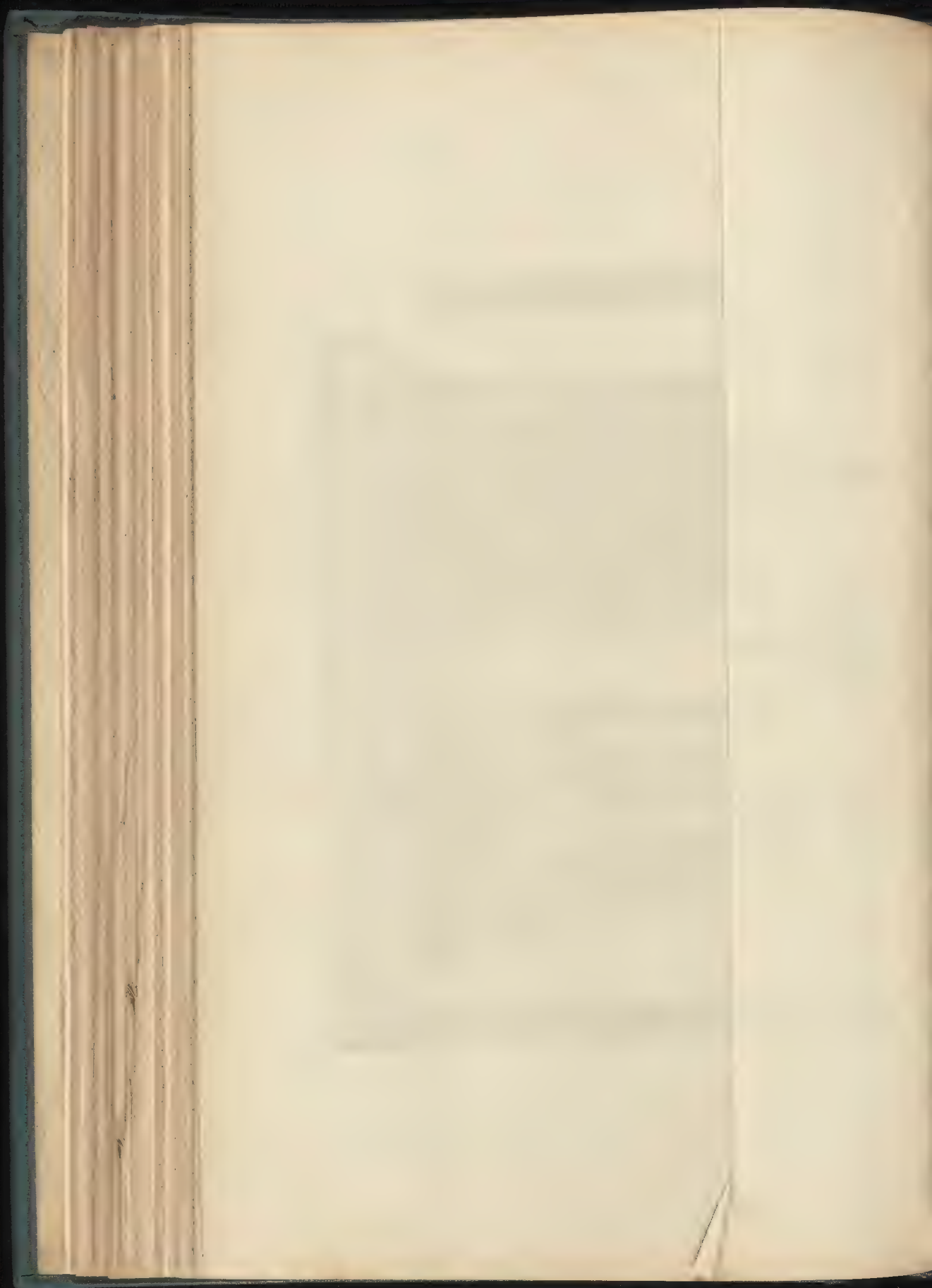
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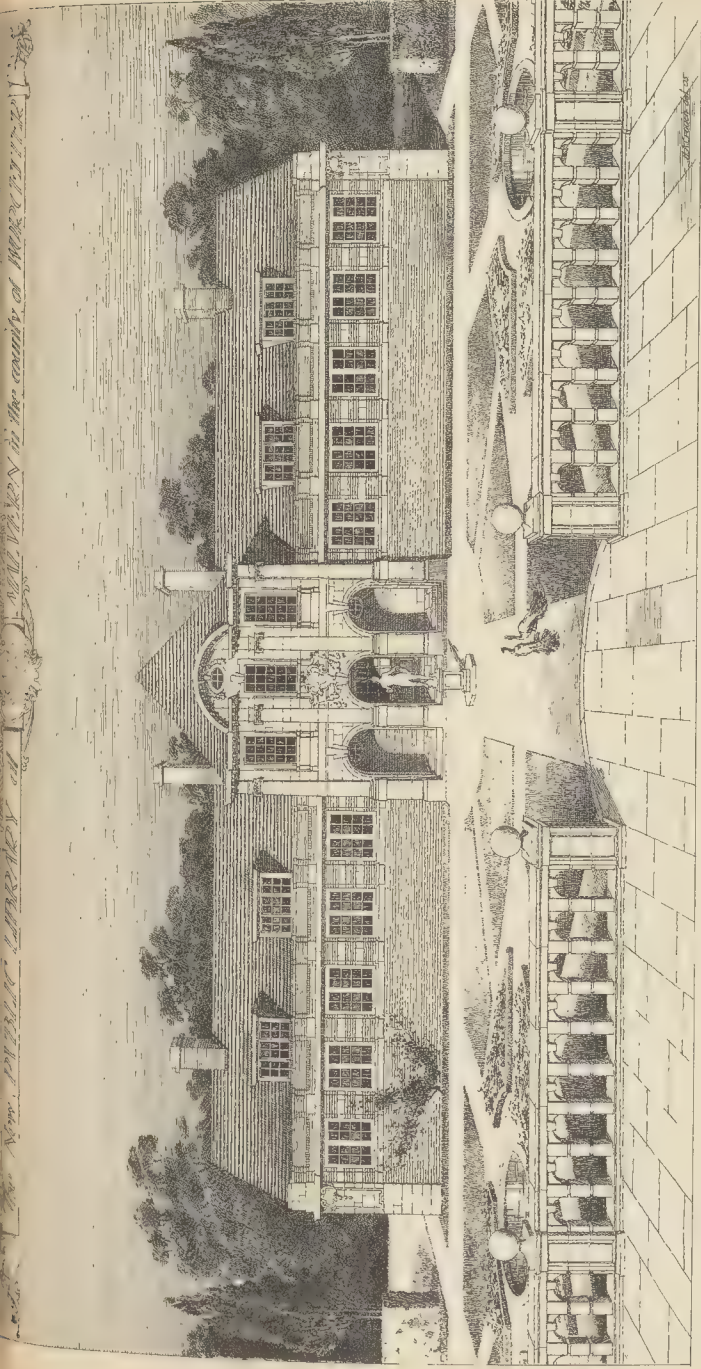






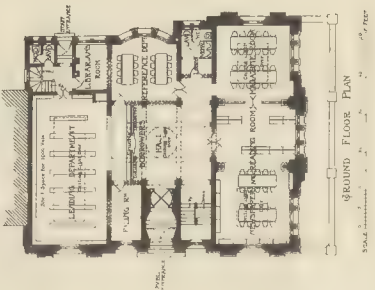




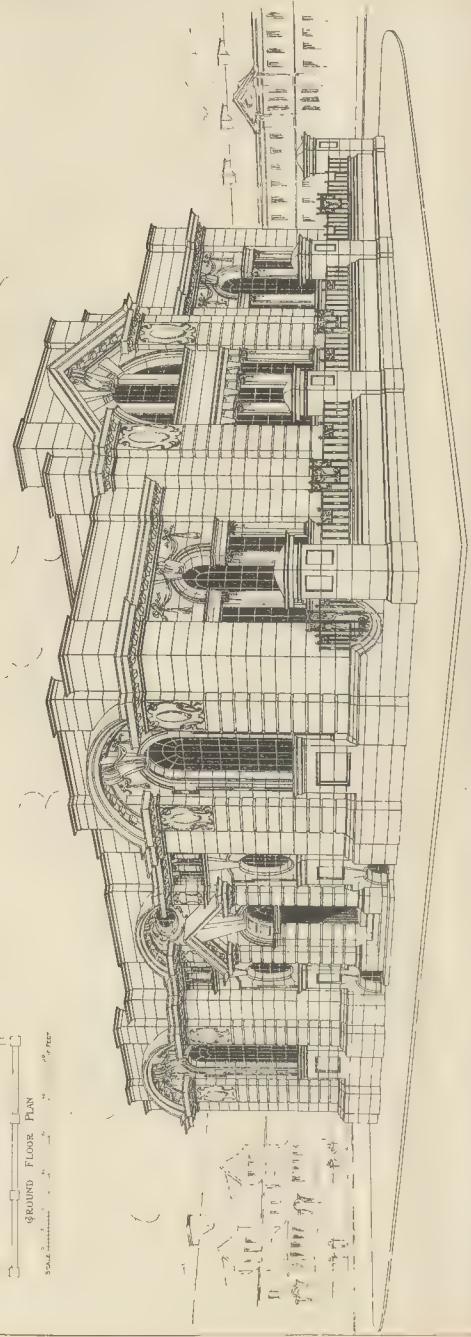


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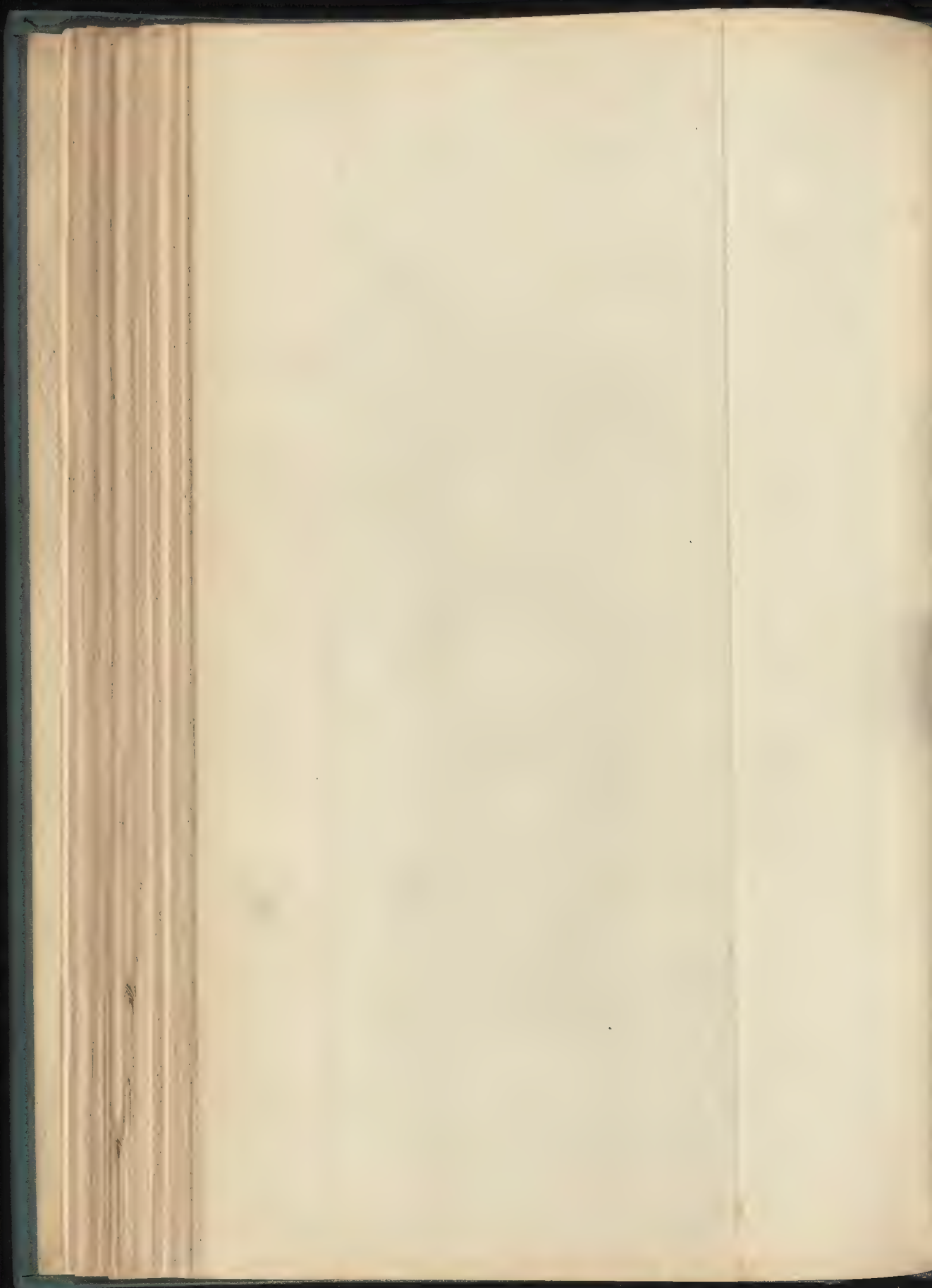


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# The Builder.

VOL. LXXXIX.—No. 3361.

AUGUST 26, 1905.

## ILLUSTRATIONS.

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Lambeth Municipal Buildings Competition.....	Design by Messrs. Ashley & Winton Newman.
Organ Case, St. Paul's School.....	Mr. T. R. Spence, Architect.

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### The late Mr. Waterhouse.

HE lamented death of Mr. Alfred Waterhouse removes from among us one of the most eminent and notable personalities connected with modern English architecture. In regard to the extent and variety of the work which he carried out, and the universality of his reputation, his professional career has no recent parallel except that of Scott. People, whether as foreigners, or as members of other professions, hardly knew the name of any other English architect, and were all familiar with that of Waterhouse. Such a position and fame does not of course necessarily imply, any more than the case of Scott, that he had produced the best architecture of his day. It does imply very remarkable abilities in regard to power and grasp over the problems of modern architecture, and readiness and facility in carrying them out. In this respect he was unrivalled. With a quickness of perception, in regard to planning, and long practice had developed almost a habit of vision, he was able to carry out on a large scale almost as an improvisation, seeing at a glance the whole treatment of the scheme, and to put it at once in an architectural

Courts, was in this sense eminently characteristic of him. In style it is a revived Gothic, which was all in fashion then, which is not in fashion now; and by those who, whether consciously or not, are influenced in their taste by fashion, it is probably regarded with little sympathy now, just as Scott's churches are regarded with little interest by the same class of critics. But architectural works ought fairly to be judged from the standpoint of the period in which they were designed; and for that period the Manchester Law Courts was a very fine Gothic revival building. But in regard to plan its value is permanent. The admirable arrangement by which the public are admitted in the most direct way to the public portions of the courts, while separated entirely from the official portion of the building, was a masterstroke in planning, the imitation of which in the National Law Courts forms the only good piece of planning in that inconvenient building; and it has received the similar compliment of imitation in a good many other cases. The Manchester Townhall, which we are inclined to think will always remain the building most characteristic of him, is also a remarkable example of ingenuity of planning, which however can only be fully appreciated by those who knew the requirements made in the instructions to competing architects. The size and the relative positions of the various rooms were laid down with a minuteness and particularity which, considering also the peculiar nature of the site (an irregular triangle), rendered the

compliance with the programme somewhat of the nature of a Chinese puzzle; but in Mr. Waterhouse's plan all the rooms seemed to have arranged themselves just as required, without even any appearance of difficulty or complexity. The building as a whole represents, at its best, the style of modernised and municipalised Gothic which Mr. Waterhouse to a great extent invented or developed for himself; and there is a unity of conception about the whole, taking plan and architectural treatment together, which certainly renders it one of the most successful and typical secular buildings of the English Gothic revival.

While we have compared Mr. Waterhouse with Scott in regard to his immense practice and extended reputation, and while he, like Scott, commenced as a mediæval revivalist, it must be added that he was a far more original architect than Scott. Even when practising as a mediævalist, almost at the commencement of his career he developed in his secular buildings a treatment of Gothic largely his own—the Gothic with square-headed windows and angle shafts, which was imitated so largely that he may be said to have started a Waterhousian manner in this country, as definitely as Richardson started a Richardsonian manner in the United States. The cult of this manner has passed away, but it passed away with its originator also. The City and Guilds Institute and the Natural History Museum show little reminiscence of this earlier manner; they differ both from it and from each other.



Indeed, it is very unusual to find two large buildings by the same architect, so near each other as the two just mentioned, and so distinct in manner and treatment. The Institute building, though somewhat heavy in style, is exceedingly dignified and very suitable in treatment and expression to its purpose. It has the appearance of a building erected for serious study. The Natural History Museum, on the contrary, is in an exceedingly florid style; it is a typical example of the elaborate detail suitable only to terra-cotta, a material which Mr. Waterhouse was largely instrumental in bringing into fashion, and of which, no doubt, he had rather too much. The idea of the architect seems to have been to render the exterior of the building symbolical of the multiplicity of form and detail in nature. For a monumental building, this treatment has been carried too far; the building wants repose and has too much the appearance of a *tour de force* in terra-cotta detail; and it must be admitted, too, that the outline of the end pavilions is not very graceful. But when we consider what a number of modern buildings have been erected in which both the general forms and the detail are almost entirely imitative, one cannot but be struck with the remarkable originality of design of the Natural History Museum. It resembles no other building in the world, ancient or modern; its defects may be its own, but so also are its merits. And here again the plan is a very fine one; simple and comprehensive in conception, and eminently suited to its purpose as a museum. In some minor practical points it would have been still more suitable, had not a false economy on the part of the Government tied the hands of the architect and prevented him from carrying out his ideas in their entirety. For he had considered its practical uses as a museum very carefully, and his own approved plan included a special feature in the shape of students' corridors at the back of the bays of the great hall, which were to be open only to students and scientific experts under special orders, and from which the cases could be opened and the subjects handled and examined with a freedom which could not be permitted to the general public. This was an eminently practical idea, new at the time, and for the conception of which the architect ought to have credit, though he was prevented from carrying it out. The most regrettable point in the interior is the employment of iron principals in the roof of the great hall, thus destroying its monumental effect. We have never been able to understand why this was done, since a barrel-vault in terra-cotta could have been carried out which would have left the whole constructional and architectural effect uniform. But with whatever defects, the Natural History Museum is a very remarkable and a very original building, and one which has not failed to secure the admiration and appreciation of foreign architects.

The leading defect of Mr. Waterhouse's architecture is perhaps, however, too much exemplified in this work, as it is also in his various buildings for the Prudential Assurance Company, which are prominent features in the street

architecture of a good many of our cities. That defect consisted in a lack of simplicity and reserve in outline and detail. Occasionally, indeed, he surprised us by a remarkable breadth and simplicity of treatment in one building or one portion of a building, as in the case of the end façades of his great railway hotel at Liverpool, which are admirable and at the same time most original. But as a general rule he seems to have been dissatisfied unless he had covered a building with detail and had broken up the outline and the surfaces by clever and unexpected manoeuvres, as one may call them, in the treatment of wall-planes and skyline. It is characteristic of his architectural taste that he seems rather to have loved odd and irregular angle sites for buildings, and pleased himself in contriving how he could lead up to and make the most of the salient angle of the plan. One of the best examples of this is the National Liberal Club, with its tower at the extreme angle; a building in other respects showing more breadth and repose of treatment than a good many others of his works. The general tendency of architectural feeling of late years has been increasingly in favour of simplicity of treatment and suppression of ornamental detail; a fashion which, in its turn, has in some instances been carried too far, almost to the extinction of architectural character except such as is derived from sound and solid construction. Mr. Waterhouse, after he had once quitted the field of mere Gothic revival, took no account of such movements in architectural taste, but went his own independent way. In consequence of this, he has almost been made a by-word among the younger generation of architects, and one may hear righteous horror of his works expressed in violent language, by young men who probably do not possess the knowledge or the practical capacity to have carried out at all one of Mr. Waterhouse's greater and more important buildings. This cant has been taken up by non-professional men in certain sets; men who probably know nothing whatever about architecture on its practical side, and little enough of its artistic side, but who seem to be convinced that it is good æsthetic form to dislike Waterhouse, and express themselves accordingly. We cannot deny that we agree to some extent with the feeling as to Mr. Waterhouse's architecture being deficient in refinement and simplicity of detail; but the current criticism against it has been pushed to an absurd exaggeration by people who seem quite blind to his real powers as an architect, and many of whom merely speak by rote, and could probably give no good reason for their prejudice. We should have preferred that the new London University Hospital in Gower-street should have been carried out in a style more in accordance with the University buildings opposite, with which the old hospital, plain and uninteresting in itself, was obviously intended to group. The present new building is too restless in detail, and might with advantage, considering its surroundings, have been treated in a broader and simpler style. But how many of the architects of the super-æsthetic school

who scoff at it could tell us how to plan a hospital so as to get the most accommodation and the most light and air within the very limited site available?

For a list of the principal works set out by Mr. Waterhouse we must refer the reader to the formal obituary notice which will be found under the heading. We can only here mention a few other characteristics of the deceased architect. Mr. Waterhouse was an accomplished artist both in oil and watercolour, not only in the way of architectural illustration—the views of his own buildings were always rendered by himself—but also in landscapes, and had a large collection of pictures and studies of his own from time to time. At one of the Royal Academy Exhibitions in recent years his single contribution was, not an architectural design, but a very pretty landscape in oil, entitled "Outside my Gate," in which he had given a most faithful picture of the view down the road outside the gate of his country house at Yateley. The picture immediately recognisable by some of the friends who had the good fortune to know the hospitable host and his surroundings. The part which Mr. Waterhouse played as an assessor in architectural competitions, of late years was a very important one, and it may be truly said that as an assessor he was almost if not quite unequalled. The same rapid grasp of the whole problem, which was shown in his own plans, was shown also in his quick and sweeping insight into the qualities of a large number of competition designs, and the almost unerring manner in which he would recognise and select the one which showed the best all-round merits in relation to the site and the objects of the proposed building. He also took an enlightened and enthusiastic interest in the proceedings of the "Society for Checking the Abuses of Public Advertising" of which he was the President, and to a great extent the founder, and to which he ungrudgingly gave a good deal of time out of his busy days.

Whatever differences of feeling about the architect, there was no difference, among those who had the pleasure of knowing him, in regard to the man. We think it might pretty safely be said of Mr. Waterhouse that among those who knew him personally he had no but friends. His simple and unassuming kindness and sincerity of manner upon every one. He was a good, upright, and amiable man; and while his works all round, he was unquestionably a great architect, and one of whom his country may well be proud.

**ISOLATION HOSPITAL, PRESTON.**—The new stone has just been laid of the administrative block of an Infectious Diseases Hospital at Preston. The site is at Holme Slack, of Duddale-road. There are to be two parallel blocks of wards, one for diphtheria and scarlet fever patients, one for typhoid, the number of beds provided being fifty-six, or about one for every 2,500 inhabitants. The administrative block contains on the ground floor matron's sitting and bed-rooms, nurses' sitting and dining-rooms, doctors' room, dispensary, waiting-room, store-room, kitchen, servants' hall, pantry, scullery, ice store, and a duty-room the windows open into each ward. The plans have been prepared by the Borough Surveyor and his staff. The cost will not exceed £20,000. The contractors are Messrs. T. & R. Colley, of Preston.



## LANGFORD MANOR, SOMERSET.

LOOKING across the Vale of Sedgemoor from the high road on a midwinter's day one sees the waters stretching away as far as the eye can reach, bounded at the horizon by a low ridge of hills; here and there the crown of a hedge testifies to the fact that the waste of waters has only temporarily submerged the low-lying lands.

It is probable that Sedgemoor was a backwater of the Bristol Channel at a comparatively recent date, and that waves once lapped the bases of the hills where now stand Aller and Glastonbury. The moors and lowlands still pay a yearly tribute for their brief season of jewel-like summer splendour. The high road between Curry Rivel and Taunton, winding along the crown of an undulating ridge of hills, has strongly-marked characteristics of its own. Passing the village of Curry Rivel, the deeply-wooded park lands of Burton Pynsent stretch away on the North side to the foot of the hills fringing the Southern edge of Sedgemoor. Pitt's mansion, now quite neglected, is almost hidden by the dense mass of surrounding foliage of beeches and elms, and giant cedar-trees, which clothe the spurs of the hills with a mantle of darkest green. At intervals deep ravines encroach almost to the edge of the highway, opening up extensive views across the valley; to the south a vast panorama of vale country unfolds itself, girt about towards the horizon with undulating hills. The valley is intersected by the river Isle, a tributary of the Parret.

To the east lies the interesting village of Muchelney. A part of its originally an abbey still remains. Until recently Muchelney was a village of old houses, but unfortunately the builder has now found a foothold, and the characteristic village green, with its cross and XIVth century vicarage, has been entirely spoilt by the erection of a glaring villa, which distorts the proportions of the adjacent buildings. The new work replaces a detached cottage of considerable archaeological interest; it formerly contained an external niche, in which a sculptured figure stood. The group was situated above the entrance doorway of the house. The builder, to emphasise the beauty of his own handiwork, has enshrined the sculptured figure in the centre of his new facade. Away to the south-east the conical hills of Montacute are outlined against the sky, sheltering the famous house of the same name. A few miles to the South, on a clear day, Taunton village can almost be seen, the celebrated Elizabethan house now falling into decay; but still unsurpassed in the richness of its detail, its grey walls and lichen-covered roof making a foil to the fretted lace-like delicacy of the weathered chimneys and ornate gables, which stand up sharply against the sky. Barrington Court and Montacute House are both so well known and have so often been described that they require no more than a passing mention here.

The district with which we are immediately concerned lies due south of the main road between Curry Rivel and Taunton. It would be difficult to find three more interesting examples of Tudor houses on the smaller scale than

Swell Court, Cathanger House, and Langford Manor; all lying within two miles of each other. The two former houses have well authenticated histories; but of Langford Manor little is known. It appears to have been through many vicissitudes, and to have frequently changed hands.

The house is situated at the foot of a hill about half a mile off the Taunton high road; it adjoins the Eastern boundary of the Parish of Fivehead. The principal approach is from the south-west side, from the road connecting Swell and Fivehead. The entrance drive to the house lies between two short massive square stone pillars, capped with a bold cornice and finished with ball terminals. The position of the drive was changed within the recollection of the oldest residents; formerly it was at right angles to the main road, and in a straight line with the South porch. The entrance pillars were moved at the same time, and were considerably reduced in height, which gives them a dwarfed appearance. On the south side of the house the grounds are intersected by a stream which, on the west side, runs between two well-defined stone walls. It is possible from the position of the house and general lie of the ground that this stream at one time was connected with a moat encircling the house; but all traces of this feature, if it ever existed, have now disappeared. The stream is spanned by a substantial stone bridge, with a culvert under, containing a sluice gate, which effectually controls the general level of the water. The south front of the house forms a species of courtyard with high walls on the east and west sides; this feature is not so fully developed as in some of the houses of this period. On the west side of the house, in a courtyard surrounded by outbuildings, are the remains of a columbarium (see block plan), only the outer walls are standing. The roof has entirely disappeared.

The house itself faces due south, and is in plan a double E, the centre arm of the E forming an open porch on each side.

The east and west projecting wings on the south side are of greater width than those occupying similar positions on the north side, where all the wings are of a more equal proportion. The south front is arranged on symmetrical lines; the windows are the only irregular features, many of these were blocked up with lath and plaster. The architectural details are all severely simple and could reasonably belong to the middle period of Tudor work. All windows throughout the house are formed with Ham hill stone mullions, the hood moulds and mouldings are of plain section, and are also of Ham stone. The general walling is of blue lias. The roof was originally covered, in all probability, with tiles; these have been replaced by a dark neutral-coloured slate. The unsympathetic texture and colouring of this roofing material has, to a great extent, been modified by a growth of orange lichen, which has been allowed to remain. The gables all stand clear of the roofs, and are coped with Ham stone; they are finished with Ham stone crow's-foot terminals, a very common feature in houses of this date in the district. The outer doorways of the porches are each spanned by four

centred-depressed arches in Ham stone, with very deep plain Ham stone lintels over; the lintel is finished on the upper side by a dripstone, mitred and returned down the sides, and returned again and stopped at the level of the springing of the arch. The arch and lintel are generally cut from one stone. The jamb mouldings, which are of the same section as those used in the reveals of the windows, die out on a splay, finished above the plinth by a delicately-shaped stop (it is noticeable that the same detail is repeated in the stonework of the window jambs, fireplaces, and entrance doorways throughout the house, with a slight variation in scale); these doorways are very effective, and are frequently found in houses of this date in the neighbourhood. The chimneys are, without exception, arranged on outside walls, and are designed on broad and substantial lines; the flues are grouped together with two outlets in each stack, but each flue is built independently of slabs of Ham stone, without any bond. It was no doubt owing to this method of construction that all the stone chimneys had perished; fortunately a fragment of one of the original chimneys remained, from which templates were taken of the mouldings for the purposes of the restoration; the only departure from the original work being that the stacks are built up of smaller stones bonded together, instead of, as formerly, in large slabs with straight joints.

Entering the house by the south porch one's attention was immediately arrested by the beauty of the massive inner oak door, with its plain wrought-iron hinges, and by the fine piece of oak panelling running between the two porches, the panels painted a bilious stone-colour, and the mouldings picked out in brown. This panelling belonged to a later date than the rest of the house. The most conspicuous feature of the small corridor hall was a modern staircase inserted in a cramped position, and forming the only means of access to the first floor. Entering by a deal doorway recessed in the oak partition, one was struck by the dimensions of the room disclosed. A fine six-light mullioned and transomed window takes up the greater part of the wall space of the west side. This window had evidently been lengthened during some former reconstruction, and the room itself modernised to its no small detriment.

The remainder of the west wing had been allowed to fall into decay for some considerable time. The south-west wing was cut off from the rest of the house, the only available access being by an outer door, which occupied the position of one of the original windows. The fine original oak and elm staircase (somewhat inconveniently placed in this wing) was in a well-nigh ruinous condition; fortunately it had originally been of a massive and simple construction. Only very plain detail was used in the mouldings, of which sufficient fragments remained to form a complete restoration of the original design.

The small square chamber, terminating the north-west wing, was originally planned with a lavish amount of window space in proportion to the size of the room. Two large four-light mullioned



and transomed windows occupy most of the north and west walls; several of the lights in these windows were blocked up with lath and plaster. This room is lined throughout with panelling of the Georgian period. The mouldings used are very simple. The principal feature is the fine-moulded cornice which runs round the room. A narrow modern staircase was inserted here communicating with the bedroom above.

The fine open stone fireplace was almost hidden by the panelling, which finished level with the stone jambs. On the left-hand side of the fireplace was the remains of an interesting feature. A semi-circular recess was formed in the thickness of the walling, and lined with studding, and finished with a plastered face; two wooden pilasters stopped the panelling on either side of the recess. Within the lines of the pilasters a semi-circular headed arch was turned in the panelling, with a delicately-moulded drop-pendant in the centre. Only the coved head of the recess remained; the portion below the springing had entirely disappeared. The panelling in this room was very much mutilated, the greater part of the cornice torn away, and the room itself used as an additional out-house for pigs, etc.

The east wing was found, upon close examination, to contain several interesting features. The south room was evidently the original kitchen. The eastern wall, containing the chimney-stack (6 ft. in thickness) appeared to be quite solid. The room had been lined throughout with deal-studding and covered with canvas and papered, and a modern cast-iron fireplace, with a deal mantelpiece painted to imitate marble inserted. On removing the mantelpiece an original fireplace, built of Ham stone slabs, was uncovered, loosely fixed to hold the cast-iron interior; behind this again was a very much larger fireplace, set in the solid masonry, 5 ft. wide, of Ham stone, with a low four-centred moulded arch, and jambs, all in perfect preservation. The whole of the studding on this wall was then removed, and disclosed two narrow recesses on either side of the fireplace, 4 ft. deep, carried up to a height of about 5 ft. 6 in., and ceiled over. A wrought and chamfered Elm bressummer, black with age and smoke, 1 ft. 6 in. by 1 ft., ran the whole length of the room above the fireplace and recesses. Within the recesses two perfectly-formed baker's ovens were found, built in thin red oven-bricks, and set in the lias stone masonry; the ovens were eventually cleared away, and the two valuable recesses thus gained added to the dimensions of the room.

Upon stripping away the canvas from the partition separating this room from the passage, the whole of the inner partition was found to be of wrought elm panelling of early date, and of a rich dark brown colour; the uprights forming the studs 3 in. thick, 4 in. wide, and ovolo moulded at both angles, both sides grooved at a depth of about an inch from the face to form a rebate for the panels, which fill the intervening spaces. The uprights average 14 in. centre to centre, and run in unbroken vertical lines from floor to ceiling. Panelling of the same pattern was used in the dairy partitions

(whitewashed) and at the side of the old staircase, and in two rooms on the first floor. The partitions across the landing at the top of the old staircase on the first floor was also of the same character. A doorway was formed in the partition, with a segmental moulded head, in the centre of which was a drop pendant. This partition was removed in order to open up the landing and placed in the entrance hall partly to shut off the corridor leading to the dining-room.

It is probable that the east wing at one time contained a second staircase, which would account for the position of a three-light window, the stone dressings of which can be clearly seen on the east elevation. This window comes midway between the ground and first floors, and is blocked up; all trace of the staircase has entirely disappeared. It is clearly evident that there were originally attics over the eastern wing, if not in other parts of the house. They were probably approached by the second staircase. All lights of all attic windows were filled up with lath and plaster. During the progress of the works a fragment of an interesting fireplace was uncovered in the large hall; one jamb was entirely cut away to allow for the insertion of the modern grate, which was put in by a former owner. The original fireplace was of the same design and date as the fireplace uncovered in the old kitchen. It measured 6 ft. 6 in. between the jambs, and the arched head was cut out of a single slab of Ham stone, 7 ft. 6 in. long by 2 ft. 7 in. deep; the height to the springing of the arch was 3 ft. 11 in. It was unfortunate that this interesting feature could not be preserved; but the disposition of the rooms in the altered scheme for the planning of the ground floor made its retention quite impossible.

While the alterations were in progress in the south-east bedroom, by stripping away some studding in the corner of the room, another recess, 6 ft. 7 in. by 4 ft., was opened out, extending to the full height of the room. The eastern wall of the recess contained a two-light mullioned window, blocked up with lath and plaster. This recess was immediately over one of the ovens in the old kitchen on the ground floor. It will be noticed, by referring to the first floor plan, that the only access between the east and west wings was by crossing the large bedroom between the two centre arms of the E and the west wing, a somewhat inconvenient arrangement. Otherwise the first floor was adaptable to modern requirements with very little alteration. In the passage between the rooms over the porches a small portion of an enriched plaster cornice of conventional design was uncovered; it had evidently been continued at the ceiling level, round the walls of the bedroom over the north porch, but the greater part has now disappeared. The levels throughout the house are curiously contrived. The large room on the ground floor, which was evidently the original hall, together with the small north-west room adjoining, are both 10 ft. 9 in. from floor to ceiling. The rest of the rooms on the ground floor are 8 ft. 6 in., with the exception of the rooms in the east wing, which have four steps down to them, and are 10 ft. 9 in.

high from floor to ceiling. The loftier rooms in the east wing are accounted for by the fact that there is a fall in the ground towards the east. The difference in height between the old hall and the remainder of the rooms has necessitated two short flights of steps on the first floor. There is very little doubt that these were the original levels, as the sills of the windows have been arranged to correspond to the heights of the floors. All bedrooms on the first floor containing fireplaces had the original Ham stone chimney-pieces. In most cases these were disfigured by deal shelves, etc., but on removing these was found in all cases that the deep Ham stone lintel was *in situ*, covered up by paper or plaster.

All Ham stone throughout the house inside was painted a sickly yellow, and oak was treated in the same way; fortunately the uprights and balusters of the old staircase escaped. This part of the house was considered too far gone for renovation by previous owners, and was only used as a cider cellar. The outer walls of the house had been allowed to fall into a deplorable state of repair. The south walls were patched up with a poor description of rough cast, to act as a check to the driving rains coming from the south-west quarter. This front was almost covered with ivy, which was very reluctantly dispensed with. The ground on the north side of the house (where there is a considerable rise) had been allowed to silt up to such an extent that, in wet weather, the water flowed freely in at the doorway inside the north porch.

As regards the restoration, it will suffice to say that all unsightly modern features surrounding the house were removed where possible. Some necessary modifications were made in the inside planning of the ground and first floors. The external elevations were restored as far as possible to their original state. All windows were opened out and glazed in leaded lights in a similar manner to the old existing windows.

The chimney-stacks were rebuilt, as previously described, in Ham stone.

The restoration has been carried out under the direction of Mr. Rupert C. Austin, architect, of London. Messrs. Hutchings & Sons, of Ilminster, Somerset, were the contractors.

## NOTES.

THE Duke of York's journey of a horse and cab Steps.  
AFTER the adventure down the steps at the foot of the Duke of York's Column, we may reasonably hope that the Office of Works or other responsible authorities, will see the advisability of fencing a somewhat dangerous declivity, to protect unrolling foot passengers as well as runaway horses and the persons who may be on or in the vehicles behind. Until London fogs have been abolished, another source of danger will continue to exist, namely that the drivers of vehicles may lose their way and accomplish undesirably rapid descents into the Mall. That this by no means an idle fear is shown by a letter to the *Times*, in which the writer states that some two winters ago he was on an omnibus which was only stopped



from accomplishing a journey of the kind by the vigilance of a police-constable. The cost of a railing would be comparatively trifling, and it is just as well that the steps should be protected to avoid any risk in the future.

We fully agree with the action of Mr. Denman in imposing fines upon several owners of motor-cars for permitting the emission of smoke from the exhaust pipes of their vehicles. As we said in a recent Note, the objectionable character of the smoke ejected is much increased when an excessive amount of oil is used for lubrication. One of the drivers told the magistrate at Marlborough-street that he supposed the smoke was due to oil being allowed to run on the hot parts of the engine, and the main point of the defence was that this constituted an accident and a temporary occurrence involving no penalty. While exhaust gases cannot be avoided in the case of oil and steam-motors, there is every reason why the owners of cars should be made responsible for seeing that their cars are constructed and managed so that smoky vapours are not emitted.

In his Report for the year ending June 30, the Engineer to the Mersey Docks and Harbour Board points to the progress made on various important works. More than 1,360,000 cubic yards of material have been removed as a preliminary to the construction of the Hornby Dock. Work at the new King's Docks has well advanced, and the Brocklebank Graving Dock, with the length of 804 ft., is practically complete. New graving docks at Tranmere Bay are progressing satisfactorily, and the Brunswick and Coburg Docks have been deepened to provide for vessels of greater draught. These works are, of course, quite apart from the great scheme to which we alluded a few weeks ago. As another illustration of the ceaseless activity shown by the Liverpool Port authorities, we have the fact that during the past twelve months more than nine million tons of sand have been dredged from the bar and principal channels, making a total of some eighty-eight million tons dredged since 1890. It is unfortunate for Liverpool that this heavy burden is imposed, but a good thing that a competent and energetic Board exists for maintaining the navigation channels and keeping the harbour abreast with the requirements of the times.

A SERIOUS railway accident which occurred last week in Virginia serves once more to remind the world of the flimsy character of many engineering structures in the United States. According to a telegram from New York, a bridge over the Elizabeth River collapsed under the weight of a heavy excursion train, the greater part of which fell into 25 ft. of water. Two similar trains had previously passed in safety, although eye-witnesses reported that the bridge swayed ominously and a second train went by. In view of the lamentable loss of life caused by this disaster, it is to be hoped that American railway directors will make a point of strengthening or replacing the numerous

remaining bridges that are really inadequate to withstand the stresses set up by modern rolling stock. English engineers have often been reproached for the strength and solidity of their structures, and unwise counsellors have recommended the American system of cutting things fine. So far as railway bridges are concerned, we can certainly afford to smile, being able to point to many fine works built in the early days of railway engineering, and as well able as ever to comply with the requirements of modern traffic. Some engineers in the United States have already learned to follow in our footsteps, but the work of eradicating the frail structures of the past proceeds far too slowly. A department like our Board of Trade, with ample powers and a fearless administration, would do much for the safety of railway travellers in that country.

#### Motor Racing on Roads.

IN a short report of the Herkomer Motor Race, which has appeared in the Press, it was stated that: "Unhappily, in consequence of the unprecedented dust referred to in yesterday's telegram, which still continues, a fatal accident occurred. In taking a corner near Herrenall, five miles from the start, a competitor ran down two children, killing both." We venture to think that, in the report of such an accident a few years or even months ago the actual and effective cause would have been put forward—viz., the unprecedented speed on a highway, and the motorist would not have been allowed to screen himself behind a cloud of dust. We trust motor races on roads will never be countenanced in this country, but it is a curious fact that, whilst we show an increased care of human life in every department, and legislation is directed to minimising its loss in connexion with railways, ships, and in factories and places of employment, loss of life in the legitimate use of our thoroughfares is being regarded with a laxity that is surprising. A little while ago a man who, by recklessness and solely for his own pleasure, caused the loss of human life, would have stood in jeopardy of being convicted of manslaughter, and of receiving a sentence of many years' penal servitude, with the loss of social recognition. Nowadays he shields himself behind a cloud of dust, or does a small term of imprisonment by deputy—in the person of his chauffeur. *Tempora mutantur.*

#### Electric Power for London.

THE main feature of the Parliamentary session which has just come to an end has been the number and importance of the electrical Bills (which have been discussed) in connexion with the supply of electric power to London. The most important of these Bills was the Administrative County of London Electric Power Bill, which, owing to the time taken in the Committee stage of the Bill, could not be passed into law last session. In its original form the Bill had many objectionable features, some of which we pointed out. After passing through the Committee stage nearly all of these had been eliminated, and, as the Company were prepared to consider the interests

of the existing supply companies, and had entered into agreements with all of them, we think that the advancement of the use of electric power in London would probably have been accelerated by the passing of the Bill. Every one is agreed that this would be a boon to the community. Any one acquainted with the great printing works in the neighbourhood of Fleet-street will understand the many advantages that would accrue from the abolition of steam boilers and engines. This Bill will have to be brought up again next session, and, as the promoters have shown an accommodating spirit, it will probably become law. It would be well, however, for them to realise that there are many other electrical engineers who are prepared to design power stations with steam turbines coupled direct with three-phase alternators. The guarantee of their engineer also, that he can tell within 1 per cent. the quantities of energy used for power and lighting in any works simply by knowing the numbers of motors and lamps connected and the total energy consumed, is ludicrous. The North-East London Railway Bill received the Royal Assent on the last day of the session. The line authorised by this Act runs from the Monument through Shoreditch, Hackney, Leyton, Walthamstow, Chingford, and Waltham Abbey. The company's tubes between the Monument and Hackney road will be lowered, so as to permit another pair of tubes above them for providing communication between the east and west of London, in accordance with the recommendations of the Joint Committee on London Underground Railways in 1900. It is proposed to have a two-minute service between the Monument and Walthamstow, and a five-minute service over the remaining portion. The engineer's estimate of forty-four million passengers per annum seems to us to be large. Another electrical Bill passed is the Metropolitan Electric Supply Company's Power Act. The company will supply "in bulk" to authorised distributors, tramways, etc., but not to large manufacturers.

#### Powers of Local Authorities.

THE case of the Attorney-General v. Pontypridd Urban District Council is one of some interest to the general public. The defendants were the local authority, and, under the Provisional Order and the Electric Lighting Acts, had obtained powers for supplying the Urban District of Pontypridd with electric light. Acting under the powers thus conferred upon them, the Council had by agreement acquired a piece of land for the purpose of erecting thereupon a generating station. It was the intention of the Council also to erect on this land a refuse destructor, the idea being that the heat thus generated might be used in assisting to generate electric light. The Local Government Board advised the Council that it could not sanction the use of the land for a purpose other than that for which it had been acquired, but it is interesting to note that it was suggested that this difficulty could be overcome by a sort of legal fiction—that is, that the land should be sold and repurchased by the Council under



the Public Health Acts for the purpose of erecting the refuse destroyer. The Court, however, seems to have swept aside this transaction, and to have treated the case on the simple footing as to whether the Council had powers to use the land for a purpose other than that for which it had been acquired. The Court held that the two purposes were entirely distinct, and that the land, having been acquired under the statutes for electric lighting, in the absence of some express power granted by the Act, could not be put to any other purpose. The importance of this decision, as is pointed out in the judgment, lies in the fact that, when powers are sought, the object for which they are required should be disclosed, as otherwise they may be obtained without opposition for the purpose disclosed, whereas severe opposition would be offered to the scheme were it known that it included some other undertaking objectionable to the neighbourhood.

#### Drains. At the Conference of the Sanitary Inspectors' Association a paper was read

on "Combined Drainage," and a discussion ensued (reported on another page) on the desirability of amending the definition of the word "drain" in the Public Health Acts. In the result, a resolution was passed in favour of petitioning the Local Government Board to obtain legislation on the lines of section 42 of the West Ham Corporation Act of 1898. This section, however, appears to us to have been drawn in terms which rival the ambiguity of the Public Health Acts. It runs: "In and for the purposes of section 41 of the Act of 1893 the word drain shall be deemed to include any sewer or drain, whether constructed before or after the passing of this Act, with which two or more houses or premises, whether belonging to the same or different owners, are at the date of the passing of this Act or may at any time thereafter be connected, or which is used or capable of being or intended to be used for the conveyance of the drainage of such towns or buildings directly or by means of any other sewer or drain to any public sewer situated under a street repairable by the inhabitants at large, but shall not include any sewer which has been constructed to the satisfaction of the Corporation under section 152 of the Public Health Act, 1875, or any sewer which has been constructed by the Corporation for the effectual drainage of the borough." The Act of 1893, as well as the Act quoted, are private Acts, and it would be important to see what are the terms of section 41 of the former Act; but one point should clearly be borne in mind when the Public Health Acts come to be amended, and that is that the primary duties of the local authorities, and the primary object for which the rates are levied, are to provide the inhabitants of towns and cities with an adequate system of public drainage. Any attempt to throw the expenses of this on the private individual, and to expend the rates on other objects, should be stoutly resisted. Where the Public Health Acts are deficient, as at present framed, is that the private individual

can, by connecting his drains with those of other houses, sometimes evade responsibility for drains properly his own, and throw the expense on the local authority. But it is clear it is neither equitable nor desirable that his liabilities should be extended outside certain limits, and legislation on this point will require careful consideration.

PROPOSALS are already being made for celebrating the coming jubilee of the opening in May, 1857, of the general reading-room, of which, it appears, the erection was originally advocated by Professor Hosking—see the *Builder* of June 22, 1850, with an illustration, and the pamphlet, "Observations on the recent Addition of a Reading-room at the British Museum," fo: 1858. The circular apartment, 140 ft. in diameter, and roofed with a dome rising to a height of 106 ft., was built in the big quadrangle by Sydney Smirke, R.A., 1855-7. It replaced the former two reading-rooms in the block on the north side of the quadrangle into which the readers were admitted from Montague-place, and a revival of that means of public access would be a great convenience. Amongst the various projects for marking the anniversary is the fixing of busts or statues of the world's greatest writers upon the consoles around the wall at the springing of the iron ribs. The number must necessarily be limited to twenty, and what hope is there of agreement upon the selected names? A well-known reader suggests the separation of the seats with partitions, but that would reduce the present scanty space on the floor of the room; another advocates the compilation of a catalogue, with full references, of printed books which are not in the national collection and yet are known to be in existence elsewhere, either at home or abroad. We scarcely expect that the authorities would enter upon so vast an undertaking, or comply with similar pet projects relating to the books and the catalogues. Meanwhile there are more urgent and practicable needs to be considered, on behalf of the public and the executive staff alike. Measures should be taken to provide an improved system of ventilation. During the past fifty years or so the numbers of the readers have increased from 70,000 to 226,325 per annum, sanitary science has advanced in the meantime, and "museum headache" is a long-standing grievance. Moreover, the interior of the dome ought to be thoroughly cleansed and renovated; a scheme for its decoration was prepared we believe, by Alfred Stevens. The interior and plan are illustrated in the *Builder* of March 24, 1855. Baker & Fielder's contract amounted to about 100,000. The rotunda of the Pantheon at Rome measures 142 ft. 6 in. across the floor, and rises to 142 ft. in the clear.

At the new offices recently opened by Messrs. W. H. Smith & Son, at 12, Norfolk-street, Strand, an exhibition is being held, by way of inauguration, of advertising drawings and designs. The requirements of the advertiser have opened up an entirely new field to the

enterprising printer, and he will now have to prepare himself, not only to produce high-class work, but to render an advertising service to his customer: suggest ideas, and provide him with drawings. The drawings on view are by Messrs. John Hassall, Cecil Aldin, F. Taylor, R. Pannett, Lewis Baumer, S. E. Scott, R. P. Gosson, Chas. Pears, H. Rowntree, and a large number of the leading draughtsmen and designers of the day. Almost without exception they are extremely clever and effective, and the exhibition goes a long way to prove that English poster-artists are now no whit behind the French, the masters of poster art. Charming faces and dainty figures by Messrs. Baumer & Pannett, Chas. Pears' inimitable children, Hassall's quaint figures, and the series of well-drawn portraits and posters by Taylor, together with numbers of others equally well-deserving of mention, form an exhibition well worth a visit, and which should prove of especial interest to the intending advertiser.

THE death of M. Bouguereau will be regarded by some lovers of art with indifference, by others as leaving a serious vacancy in the ranks of eminent French painters; according as painting is regarded as a means of poetic expression and suggestion, or as a highly developed craft. As an executant in his art Bouguereau was a painter of quite exceptional attainments; his drawing was faultless, his finish of execution exquisite; and if his colouring was somewhat cold and dead, colour is a matter of inspiration and not of craft and training. Perhaps it is an instance of the truth of Mr. Clausen's dictum (which we rather questioned at the time) that colour is the element by which a painter's real greatness is decided, that Bouguereau, whose colour was his weak point, was an example of a painter of high accomplishment whose works nevertheless totally failed to interest one: "uninteresting" was the word that rose to one's mind in connexion with almost all his pictures. It is a mistake to suppose that this was because his subjects—his "Nymphs," "Amours," "Jeunesse's," etc.—were necessarily in themselves uninteresting; such subjects can be made interesting enough, as many extant examples prove; it was the cold, correct, Academic manner in which they were treated that froze the spectator's sympathies. But while we condemn the coldness, we ought to honour the correctness of Bouguereau's execution. In days when there is a great deal of slip-slop execution in art, a painter who upheld a standard of thoroughly competent execution should at least have credit for that. And if he was without poetic suggestiveness, physical beauty he could at all events realise. His *Salon* picture, two or three years ago, of a nude figure reclined on the shore with a breaking wave behind her (the latest edition of a subject he painted several times), displayed a face and figure of really exquisite beauty. Some of his pictures of cottage children (his other class of subject) were also of great grace and sweetness of character, and may perhaps come to be more valued than his nymphs.



It evidently gave the public what a large section of it, at all events, wanted, for he amassed a large fortune.

IMPRESSIONS OF HAMBURG AND LÜBECK.

(FROM A CORRESPONDENT.)

It is suggestive to place Hamburg and Lübeck together for the purpose of contrast, since Hamburg represents the highest type of German modern commercial cities, with its large and imposing offices, its warehouses, its immense docks; Lübeck, its mediæval counterpart, with its gates, its churches, its small squares, and its ancient Rathaus. Hamburg also has its Rathaus, but it was not begun to be built until 1884, and it is in some internal details still unfinished. Hamburg being a Free City, as are Lübeck and Bremen, is, in a word, a state within the German Empire, and its citizens, as do those of the other two Free Cities, govern themselves to a greater degree than do those of any other German or English city.

As a port Hamburg is, more especially at the present time, of much interest, since it is a keen rival to London, and, it must be confessed, is likely to be a match for it. It is exceptionally well situated, for the Elbe on its southern side has several branches which extend like fingers from the hand, giving natural harbours. In addition to these, sub-harbours have been formed on the north and south sides, so that the Elbe at Hamburg resembles a stalk or bunch, the head of which is the railway bridge, and below, branching to right and left, are numerous "hafens." The weak point of Hamburg as a port for passengers is that there is no quay as at Southampton where passengers can land and embark close to a main line of railway. But approach Hamburg from the sea on a fine summer evening, when the light has mellowed and a slight haze softens the outlines of buildings and ships, and it is a striking and remarkable sight. The houses and churches of Altona and Hamburg, the large looming masts of many steamers, the masts and rigging of the sailing ships, the passing craft, the large, some small, moving without cessation up and down and all over the mouth of the Elbe. In Hamburg itself the characteristic to be noted is how its proximity to a commercial city in the Middle Ages has been continued under altered forms to the present day. Striking bits of old structures are to be seen in many places along the quays, in some of the side streets, and in a few of the canals, such as the picturesque Ditch Strassenfleth, which is like a canal at Amsterdam or Haarlem. Look down a canal and at the end you see a group of old buildings with rows of windows on the other narrowing floor by floor till the apex of the gable comes the termination in a single aperture. But these ancient buildings are lost amongst the large and lately modern buildings, of which the new offices of the Hamburg-American Steamship Company are typical. A well-proportioned and fine building in the Classical style it stands on the Alsterdamm overlooking the Alster Bassin, a large lake which forms the centre of the towns of Hamburg and Altona, which are structurally a single city. From this sheet of water many small steamers, sailing and rowing boats are plying, the banks edged north and south with an immense number of houses, the upper and lower Brücke divides it from the Aussen Alster, another and larger lake, with an area of 430 acres, which is, in fact, the embouchure of the small river Alster, which is found its way through unhealthy marshes to the Elbe, and now joins the larger stream after it leaves the small Alster through a canalised course. This large lake is surrounded by agreeable and often charming mansions with shady gardens touching the water more resembling the "cottages" of the rich American merchants at Newport and other places in the United States than anything we have in England. It may seem a digression from the place where we started—the offices of a famous steamship company; but, standing as these are in sight of the houses of the chief Hamburg merchants, overlooking the water and its picture-seekers, having in view the shops

and restaurants of the town with the high tower of the Rathaus at no great distance, it typifies not only the way in which the commercial and the general life of Hamburg is intermixed, but the way also in which it is architecturally harmonious. Above the portal of the building are engraved the suggestive, and one may say, applying them to Hamburg of the past and the present, true words, "Mein Veld ist die Welt."

Spaciousness is perhaps the most striking feature of Hamburg; it is exemplified not only in the central parts which have just been mentioned but all over the city. To this must be added a singular cleanliness and attempts, not unsuccessful, to use any opportunity of making the town agreeable to the eye. This is well exemplified in the long quay, called the Versmann Quay. Here the waterside is lined by large sheds, cranes, and other appliances for loading ships; behind them a line of rails, next to and separated from this by a low railing is a bicycle track, then a roadway, and then a broad footway, along which plane trees are planted. Fortunately, too, Hamburg is free from all forms of wall or "sky" advertisements—a fact tending much to the dignity of a great town.

Many cities can show as fine streets of shops as Hamburg, and it is rather in such a building as the chief Custom House that we see the wealth and importance of Hamburg most significantly displayed. If with this class of building we couple the Rathaus or Town Hall, with its Parliament and Senate Chambers, its Banqueting Halls, and other rooms which would be worthy in design and decoration of a royal palace, we shall best appreciate the way in which, commercially and architecturally, Hamburg still upholds and enlarges its past characteristics.

A little more than an hour's railway journey brings one from Hamburg to Lübeck. The change of architectural atmosphere is apparent the moment the station is reached, when the twin towers of the Holsten Thor are seen barring the way to the town. Lübeck is quiet, ancient, and individual. It should be studied carefully by every architect, for there, more than perhaps in any other town, the use of brick as a building material has been brought to the highest perfection. New houses are, at Lübeck, built after the style of the old buildings, so that the harmony of the town is retained. The use of brick as a material cannot be better studied than in the Marien Kirche. This church is exteriorly disappointing. Those accustomed to take note of ecclesiastical stone buildings in the Gothic style cannot but feel the flatness and the absence of artistic details; but, after all, it makes one also feel how rich England is, in that in every other village the most delightful examples of Gothic architecture are to be found. But within the Marien Kirche there is no disappointment, and the spaciousness, the charming lightness, the graceful simplicity, of the whole, with its lofty and slender pillars, the simple lancet windows, give one a feeling of admiration for the way in which the architect has used his material.

It is not intended to give a catalogue of the contents of the church; it will be sufficient to state three points. The first has, indeed, already been referred to—the treatment of brick in the Gothic manner. The next is the unique character of the monuments. Nearly every one has in the centre an oval portrait, which is surrounded to various degrees by monumental sculpture. A favourite form is for some allegorical figure on the left hand to hold the portrait, opposite is another figure, and so the whole monument is gradually built up as in that of Johannes Sirricio (1696). Every pier is adorned in this way, and in some places the walls. The monumental brasses, fine specimens of the German manner, are the third feature of this church. The brasses are large; that to Abraham Hoeven, of the date of 1571, is about 8 ft. by 4 ft., and they are in truth pictures on brass. In this instance large-sized figures of a man and his wife fill the lower part of the brass; behind the man are grouped other minor figures, and above angels in various forms are visible. The spaces between the figures are filled by foliage and tracery. Interestingly, however, as are these and similar brasses, they are artistically failures, for the medium employed

is unsuitable for this form of artistic treatment, which is never more fitly employed than in the simple and severe figures of knights and their ladies which are the chief subjects of English brasses. The pictures, on the other hand, on these brasses are flat and inanimate. Similar attempts may occasionally be seen in England in some small churches, as at Bletchley and Tingewick, Buckinghamshire; but, except for a few rare examples, such as the remarkable Flemish brass to Abbot Delamere at St. Albans, brasses of the size and character of these in the Marien Kirche and of that to Bishop Tiedman in the cathedral are unknown. The Cathedral, it may be said in passing, is of small importance in comparison with the Marien Kirche.

Again, in the Rathaus, the use of tiles as a material as well as brick externally is most noticeable. The vestibule and staircase spaces are supported by pillars of dark-blue tiles, and the vaulted roof is of the same material. Some restoration of imperfect parts has taken place; but the Rathaus dates from 1442, and we see it pretty much as it was when erected in the XVth and XVIth centuries. The external staircase (1594) shows marks of the influence of the Renaissance, but the main feature for an architect to note is the manner in which brick and tiles have been used. In the interior the minute wood-carving of the Kriegstube (1595) would in itself be worth a tiring journey to see, the door, in either side of which are two large figures, being of the most minute and ingenious work. At the opposite end of the room the fireplace and its surroundings vie in skill with the entrance carving. But, marvellously clever and admirable as is all this work, from a decorative point of view it is not so excellent a success, for the woodcarving is so minute that it has no large effects at a distance, and, though beyond praise in detail, it gives no individuality to the chamber as a whole.

These two buildings in the centre of the city, one ecclesiastical and the other secular, give the keynote to all the architecture of Lübeck. A walk up the Breitstrasse confirms the first impression. Here on the right is the Hospital zum Heiligen Geist. A chapel of the XIIIth century has been converted into an entrance hall; like the Marien Kirche, it is of brick, with light pillars and a vaulted roof. Somewhat further on the left is the former house of the Schiffergesellschaft, of the Guild of the Seamen. Over the doorway is carved a ship in full sail, and below it is the date 1537. The inside is used now as a tavern, but the old quaint carving of ships and of the sea still exists, and from the ceiling depend old models of old-fashioned ships. Perhaps no place retains more than this quaint building the atmosphere of Mediæval Lübeck. A few steps further and the Burghor stands at this end of the ancient town—a quaint brick edifice, dating from 1444, with picturesque wings showing signs in its decoration of Gothic sympathies, though the tower itself is of the domestic character and is purely North German in style. The middle and modern ages thus in Hamburg and Lübeck exist in singular contrast and suggestiveness in either city. An aristocracy has not created these interesting towns, but a society of merchants and shipowners. In either city tradition still produces its social and architectural effects, though in Hamburg we see the traditions of centuries in more vital form than in Lübeck. There are many cities in Germany remarkable as examples of modern and mediæval architecture; but in Hamburg and Lübeck, each of them out of the ordinary field of the tourist, there is an opportunity for the study of architecture applied to commerce and local government of a special character and of much historical antiquity.

BUSINESS PREMISES, BELFAST.—The new premises of Messrs. Crane & Sons in Wellington-place, Belfast, are now completed. The contractors for the erection of the building were Messrs. Courtney & Co., Belfast, and the architects were Messrs. Young & Mackenzie, also of Belfast. The ironwork in connexion with the staircases and lift was made by Messrs. Riddells, Ltd., and the plumbing was executed by Messrs. John Dowling & Sons. The electrical work has been executed by Messrs. Wilson Brothers & Co., under the superintendence of Mr. John Woodside, A.M.I.E.E.



### THE SANITARY INSPECTORS' ASSOCIATION.

AN autumn meeting and conference of the Sanitary Inspectors' Association was held on Wednesday, Thursday, Friday, and Saturday last week at Carpenters' Hall, by permission of the Worshipful Company of Carpenters. Between 200 and 250 members attended the various meetings. Wednesday was devoted mainly to committee meetings, but in the evening the President (Sir J. Crichton-Browne) received the delegates at Caxton Hall, Westminster. The Conference opened on Thursday morning.

#### Presidential Address.

Sir J. Crichton-Browne, in the course of his presidential address, said that one of the hopeful signs of the times is the popular interest that is manifested in health questions. This is as it should be, for the intelligent co-operation of all classes is needed in carrying on the great work of sanitary reform. Having dealt at considerable length with the question of food in relation to physical deterioration, the President said they could not sit with hands crossed waiting for the golden age to be conferred by any Government or Commission. They must strenuously persevere in their endeavours to ameliorate the condition of the people, and this they could best do by improving their environment in the widest sense. It was with environment that they as sanitary inspectors were officially concerned, and he was sure that they had already, by their uphill labours, left their stamp on the condition of the people. Their duties as sanitary inspectors brought them into intimate contact with the people of all classes, and he thought they would agree with him that the condition most urgently affecting them at the moment was that of housing. From all parts of the country came complaints of overcrowding in wretched dwellings, and, particularly in the great centres of population, they were growing at a rate that could no longer be overlooked. Heavy were the penalties we paid for these housing conditions and this overcrowding, in combination with other insidious influences that appertain to towns. Proceeding, the President touched on disease and death statistics in towns as compared with the country, and also referred to the question of the decadence of character and of intelligent leadership. Personally, he was inclined to think that intellectual decadence, if it be upon us, is not necessarily destined to deepen as time went on. As things are now, the country is in many parts guilty of sanitary offences as heinous as those of the towns, and is only saved from the consequences by the fresh air and unpolluted sunshine it gets. Private enterprise has failed to furnish anything like adequate accommodation for agricultural labourers, and owing to heartless indifference, indolence, or official obstruction—perhaps in some degree also to their own complicated ambiguities—Acts of Parliament, such as the Housing of the Working Classes Act of 1890, have remained practically in abeyance. But, in spite of all this, the country, measured by every standard, remains more salubrious than the town. He had been contrasting the merits of town and country from a health point of view, and the conclusion might be that, while the country is entitled to the preference of the sanitarian, both are urgently in need of his attentions. Excellent work had already been done in both, but much remained to be done, for the greatest wants of the moment are remedies to relieve the pressure caused by the increase of population in urban centres. They were acquainted with the remedies which have been proposed for that state of things—viz., regulations directed against overcrowding, the acquisition of special areas by the authorities for the obligatory rehousing in the same neighbourhood of those disturbed under Parliamentary powers, and the acquisition by municipalities of vacant land for the construction of suitable dwellings. These are excellent as far as they go, but seemed, to him to be palliatives rather than remedies. They shifted the load a little, but did not really lighten it, and it had been, perhaps, the perception of their futility that had led to the half-hearted manner in which they have been applied. Real relief is only to be obtained

by establishing an outflow from the centre to the circumference, and it is by affording the increased facilities of locomotion that this may be done. It is to the new motive power that is now advancing with such giant strides that we must look for the removal of some of our housing embarrassments. Railway extensions, tube railways, surface and sub-surface tramways, and motor omnibuses and cycles will inevitably bring into existence a number of new suburbs around our big cities, to which, if the cost of transit is kept low and rents remain moderate, many of the poorer classes who are not compelled to live near the factory or shop will resort, all the more readily if a shortening of the working day gives time for the journeys to and fro, and if associations are formed to help them to become the owners of their houses. And to these suburbs, should the cost of transit and the time occupied by it or high rents prove prohibitive to the working classes, the well-to-do will in numbers retreat, making room for their humbler neighbours in the inner circles. It is probable, too, that these new suburbs would in some degree intercept the streams of population that are perpetually flowing into the towns from the country, showing that, as regards London at any rate, immigrants settle mainly in the most outlying parts. The new suburbs of towns would, of course, always spring up on lines of communication and where facilities were offered for building speculation, and spread out around, but it is to be hoped that they will be taken in hand in time, and means devised to limit their indefinite expansion.

#### Growth of the Suburbs.

Mr. Charles Booth had said that towns advancing show a noticeable tendency to shoot out tongues like the sun's corona, the intervals between them being filled up later, and it was this filling up of the intervals between them that should, if possible, be prevented. Island suburbs are well enough, but when they swell out, become continuous, and form a girdle round the parent town, they aggravate its evils, and help to strangle it. It has been proposed that air should be supplied to the centre of great cities by mechanical means, but infinitely preferable to any such artificial arrangement, necessarily finical and liable to break down, is a liberal scheme of natural ventilation. There should be maintained in connexion with all great cities a series of broad avenues converging towards them from all the points of the compass, free from buildings, and covered with vegetation. The parks and open spaces in these cities are called their lungs, but the lungs are not of much use without the windpipe, and the green avenues would act in that capacity, and allow an influx of fresh air and the escape of the vitiated air which is always accumulating in cities. These avenues should be clothed in vegetation, and, to his thinking, the preservation of vegetation, not only around our great cities, but throughout the country generally, is becoming a matter of grave import. It was to the rise of the suburb—the island suburb—set in a sea of chlorophyll easily accessible, well planned, honestly built, that we must look in the first instance for the removal of some of the afflictions that overcrowding had brought upon us. But the suburb, while it might do much, cannot do everything, and there were other sources of relief which it was their duty to turn to and to improve. They must take measures to reduce the influx of population into our already congested towns, and to keep on the land those who have been born and brought up on it and to bring back to the land those who have inconsiderately left it. And there were several ways in which this could be done. They could create new cities on new sites, with all the advantages and none of the drawbacks of the old ones—garden cities of the type so eloquently and convincingly advocated by Mr. Howard, in which the needs of industry and the needs of humanity will be reconciled. Charles Kingsley in his philanthropic ardour foresaw something of the kind, for he dreamt of cities—which should be “a complete interpenetration of city and country, a complete fusion of their different modes of life, and a combination of the advantages of both, such as no country in the world has ever seen.” And his vision had come to pass. They had Bourneville and Port Sunlight—cheering

oases in the industrial desert—and, better still, they had Letchworth, gradually coming into being, on a broader basis and with greater amplitude of design. Letchworth was still incomplete, but two visits to it had enabled him to appreciate the judicious way in which it had been mapped out, the excellence of all its sanitary arrangements, and the rapid progress it was making. It was full of promise, and it would be a national calamity should any want of financial support prevent the project in its entirety from being carried to a successful issue. It was to provide for 30,000 inhabitants, and that would not be much of a depletion for congested London; but, whenever Letchworth was an accomplished fact, other garden cities would be undertaken. Another way in which they could tap their great cities of their dangerous superfluities of population was by establishing in their dominions beyond the sea level colonies under some such scheme as that so ably expounded by Mr. Rider Haggard. But the best of all methods, and the most promptly available for checking overcrowding in towns, was by improving housing in the country. They were told that the horror of the agricultural class flock to the towns, because they dislike the monotony of country life and long for excitement and variety. That was so, no doubt, to a large extent, and perhaps their present system of education was calculated to foster discontent with the peasant's lot, and engender vague notions, restlessness, and a thirst for novel stimulants; but he suspected that some contingent of country folk found their way into the towns, not so much attracted by the glamour as repelled by the dingy wretchedness they left behind them. Agriculture was, after all, the most varied and least monotonous of employments, and could the cottages of the labourers be made wholesome and attractive and the village life invested with some interest, many who now migrate to the towns would stay at home, and many who are in the towns and have tried them and failed would be glad to be taken back to the land.

#### Rural Housing.

It was to rural housing, more especially in its relation to the relief of overcrowding in towns, that he had intended to direct their attention, but his excursions into the approaches to that subject had left him only a few minutes in which to touch on it. The main point, however, was—and on that he had already insisted—that by improving their country cottages and adding to them cottages of an approved type they should in some degree check the exodus from the country and even set up a back-wash from the towns. And in order that they might do that they must have amendment of the building by-laws, that have been in so small measure answerable for the depopulation of rural districts and for the congested state of towns. That these by-laws require to be overhauled and remodelled no one who has read Mr. Wilfred Blunt's article in the *fourteenth Century*, or the speeches made by the members of the deputations that visited the Local Government Board, in November last, could doubt. The unfortunate clause in the Public Health Act of 1875, providing that poor law districts might declare themselves urban districts and so acquire powers similar to those exercised in towns and frame by-laws of their own, had been the source of all the mischief. Under this clause half the rural districts of England have acquired urban powers, which, being exercised by persons having for the most part an interest in urbanising the district—jobbers in residential land ripe for development, tradesmen, contractors, and local builders—had been used as an instrument to prevent the erection of dwellings suitable for agricultural labourers, and to tie the hands of the owners willing to provide such dwellings. No better example of this could be adduced than Mr. Wilfred Blunt's own case. Having himself experimented with an iron township which he found singularly comfortable and commodious, he directed his estate agent to erect on his property in the New Forest, where there were no builders' by-laws, cottages, intending, should they prove successful, to make them the model for cottage building in Sussex. And English



successful they proved. He found they could be erected at the cost of £130 for a building covering 700 ft. area, with a veranda of 240 ft. more and an outbuilding containing wash-house and closet—"as snug and comfortable as any poor man could wish to inhabit, for there was a fireplace in every room, and ventilation, and ample door and window space." But when Mr. Wilfred Blunt came to Sussex, where the London Building by-laws were in force, there was a different and a very fierce lion, in the path. The plan of a cottage was submitted to the rural council, and no objection was taken to it until the building materials had been deposited on the ground. Then, however, objection was given that the plan was disapproved by the council as violating the by-laws. This notice Mr. Wilfred Blunt thought it his duty to disregard, and went on with the cottage, which cost £130, and of which, with an additional quarter of an acre of land, he could let without loss at 2s. 6d. a week, or 1s. a week less than an old cottage it replaced. But alas for rural economy! The builder was summoned for building with other than bricks and mortar, and an action was brought against Mr. Wilfred Blunt, as a result of which a continuing penalty of 2s. a day was inflicted on him until the model cottage was pulled down. It was clear that a check must be administered to rustic Bumbleton, and a stop put to the application to purely agricultural areas of regulations intended for towns, and which in towns had had an altogether salutary effect in preventing the construction of unsafe and insanitary houses. But he could not go so far as some who had urged that there should be no by-laws in country districts, or that such by-laws should not apply to any new buildings on a freehold property where such buildings were more than a given number of rods from other dwellings or past the property of adjacent owners. In regard to sanitary arrangements, by-laws seemed to him as necessary in the country as in the town. It was not licence, but reasonable elasticity, and it was to be hoped that this would be realised in the model code of by-laws for rural districts commenced by Mr. Walter Long, and in which cottages in certain situations were to be permitted of wood or other materials.

#### The Letchworth Cottages.

Continuing, Sir James advised every sanitary inspector concerned in rural housing to visit Letchworth and study the buildings erected there diligently. He would there have an instructive lesson, and be able to satisfy himself that a serviceable and comely cottage in all respects suitable for a labourer and his family, could be erected for £150, including builder's profit. He would there see cottages of many small patterns and built of many different materials—of stone, wood, brick, concrete, cement, steel, and plaster in various combinations—and would obtain from the catalogue full information about the price and specifications of each. He would see a careful display of ingenuity and convenience in the filling in of domestic requirements and of making the most of next to nothing. No doubt his critical eye would detect flaws here and there, but everywhere he would perceive an intelligent deference to the claims of modern sanitation. The cottages varied greatly; each had an individuality of its own, but soundness and airiness and common sense characterised almost all of them. They appealed to many tastes, but to no tastes that were vulgar or debased. They were subordinate to their vitality; they were picturesque, but not pretentious. Simplicity and cleanliness were the dominant ideas, and they were cheap with a cheapness that was commendable until they had been actually seen and examined, and compared with the estimates. Think of a detached cottage, well proportioned and artistic in design, with a living-room with range 15 ft. 6 in. by 20 ft. 4 in., parlour with mantle register stove 9 ft. 4 in. by 7 ft. 6 in., three bedrooms 9 ft. high, 13 ft. 4 in. by 9 ft., 12 ft. 4 in. by 9 ft., and 8 ft. 6 in.; with pantry, two cupboards, coal-hole, shed for wood, water-closet, water laid on, drains

connected, rain water-butt, floor of scullery and pantry tiled, and say if it was dear at £150. A survey of some of these cottages at Letchworth, so quaintly pretty, so minutely commodious, so hygienically correct, so reasonable in price, suggested that they should have attractions for the well-to-do not less than for the labouring class. Perched on some beetling cliff or breezy down, bosomed in some bosky dell, or planted in the fields neighbouring some quiet hamlet, they would form a delightful week-end or holiday resort for families of moderate means. The farmhouse had, no doubt, many advantages as a holiday retreat, but the cheap cottage, as a family seat and permanent possession, was infinitely superior.

He hoped that some of his sanitary inspector friends in the large towns might see their way to acquire one, in some suitable locality, of well-selected plan, and, with some small attractions and additions such as they would well know how to devise, raising the price somewhat upon that of the Letchworth model, but still leaving it within the category of cheapness. Such a dwelling should be a source of health and pleasure, and also a good investment.

A hearty vote of thanks was accorded the President for his address, on the motion of Mr. Baldwin Latham, seconded by Mr. Smith (Blackpool), and the Conference afterwards accepted an invitation to meet at Blackpool next September.

#### Examination and Training of Sanitary Inspectors.

Mr. H. H. Spears (chairman of the Midland Centre) contributed a paper on "The Present System of Examination and Training of Sanitary Inspectors," in which he particularly referred to the existing practice of granting certificates, and pointed out that now the Sanitary Institute, the Sanitary Inspectors' Examination Board, the Victoria University of Manchester, the Liverpool University, and possibly others, all hold examinations and issue certificates of competency. Some local authorities prefer one certificate and some another, while a large number are absolutely indifferent as to whether the candidate possesses any qualifications whatever for the position he holds. With such an anomalous state of affairs it was not surprising that the Executive Committee of their Association should have consulted the district centres as to the desirability of assimilating the qualification of provincial and metropolitan inspectors. Despite, however, the apparent advantages of this step, it was a noteworthy fact that provincial members generally had evinced a decided disinclination to pledge themselves to support the assimilation proposal. He hardly knew that they would be acting wisely to espouse the principle of the restriction of the right to hold examinations to one body. The ideal system, so far as they were concerned, would be that the examination board should be constituted by their Association, but, failing this, he thought they might very well consider the claims of other bodies to share in the work of examination.

Considerable discussion followed the reading of the paper, in which Messrs. Quinton (Manchester), Humphreys (Reigate), Peers (Wolverhampton), Young (Battersea), Cowden (Liverpool), G. Anderson (Middlesbrough), McMahon (Torquay), Ablett (Woking), Martin (Burslem), and Miss Carey (Westminster) took part.

Mr. Young said the executive committee was making inquiries and getting information, and it was hoped that before long they would place some definite line of action before the Association. In the meantime he thought it would be well to leave the matter in the hands of the committee.

Mr. G. Anderson thought that they owed thanks to the Sanitary Institute for stepping in twenty years ago and instituting examinations. Their complaint of the Sanitary Institute was that it had not moved with the times, and looked more to fees than to competency.

The President remarked that what was wanted was a central board on which various authorities would be represented, similar to the General Medical Council.

#### Sanitation of Cow Sheds.

Dr. William Daley (Bootle) followed with a paper on "Some Points Connected with the Sanitation and Management of Cow Sheds

and Dairies," in the course of which he laid great stress upon the necessity for ventilation. He laid it down that the practical difficulties connected with efficient ventilation cannot possibly be overcome if the air space of the shippin is less than 600 ft. per cow, but a well-ventilated shippin with this amount of cubic space is infinitely more wholesome than one with twice its capacity if not properly ventilated.

#### London Main Drainage.

Sir Alexander Binnie, formerly Chief Engineer to the London County Council, had prepared a paper on "London Main Drainage," which in his absence was taken as read. The author described the history of the system, the gist of which was contained in his address at the conference of the Institute of Public Health, reported in the *Builder* of July 29. On the general question of the disposal of sewage, however, the author stated that, having studied the question very carefully for the past twelve years, the conclusions he had arrived at were as follows:—(1) That, as far as possible, all solid and floating matter should be removed from the sewage by mechanical means, for although undoubtedly these solid and suspended matters would ultimately be destroyed by the micro-organisms, yet the time required would be too long to admit of its application in ordinary cases; (2) that, as far as possible, such minute suspended matter still remaining in the sewage should be reduced by the aid of those organisms with which we are well acquainted from the solid to the fluid state. This, to his mind, was the first step and the first lesson which they had clearly learned from their investigations into this wonderfully interesting subject.

The effluent sewage containing, then, a large proportion of dissolved organic matter was in a condition to be further treated either by intermittent filtration in which were called contact beds or by some other means being brought into contact with those organisms which had the mysterious power of reducing these dissolved organic substances, which if left to themselves would putrify and be the cause of offensive smells, if not of dangerous consequences. In the case of intermittent filtration and contact beds, considerable difficulty arises from the presence in the effluent along with the dissolved organic matter of certain mineral substances in a minute state of subdivision, derived, no doubt, from the washing of the streets. These latter substances, of course, could not be acted upon by any species of bacteria; consequently, in course of time, they tended to clog up the filter beds themselves. But intermittent filtration and contact beds was not the only mode of treating the sewage effluent which had been deprived of its grosser and more palpable organic matters. It was a well-known fact that if the sewage effluent be poured into a sufficiently large volume of otherwise comparatively pure water the dissolved organic matter contained in it disappeared with remarkable rapidity; in other words, the contact bed, instead of being composed of coke or other solid matter, was formed of water, in which the dissolved process of the reduction of the dissolved solids was carried on. Of course, it was to be understood that the water into which the sewage effluent was discharged must be of large volume and in constant motion, and it was to this latter process that the success which had attended the London sewage works was to be attributed. No doubt these works were not perfect, and at the present time required enlargement, but the success which had attended the work of the past eleven years was a sufficient guarantee that, if the surrounding circumstances were suitable, this mode of treatment was almost as good as any which at the present time could be suggested.

In the afternoon the party were taken by steamboat to the Crossness outfall works of the London County Council, and were conducted over the works by Mr. Beale, the Chief Resident Engineer, who explained the process.

#### Popular Instruction in Sanitation.

On Friday the conference was resumed, when Mr. James Brand (delegate of the Sanitary Inspectors' Association of Scotland) read a paper on this subject. The



author urged that not only should habits of personal cleanliness be inculcated into the minds of school children, but the cleansing of the school building might also be made a means of instilling habits of cleanliness and orderliness in children. He thought that instruction should not stop short at the children, but that ministers of religion, medical men, and sanitary inspectors might seek to educate adults.

#### *Sanitary Inspectors and Biology.*

Mr. F. C. Lewis (University of Liverpool) had prepared a paper entitled "A Biological Contribution to the Sanitary Inspector's Education," which in his absence was read by Mr. E. C. Tidman. The author referred to the necessity of a wide knowledge of things, and to the advisability of a man not confining himself to the study of that which was obviously part of the every-day work, but of going along the by-ways of learning and seeking to know more of those things which influenced such every-day work. Perhaps no other branch of biology was more important than the work which dealt with bacteria. Mr. Lewis proceeded to draw attention to the action of bacteria on foods, etc.

#### *Combined Drainage.*

Mr. I. Young (Battersea), in the course of a paper on this subject, said it was of the greatest importance both to provincial and metropolitan sanitary authorities—to the former on account of the great cost incurred in reconstructing and maintaining the drains of private property at the public expense, and to the latter owing to the difficulties experienced in securing the abatement of nuisances. Without wearying them with legal decisions, he might say the fault lay in the definitions of the word "drain" more than in the decisions which had been given from 1894 onwards. The root of the whole question was the necessity for an amendment in the law rather than to expect that the administrators of it should find what was clearly defined as a "sewer" to be a drain. In section 4 of the Public Health Act of 1875 they were defined as follows:—"Drain" means any drain of, and used for the drainage of, one building only, of premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by persons is conveyed. "Sewer" includes sewers and drains of every description, except drains to which the word "drain" interpreted as aforesaid applies, and except drains vested in or under the control of any authority having the management of roads, and not being a local authority under this Act. That Act did not apply to the Metropolis. As regarded the Metropolis, by section 250, a "drain" was defined to mean and include any drain of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed, and shall also include any drain for draining any group or block of houses by a combined operation under the order of any vestry or district board. A "sewer" is by the same section defined to "mean and include sewers and drains of every description except drains to which the word 'drain' interpreted as aforesaid applies." It might be assumed that at least 60 per cent. of the houses erected in the Metropolis between 1855 and 1896 were drained by combined operations, and lack of supervision by the authorities rather than any intention of the owners had resulted in a permanent burden being played upon the ratepayers to keep such systems in repair. It was not until 1903 that the sanitary authority could demand plans, etc., to be submitted, and this undoubtedly was responsible for the existence of so many unsanctioned combined systems being laid down. There was the further fact that alterations to drainage systems subsequent to their original construction were responsible for many of the sewers now existing on private property. Although such alterations had been made surreptitiously in many cases, the burden of maintaining such systems rested with the

sanitary authority, and this must appear to everyone the greatest of all anomalies in connexion with this vexed question. That, where the authority was able to prove a combined system had been laid down by the approval of itself or its predecessors, the owners are liable, but where no such consent can be shown it was itself responsible even for a stack pipe conveying the rain water from two or more roofs not within the same curtilage. Such a case was decided in the Court of Appeal on April 7, 1903 (*Silless v. the Fulham Borough Council*). He had examined the records of the Commissioners of Sewers, who were in power from 1847 to 1855, and combined systems of drainage laid prior to 1847 it might generally be assumed were sewers for which the local authorities were responsible. Mr. Young submitted some drawings illustrating the position as it operates in the Metropolis, in which the anomaly of "premises within the same curtilage" was clearly shown. One was the use of a large house originally in one curtilage and drained separately to the sewer. Years after it was built the house was divided into two separate properties. No alteration in the drainage was necessary, and it was not until a nuisance arose in the drain that any question as to liability for repair was raised. Notice was served, and it was decided that the portion which was originally a liability of the owner to repair was simply by the alteration in curtilage decided to be a sewer, for which the sanitary authority was liable. Coming to the question of expense, Mr. Young showed that the cost of repairing private property as sewers had been to the metropolitan borough councils from 1900 to 1904 inclusive 115,444*l.* 1*s.* 6*d.* This was exclusive of Holborn and Westminster. During the past nine years the metropolitan authorities had striven their utmost to secure an alteration in the law. At the instigation of these bodies the London County Council in five sessions of Parliament introduced the "Metropolitan Sewers and Drains Bill." This Bill encountered considerable opposition, and a difficulty was experienced in getting members of Parliament to take charge of the measure, and it had to be finally abandoned. The London County Council, when advising the authorities of this decision, stated that it was one with regard to which the borough councils should themselves seek legislation upon. The various local councils, continuing their action, secured an interview with Mr. Walter Long, the President of the Local Government Board, on June 18, 1903, the metropolitan borough councils being represented by nearly sixty members. A very strong case was made out by the representative speakers, the fiscal importance of the case being strongly urged, together with the fact of the impossibility of sanitary authorities being unable to engage a sufficient staff of sanitary inspectors to prevent systems of drainage being converted into sewers. It was further pointed out how impossible it would be for each council individually to present Bills in Parliament to deal with a common question, and that it was therefore a question with which the Local Government Board alone could effectively deal. To recapitulate the main points of Mr. Long's reply, the question, he admitted, was by no means free from difficulty, and agreed that a very strong case had been made out. Generally speaking, he said "it does not seem to me that there ought to be in fact and in law any confusion between two things which appear to me so essentially different as a sewer and a private drain." With regard to a sewer which the local authorities have to maintain, they ought to be masters both as to its situation, construction, and everything connected with it before they should be responsible for its maintenance. Further, he stated he recognised the justice of the demand that the Government should legislate, that it would be ridiculous for any one borough council to introduce a Bill, and promised that he would give to the solution of the difficulty his most careful and earnest consideration. Since this interview much additional information had been furnished to the Local Government Board, but no official action appeared to have been taken by the

Board. In conclusion, he would only reiterate the points that combined drains were laid by owners for economy and profit. They were never intended to be maintained by the community, being constructed generally without any communication with or the knowledge of the local authority or Commissioners of Sewers, and consequently never had the opportunity of making the required statutory order in regard thereto. It was visibly illegal to assume the Legislature intended to throw such a burden upon ratepayers, when the cost of maintenance of drains made pursuant to an order was expressly laid upon the owner. Another point deserving attention was the increased activity of local authorities since the passing of the Public Health (London) Act, 1891, in ascertaining the existence of nuisances and securing their abatement. If some remedy was not found for abating nuisances arising from defective combined drainage without inflicting the cost upon the ratepayer, there was the danger that a less energetic discharge of these duties might arise, and the public health would consequently suffer. Having regard to the facts, it was curious that, whilst the metropolitan authorities had been striving to obtain, but without success, the relief required, the West Ham Corporation, whose boundaries adjoin those of the Metropolis, has secured relief in a private Bill introduced in 1898. As during the past six years he had seen no remedy suggested which, in his opinion, met the case so well as this clause both in regard to the difficulties obtaining in the Metropolis and the provinces, he ventured to suggest that the Association petition the Local Government Board upon the matter asking for legislation upon the lines of clause 42 of the West Ham Corporation Act of 1898, which ran as follows:—"In and for the purpose of section 41 of the Act of 1893 the word 'drain' shall be deemed to include any sewer or drain, whether constructed before or after the passing of this Act, with which two or more houses or premises (whether belonging to the same or different owners) are at the date of the passing of this Act, or may at any time thereafter be connected, or which is used, or capable of being or intended to be used, for the conveyance of the drainage of such houses or buildings directly or by means of any other sewer or drain to any public sewer situate under a street repairable by the inhabitants at large, but shall not include any sewer which has been constructed to the satisfaction of the Corporation under section 152 of the Public Health Act, 1875, or any sewer which has been constructed by the Corporation for the effectual drainage of the borough."

Mr. H. Alexander (Shoreditch) moved the following resolution:—"That this Congress is of opinion, having regard to the anomalous condition of the law relating to sewers and drains, to the inequitable costs imposed on local authorities, and to the obstruction experienced by sanitary inspectors in the discharge of their duties by the abuse of the law, that an amendment thereof is necessary for a proper settlement of the distinction between sewers and drains, and that such amendment should be on the following lines:—(1) That the existing definition of the words 'drain' and 'sewer' as contained in the 250th section of the Metropolitan Management Act, 1855, and the 112th section of the Metropolitan Management Act, 1862, the 40th section of the Public Health Act, 1875, and the 19th section of the Public Health Amendment Act, 1890, should be repealed. (2) That the Local Government Board be memorialised to introduce a Bill in Parliament enacting, firstly, the repeal of the aforesaid definitions; secondly, enacting that the word 'drain' shall mean all pipes or other conduits for drainage which may have been or shall be hereafter constructed or constructed on private or public premises by persons other than a local authority or county council, or the predecessors of such bodies, and shall include that part of such conduit which extends from the premises to a sewer; and that the same shall be deemed to have been constructed at the expense of the owner or owners of the various premises drained in combination, and shall be maintained and kept in good condition at the expense of such owner or owners jointly. (3) That the



and 'sewer' shall mean and include all sewers and conduits used for drainage of every description, except those to which the word 'sewer' is interpreted as aforesaid applies; and shall include such pipes and conduits as may have been constructed by private persons, but which have been taken over by a local authority or county council, or the predecessors of such bodies. (4) And that the aforesaid enactment shall apply to the Metropolis and to the whole of England and Wales.

Mr. J. T. Quinton (Liverpool), in seconding the resolution, said they were all agreed that a more explicit definition was required, and in that opinion they were supported by the highest legal mind in the land. It must be clearly obvious that sanitary inspectors in advocating a change in the law could have but one desire, which was the welfare of public health. Again, no officer could have greater opportunities for seeing how the present law encumbered the local authorities in dealing with matters affecting the public health than those who were daily entrusted to carry out the duties under the various Acts, by-laws, and regulations. It was, therefore, well within the sanitary inspector's province to call attention to the present anomaly as to what was a drain and what a sewer. Many local authorities had been fully alive to the existing anomaly, and had seen the necessity of removing the impediment in the way of improvement, and Mr. Young had quoted the clause which the West Ham Corporation obtained in 1898. Liverpool had also a clause in their Act of 1902, which was as follows:—'Where two or more houses or other buildings belonging to the same or different owners are connected with the public sewer or cesspool by a single private drain, an application may be made under section 41 of the Public Health Act, 1875, relating to complaints as to nuisances from drains, and the Corporation may recover any expenses incurred by them in executing any works under the powers conferred on them by that section from the owner of the houses or buildings, and such expenses shall be recovered summarily or may be decided by the Corporation to be private improvement expenses under the Public Health Act, and may be recovered accordingly. For the purposes of this section the expression 'drain' includes a drain used for the drainage of more than one building, whether belonging to one or more owners.' It would be noticed that both the West Ham and the Liverpool clauses could only be brought into operation for the purposes of section 41 of the Public Health Act. The powers possessed by the two corporations might have been secured at considerable expense, but they had secured a great advantage for themselves when dealing with nuisances arising from drains. If such powers were required for Liverpool and West Ham, why not for the rest of the country? Things were in an absurd state now. For instance, there might be thirty houses all belonging to one owner having a drain to convey the drainage of the houses to the public sewer. On the other hand, they had two houses drained by one drain to the public sewer. The owner of the thirty houses had the main drain maintained by the local authority, while the owner of the two houses must keep the drain in good condition.

Mr. Duck (Woolwich) said that the unfortunate aspect of the case might possibly seriously affect the health of the inhabitants. He supposed that in all the old districts of London the inspectors would not have the slightest difficulty in finding in these old districts some of the vilest and worst that could be imagined, but to refer these to the sanitary authority to be dealt with would be to mean that whole districts would have to be re-drained by the local authorities at enormous expense. He thought, however, that they had better not themselves seek to suggest the clauses, and Mr. Alexander's clauses were to be put in an Act difficulties would arise at once. It would like to know what was the meaning of 'taking over' by the sanitary authority, although he presumed that those for which the local authorities had paid 116,000 had been taken over. He supposed that they had better leave the suggestion of clauses to lawyers.

Mr. Mort (Cheshire) thought the importance of the question of what was a drain and what a sewer was such that it should not be shelved, and that some satisfactory definition should be given.

Mr. Wells (Newcastle) expressed his opinion that it would be well to expunge the words 'belonging to different owners' from the section.

The President thought this was no legal, but a practical and logical question, and what the lawyers had to do was to put in plain language the practical knowledge of such gentlemen as those before him. It seemed desirable that, whatever the requirements were, they should be in force all over the country.

Mr. Young said he was opposed to the resolution. They were not lawyers, and to tell the Local Government Board how they ought to deal with this question seemed to him unwise. They might direct the attention of the Board to the West Ham clause, which had been in operation for seven years and had worked well.

Mr. Alexander denied that there was any wish to dictate to the Local Government Board, but the clauses might be suggested to them. Mr. Duck knew what was meant by taking over a drain. A large number of drains had been remodelled by the local authorities, and were then taken over by them as sewers.

Mr. Young moved as an amendment—'That the Sanitary Inspectors' Association petition the Local Government Board asking for legislation upon the lines of clause 42 of the West Ham Corporation Act of 1898.'

The amendment was carried, and the Conference rose for the day.

A final meeting of the Conference took place on Saturday morning, when votes of thanks were passed to those who had extended hospitality to the visitors and to the Carpenters' Company for the use of the hall. On Friday afternoon visits were paid to St. Thomas's Hospital for an inspection of the Shone new patent system of drain and soil pipe ventilation, to Messrs. Doulton's Pottery, and to the works of the Absolute Smoke Prevention Syndicate. On Saturday the works of the Sanitas Company at Limehouse were visited.

#### ADAPTATION OF HIGHWAYS FOR MODERN TRAFFIC.

It must be apparent to the most casual observer that many of the existing highways of this country are sadly in need of improvement, in order to adapt them for rapid traffic, such as has been introduced with self-propelled vehicles. The fact that some of the existing carriageways have remained in their present condition as a menace to life and limb for so many years reflects great discredit on highway authorities.

Many authorities allow buildings to be brought forward in such a manner that ultimately large sums of money have to be expended in order to widen highways which must eventually form arterial thoroughfares. The author knows of many cases in and about the Metropolis where, within the last thirty years, owners offered land to highway authorities, either without payment or for a nominal sum, for the purpose of widening highways, provided the authorities did the paving; but the so-called economist of those days had not the nerve to undertake such paving, the consequence being that now buildings have been erected these widenings become matters of necessity, and hundreds of thousands have to be expended where hundreds would have sufficed some few years since.

By-laws, and so far as the author is aware, local Acts, make no provision for the rounding of corners at the intersection of roads, even in the case where such roads are being laid out. The author has been much struck with the great difficulty experienced in getting local authorities to appreciate the necessity of wide highways and the rounding off of corners, and he has been met with such arguments as that Ratcliff Highway, which is only 30 ft. wide, carries more traffic than any road in his district, and why, therefore, should he insist on a wider road—and this not from an ordinary member of the council,

\* A paper read by Mr. C. H. Cooper, of Wimbledon, at the annual meeting of the Incorporated Association of Municipal and County Engineers, held at Norwich, June, 22, 23, and 24.

but from an eminent member of the engineering profession.

It would be well if some provision were in force to compel highway authorities to have new streets so laid out that every portion of the carriageway is visible from every other part of such carriageway, which is within a distance of at least 100 ft., and that at the junction of any two carriageways the same rule is observed as if they formed the same street. The reason of this provision is, that vehicles approaching should see each other at as early a period as possible, so as to give every opportunity of avoiding collision.

Steep inclines form a great source of danger for all forms of wheel traffic, more especially when roads meet on inclines or at, or near, their lower termination. The author knows of nothing that shows the absurdity of having a uniform rate of speed allowed for vehicles more than the case of steep inclines, especially when it is remembered that on many of these inclines not a single week passes without accidents, which if not accompanied by loss of life or personal injury, results in considerable damage to rolling stock and fences, which shows that it has been due more to good luck than otherwise that personal injury has not accrued. Authorities should therefore endeavour as far as possible to have streets laid out so as to reduce inclines, and where roads intersect to round off corners next the higher portion of the incline to as great an extent as possible.

#### Surface.

The surface of carriageways is a matter which requires considerable attention, not only to carry horse traffic in comfort, but more especially to ensure safety and comfort to cyclists and motorists. The surface should therefore be as even as possible, and although all carriageways should be properly arched, there should be no excessive arching, such as would lead to the centre of gravity of vehicles being placed dangerously near the outer wheel. No gully gratings should be allowed in the carriageways, but gullies should be placed beneath the paths, with a proper weir formed in the kerb to take the water on to such grating; this leads to the necessity for provision being made to prevent mains being placed beneath the paths in such positions as to interfere with that suggested for the gully-pans.

Many persons look on motors with pneumatic tyres as causing considerable damage to highways. They are no doubt the cause where carriageways are badly constructed in the first instance, or are badly maintained; but the author knows of no form of traffic which causes less damage to carriageways, provided the surface is properly laid and a proper state of moisture maintained. This will be seen on a main road taking a large quantity of motor traffic on a spring or autumn morning when the carriageway holds just sufficient water; a beautifully smooth surface will result from the constant rub of the pneumatic tyres; a very large amount of tonnage is thus carried with a minimum amount of damage to the carriageway.

There is no doubt that when railways became the great carriers of the country the question of our highways became a matter of secondary consideration; in fact, in too many cases they were neglected to an extent that must have damaged many interests. This state of affairs is rapidly changing, as our carriageways have, with the introduction of self-propelled vehicles, become a great means of conveying the wealthier portion of the pleasure seekers. At the same time, the introduction of heavy motor traffic is being instituted for the carrying of goods, a class of traffic which must of necessity increase enormously. Local authorities, if they wish to remain highway authorities, must, therefore, make up their minds that the ordinary country road, which in years gone by was never subjected to a load exceeding 2½ to 3 tons, will in the near future be subjected to loads of at least ten times this amount, and that any attempt to prevent these loads traversing their roads at seasons when injury is likely to be caused cannot be maintained. The only step for such authorities to take is to form their highways in such a manner as that at all seasons they are capable of bearing heavy traffic, and, above all, to see that all new streets and roads are so laid out that they will carry heavy traffic at all seasons.



This work may appear to involve at first sight a large capital outlay, but the author can only state that in his own district, in which, he is happy to say, there are now very few roads without proper foundations, the cost of maintenance of roads properly formed is far less than that of roads without good foundation, and that the difference in cost of maintenance per mile more than compensates for the cost incurred in properly forming the highways in question. There are obstructions which should be avoided as far as possible, viz., the placing of lamp-posts and sign-boards close to the carriage-way. These should be placed in such positions as not to interfere with the use of the whole of the carriageway, which they do if placed in such position as to engage overhanging loads.

#### Footways and Bridle-Paths.

Although the title of this paper may not entitle the writer, he cannot conclude a paper on highways without referring to the neglected state of footways and bridle-paths throughout the country. Now that our carriage-ways are being converted more or less into engine tracks, the solitude of these paths forms a most pleasing contrast to the danger and flurry to which our highways are subjected, and the author thinks it is a matter which reflects very severely on highway authorities that in many cases they take no steps whatever to prevent these footways and bridle-paths being closed—viz., Ermyth Street, the Roman road crossing Epsom Downs and Mickleham, Surrey. Others are so overgrown with trees as to be perfectly useless. The author knows of many in which one would be above his knees in mud were he to attempt to traverse them. Whilst highway authorities have of necessity to lay out money to accommodate the pleasure-seeking motorist and cyclist, the author considers that the equally deserving individual who is still satisfied with the means of locomotion that the gods have allotted him has quite as strong claims on the rates expended on highways as the individual who can afford 1,000*l.* for a motor. But whereas hundreds of thousands of pounds are laid out to provide for the comfort of the latter, not one penny

piece, so far as footways and bridle-paths are concerned, is laid out for the former. There is no doubt that this is to a large measure due to the desire on the part of landowners to attempt to close, as they do in many instances, footways and bridle-paths.

#### ARCHITECTURAL SOCIETIES.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—On Saturday last week the members of the York Society of Architects visited Sheffield in order to see some of the buildings which have been recently erected for educational purposes. Chief among these are the new University buildings in Western Bank. Here the visitors were joined by many members of the local society, and the combined party was conducted over the building by the architect, Mr. E. M. Gibbs. Before proceeding to the detailed inspection, the party assembled in the Fifth Hall, where Mr. Gibbs gave an account of the various materials used in the erection of the buildings, and explained how the requirements of the various departments had affected the general arrangement. At the conclusion of the inspection the party left by special tram-car for Neith Green Council School, where the members were met by Mr. A. F. Watson, the architect of the building, who conducted them round, and explained the arrangement of the school. An adjournment was then made for tea.

**CLUB PREMISES, FLEET.**—New premises are being built for the Fleet Club, at Fleet. They will have a frontage of 30 ft. and a depth of 96 ft. Mr. H. Love is the architect, the builder being Mr. S. Vass.

**SAFETY OF THE PUBLIC IN THEATRES.**—In a recent number of the *American Architect* was published an article, with illustrations, describing a novel method of getting an audience out of a theatre in case of fire. One of the essential provisions was a second fire-resisting screen, which was claimed as a new idea of the inventors. In 1903 the London County Council suggested a second fire-resisting screen for the improvement of Drury Lane Theatre, but it was waived at the recent arbitration.

#### Illustrations.

##### LANGFORD MANOR.

THESE illustrations are given in connection with the article on Langford Manor, which appears on another page.

##### MUNICIPAL BUILDINGS, LAMBETH.

THE design illustrated was one of those placed by the assessor. The conjunction of the two streets at an acute angle suggested a lay-out on a triangular basis; it gives a symmetrical treatment to the façades on Brixton-road and Acre-lane, and also leaves a rectangular plot, some 95 ft. wide by 160 ft. deep, for any future building it may be decided to erect hereafter. The plan sufficiently explains the working out of the scheme, but it may be noted that each department is *en suite*, and the main corridor round the three sides of the triangle gives easy and direct access to the various rooms, and the council chamber being placed in the centre is carefully secluded, and free from the noise of traffic, etc. The treatment and watery nature of the subsoil have influenced the design in so far as to exclude the adoption of any basement (except a small part for stores), the building being placed on two floors only—i.e., ground and first floor. The perspective clearly shows the external treatment of the building. The materials proposed were bright red facing bricks, with Portland stone dressings, the windows being double hung sashes, placed on the outer face of the wall.

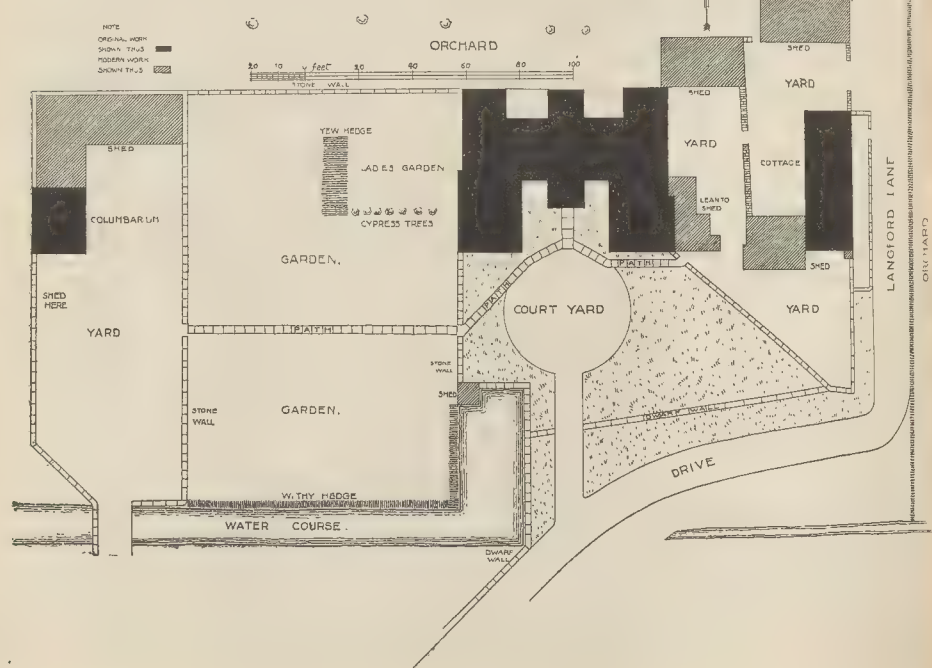
H. V. ASHLEY & WILTON NEWMAN.

##### ORGAN CASE, ST. PAUL'S SCHOOL.

THIS organ case was erected in St. Paul's School as a memorial to the late Professor Jowett, who was an old Pauline.

The general design is by Mr. T. R. Spence. The bronze bust is the work of Mr. R. B. Pinker. The wood-work was executed by Messrs. Gaire & Sons, of Aberdeen; and the heraldic shields and pipe decoration by Mr. L. J. Spence.

#### LANGFORD MANOR FIVEHEAD SOMERSET.



Block Plan of Langford Manor.



## TESTS OF THE BRITISH FIRE PREVENTION COMMITTEE.

Tests were undertaken by the British Fire Prevention Committee on the 16th and 17th inst. The Committee's own experimental test with a concrete floor, 5 in. thick, supported by heavy broad-flange girders, protected by 2 in. of concrete (the concrete being of an aggregate of one cement to two sand to two ballast), definitely demonstrated the unreliability of a rich concrete aggregate containing ballast. The floor was loaded 24 cwt. per foot super., and fired for four hours, followed by steam fire-engine stream for five minutes for classification as "fully protective" (class B). The main girders were not bent and deflected considerably during the fire, and two of the bays collapsed upon application of water. This experimental test with non-proprietary work was of a most interesting character, it being possible closely to observe the peeling away of the concrete, the action of the flames, and disintegration on the application of water.

The test with the "Faber" floor was a two-and-a-half hours' test, followed by the application of water for two minutes—i.e., for classification as "fully protective" (class A). The load was, hence, 2 cwt. This floor showed the application of the principles of reinforced concrete to a floor of hollow semiporous bricks, the reinforcement being by rods laid crosswise. The detailed report will give the particulars of the result, but, summarised, it can be said that the floor obtained classification by not allowing fire and water to pass through, although the floor was severely damaged, and the rods laid bare during the testing operations.

The roller-shutter door test with the "Kinneir" shutter was a test for one and a half hours, followed by the application of water for two minutes, for classification as "partially protective" (class A). This classification was attained, as neither fire or water passed through the shutter, although the shutter buckled severely. The flames, however, got over the top. We understand that the makers are putting forward a further shutter for test. The size under review was 9 ft. by 8 ft.

The test with the partition erected by the National Fireproofing Company was for classification as "fully protective" (class A), which requires a partition not thicker than 2½ in. to withstand fire for two and a half hours, followed by water for two minutes. This partition obtained classification, neither fire nor water passing through, although it showed cracks and bulged.

In all these tests the temperature had to attain 1,500 deg. Fahr. The last-named tests were in chambers 10 ft. by 10 ft. in plan. The Faber floor was in a chamber measuring 23 ft. by 10 ft., and the experimental test was in the Committee's new large chamber, measuring 22 ft. by 15 ft.

## APPLICATIONS UNDER THE 1894 BUILDING ACT.

At the meeting of the Building Act Committee of the London County Council, held on July 31, being the day before the Council adjourned for the summer recess, the proceedings were governed by the clause in the Act of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the Committee's order of reference. The names of applicants are given between parentheses:—

## Lines of Frontage and Projections.

**Adelphi.**—The retention of an iron and glass screen to the Adelphi Hotel, John-street, Adelphi (Messrs. H. & C.).—Consent.

**Rotherhithe.**—Buildings on the southern side of Lower-road, Rotherhithe, opposite Neptune Messrs. Newman & Newman for the trustees of the Parish of Bermondsey).—Consent.

**Dulwich.**—An open wooden porch at No. 34, Dulwich (Mr. W. M. Brutton for the owner).—Consent.

**Wandsworth.**—A building on a site on the corner of Garratt-lane and western side of Wandsworth, Tooting (Mr. H. J. Marten for the Council of the Metropolitan Borough of Wandsworth).—Consent.

**Wandsworth.**—That the application of Mr. C. de Gruchy for an extension of the period within which the erection of additions to the Union

Church, Upper Richmond-road, Putney, was required to be commenced, be granted.—Consent.

**Woolwich.**—A Welsh Congregational Chapel on the northern side of Willenhall-road, Woolwich (Mr. J. M. Peate).—Consent.

**Brixton.**—Three houses on the eastern side of Willington-road, Brixton (Messrs. McIntosh & Co. for Mr. E. M. Hayward).—Consent.

**Haggerston.**—Buildings on the site of Nos. 25, 27, 29, 33, 35, and 37, Hackney-road, Shoreditch, to the line in Hackney-road (Mr. J. E. Saunders for Messrs. Howard Wall & Co. and Creeds Trust).—Consent.

**Hampstead.**—A bay window and a balcony railing at a house to be named "St. Ann's," in course of erection on the eastern side of Redington-road, Hampstead (Mr. C. H. Saunders for Miss R. Thomas).—Consent.

**Islington, East.**—Two projecting hoods over the entrances of Nos. 46 and 48, Elwood-street, Islington (Mr. R. Hancock).—Consent.

**Kensington, South.**—A verandah in front of No. 3, Campden-hill, West Kensington (Mr. J. W. Legge for Mrs. Morgan).—Consent.

**Paddington, North.**—Bay windows to a proposed block of flats on a site between No. 401, Edgware-road and Cuthbert-street, Paddington (Messrs. Done, Hunter, & Co. for Mr. H. Ward).—Consent.

**Wandsworth.**—Houses in Cowick-road and Coteoford-street, Tooting (Mr. R. Robertson for the Housing of the Working Classes Committee of the Council).—Consent.

**Strand.**—The retention of three wood and glass showcases in front of No. 1, Piccadilly-circus, St. James's, Westminster (Mr. A. Oldcorn).—Consent.

**Hampstead.**—The retention of one-story buildings on the eastern side of West End-lane, Hampstead, northward of West Hampstead station (Mr. E. P. Seaton for the Metropolitan Railway Company).—Consent.

**St. Pancras, North.**—One-story shops on the forecourts of Nos. 123 and 125, Fortess-road, St. Pancras (Mr. T. Frazer for Mr. T. H. Hawkins).—Refused.

**Wandsworth.**—A motor-car shed at "Beeligh," West-hill, Wandsworth, to abut upon Dromore-road (Messrs. Barton & Theobald for Dr. C. Banting).—Refused.

**Kensington, South.**—The rebuilding of South Kensington Station, Cromwell-place, Kensington (Mr. G. Sherrin for the Metropolitan and Metropolitan District Railway Companies).—Refused.

**Lambeth, North.**—An open letter sign at No. 235, Westminster Bridge-road, Lambeth (Mr. L. Wood for Mr. Arthur).—Refused.

**Lewisham.**—Iron and glass porches over the entrances to houses in Boyne-road, Lewisham (Messrs. H. & G. Taylor).—Refused.

**Lewisham.**—A building on the north side of Elmer-road, Catford, eastward of No. 74 (Mr. H. Woodham & Sons for Mr. H. Woodham).—Refused.

**Marylebone, East.**—An iron and glass shelter in front of St. George's Hall, Langham-place, St. Marylebone (Mr. J. G. W. Buckle for Mr. J. N. Mackay).—Refused.

**Strand.**—The rebuilding of Nos. 133 and 135 and Nos. 137 to 167, Regent-street (Messrs. R. C. Harrison & Son).—Refused.

## Width of Way.

**Hammer-smith.**—A forecourt fence at St. Vincent's House, Queen-street, Hammer-smith (Messrs. H. F. Tasker & Slater for Madame M. Dubois).—Consent.

**Hackney, North.**—A one-story stable building and the retention of a wooden gantry at the rear of No. 401, Kingsland-road, Hackney, at less than the prescribed distance from the centre of the roadway of Derby-road (Mr. G. Carter for Mr. A. Weibking).—Consent.

**Hackney, Central.**—A building on the west side of Holly-street, Dalston, southward of No. 71 (Mr. D. P. Hayworth for Messrs. S. Hayworth & Sons).—Consent.

**Peckham.**—Three buildings on the south side of Wagner-street, Peckham (Mr. J. P. Choate for Mr. B. Gale).—Consent.

**Hampstead.**—Retention of a motor-shed and glass roof at "Northcourt," College Villas-road, Hampstead (Mr. W. Scott).—Refused.

## Width of Way and Line of Frontage.

**Marylebone, West.**—The rebuilding of the Western Ophthalmic Hospital, Marylebone-road, St. Marylebone, with external walls at less than the prescribed distance from the centre of the roadway of Circus-street, and to the line in Marylebone-road (Mr. W. Harvey for the Committee of the Hospital).—Refused.

## Width of Way and Construction.

**Lewisham.**—A wood and iron building at the rear of No. 57, Tyrwhitt-road, Lewisham (Mr. J. Cox for Mrs. A. Fenton).—Consent.

## Lines of Frontage and Construction.

**Bow and Bromley.**—The retention of the wood and iron street fire-station on a piece of land on the north side of Wallis-road, Hackney Wick, at the corner of Windsor-road (Mr. O. Fleming for

the Fire Brigade Committee of the Council).—Consent.

**Kensington, North.**—Permission to retain a bicycle shed, adjoining No. 13, Colville Houses, Talbot-road, Bayswater (Mr. W. H. Burnet for Mr. A. H. Meiklejohn).—Refused.

## Width of Way, Line of Frontage, and Construction.

**Rotherhithe.**—The erection of two fixed gangways and three travelling gangways across Pickle Herring-street, Rotherhithe, and of a steel-framed platform, on the south-west side of that street (Messrs. Stock, Page, & Stock).—Consent.

**Width of Way and Buildings for the Supply of Electricity.**

**Hackney, North.**—An electric light sub-station on a site abutting upon the west side of Edward's-lane and south side of Lordship-terrace, Lordship-road, Stoke Newington (Mr. W. F. Loveday for Stoke Newington Borough Council).—Consent.

**Widening of Street and Deviation from Certified Plans.**

**Strand.**—New buildings on the site of Nos. 59 and 60, Pall Mall, and 1, Crown-court, Strand, and the widening of Crown-court (Mr. E. G. Dawber for the London and Lancashire Fire Insurance Company, of Liverpool and London).—Consent.

## Space at Rear.

**Lambeth, North.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of Nos. 8, 9, and 10, Lower-marsh, Lambeth (Mr. W. H. Roger).—Consent.

**Lewisham.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on the north side of Theodore-road, Hither Green-lane, Lewisham (Mr. E. Willson for Mrs. Moore).—Consent.

**Means of Escape from the Top of High Buildings.**  
**Strand.**—Deviations from the drawings approved in respect of the means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act from the (fifth) top and fourth stories of Nos. 1 and 1A, Cockspur-street, and Nos. 18 and 19, Pall Mall East, Strand (Waring White Building Co.).—Consent.

## Formation of Streets.

**Battersea.**—That an order be issued to Mr. W. M. Wilkins, sanctioning the formation or laying out of a new street for carriage traffic to lead from Theatre-street to Latchmere-road, Battersea (for the Council of the Metropolitan Borough of Battersea).—Consent.

**Strand.**—That an order be issued to Mr. J. W. Bradley, sanctioning the formation or laying out of a new street, for foot traffic only, to lead from Bow-street to Cross-court, Strand (for the City of Westminster).—Consent.

**Woolwich.**—That an order be issued to Mr. M. Fitzmaurice sanctioning the formation or laying out of a new street for carriage traffic to lead from Church Manorway to Harrow Manorway, Plumstead (for the Main Drainage Committee of the Council).—Consent.

**Lewisham.**—That the application of Mr. P. Roche for an extension of the period within which the erection of houses with shops on the eastern side of Springbank-road, Hither Green, between Nos. 11 and 53, were required to be completed, be granted.—Agreed.

**Islington, West.**—That the Council do not consent to the application of Messrs. Lee & Pain-Clark, on behalf of Sir John Poynder Dickson-Poynder, for permission to erect a hoarding at the end of Widdenhall-road, Islington, next Stock Orchard-crescent.—Agreed.

**Woolwich.**—That an order be issued to Mr. A. H. Huston refusing to sanction the formation or laying out of a new street at the rear of houses in The Slade, Plumstead (for Mr. C. Curtis).—Agreed.

## Buildings for the Supply of Electricity.

**Westminster.**—That the Council do consent to the application of Mr. G. S. Peach for permission to retain for a further period the temporary iron chimney shaft at the electricity generating station, Millbank-street, Westminster.—Consent.

**OFFICES, SUNDERLAND.**—The Sunderland and South Shields Water Company are having new offices built at Sunderland, at the corner of John-street and Borough-road. The architects are Messrs. W. & T. R. Milburn, Red Carse Hill. The material employed in the structure is the material employed in the cost of the work will be about 10,000.

**ROMAN CATHOLIC CHURCH, HAYDOCK.**—The foundation-stone was laid recently of the New Church of the English Martyrs, which is being erected at Haydock. The church is estimated to cost 1,850, exclusive of decoration and furnishing. It will accommodate 450 worshippers, and is being erected in the Early English style, with grey bricks externally, relieved with terra-cotta dressings. The architects are Messrs. Curran & Son, of Warrington, and the contractors Messrs. H. & F. Lomax, of Platt Bridge.



## COMPETITIONS.

**THE PALACE OF PEACE.**—The Foreign Office has received a communication from His Majesty's Consul at Amsterdam (Mr. W. C. Robinson) stating that the programme for the international architectural competition for the Palace of Peace in the Hague has been issued. The amount appropriated for the building is 1,600,000fl., or about 130,000l. Designs are to be handed in within seven months. Details will be supplied, on application, by Mr. D. E. C. Knuttel, architect, Fluweelen Burgwal, The Hague.

**COUNCIL SCHOOLS, BOLSOVER.**—In the recent competition (limited to architects in the geographical county of Derby) for three Council Schools at Bolsover for the Derbyshire Education Committee, the first place for the Stanfree School was secured by Mr. Clarence R. Ross, of York Chambers, Long Eaton; while for Langwith Bassett and New Bolsover the successful architect was Mr. H. Tatham Sudbury, of Lord Haddon-road, Ilkeston, and these gentlemen have been engaged by the Committee to carry out the work.

## Books.

*An Introduction to the Design of Beams, Girders, and Columns in Machines and Structures, with Examples in Graphic Statics.* By WILLIAM H. ATHERTON, M.Sc. London: Charles Griffin & Co., Ltd. 1905.

MUCH has been written on the theory and practice of beam design, and, notwithstanding the fact that the subject is by no means of abstruse character, it must be admitted that several essential points which ought to be made perfectly clear are not invariably discussed to the complete enlightenment of the inquiring mind, owing to the stereotyped methods adopted in many treatises. In the present book we are glad to find that Mr. Atherton has gone to the root of several matters that are touched upon but lightly in some other works, and that, prompted by personal knowledge of the difficulties occurring to students and draughtsmen, he has relied upon fully worked examples rather than upon general statements for the purpose of imparting clearness of view as to first principles and their application to actual practice.

Although thorough in treatment so far as it goes, this treatise is strictly introductory in scope, and, with the exception of a short chapter on "The Strength of Columns," the subject-matter is restricted to the design of beams, without any attempt to deal with the design of complete structures, except so far as these are represented by braced girders and trusses. The result is a very useful and satisfactory manual, which, we believe, will find general favour from engineering and architectural students. Among the introductory chapters which are inevitable in a work of this class, we notice a very simple explanation of the nature of couples and of their bearing upon the strength of beams. The difference between "stress" and "strain" is clearly and very properly emphasised, and the relation between these two, which may be regarded as cause and effect, is investigated to a sufficient extent. In Chapter V, on the "Strength of Rectangular Beams," the much-debated question of the position of the neutral axis of a beam section is discussed at some length. Mathematicians insist that the neutral axis must pass through the centre of gravity of the section, and therefore that its position must be determined by geometrical means alone. The theory can only be true on the assumption that the modulus of elasticity of the material is the same for compression as for tension, or that  $E_c = E_t$ , at the stress intensity actually involved. Ordinary beam theories and their resulting formulae are based on the assumption that the neutral axis passes through the centre of gravity of the section under all circumstances. If we understand him aright, Mr. Atherton does not recognise the reasonableness of this treatment, although owing to the deficiency of experimental data he does not feel justified in recommending any departure therefrom. It is well-known that the ratio of the coefficients for compression and tension varies with the stress intensity, and it is strictly logical to suppose that the position of the neutral axis must vary also with the stress. Therefore the idea of a fixed position seems to be wrong, and in the case of a material

where the value of  $E_c$  is, say, double that of  $E_t$ , it is difficult to justify the usual assumption that the surplus strength of the top half of a rectangular beam is of no use whatever. A more probable hypothesis is that nature, more probably hampered by human theories, so refusing to be hampered by the neutral axis that adjusts the position of the neutral axis that the compressive and tensile resistance of the material shall be exercised to the best advantage. While the author decides to follow the usual method of dealing with beams, his discussion of the point here mentioned is distinctly suggestive.

Near the end of Chapter VI, which contains a number of worked examples, attention is called to the discrepancy between the actual and calculated strength of a rectangular beam. The author accounts for the greater breaking load by the theory that the plastic yielding of material more remote from the neutral axis throws a higher stress on the material near to that axis, and so tends to equalise the stress over the section. This explanation seems quite reasonable, but it is probable that lateral action between the different fibres has also an equalising effect, and, further, in the case of beams composed of materials in which the ultimate tensile and compressive strengths differ materially, it is reasonable to assume that shifting of the neutral axis with increase of load has a considerable influence, as suggested above.

Chapters VII. to XII. constitute a connected series, dealing with the strength of non-rectangular beams, shearing forces, bending moments, the strength of rolled joists, the moment of inertia, and numerical applications, and do not need detailed comment. In Chapter XIV. the stiffness of beams is considered, this being a most essential feature in architectural construction. "Some Types of Girders" and "Braced Girders" form the subjects of Chapters XV. and XVI., and the concluding chapter is devoted to "The Strength of Columns." This is the only unsatisfactory chapter in the entire book. The formulae recommended for adoption are certainly not wisely chosen, and the chapter is too short for the adequate discussion of so important a subject. This chapter suffers considerably by comparison with other parts of the work, where the treatment is very complete, and the details are worked out thoughtfully and with minute care.

*Calcareous Cements: Their Nature, Manufacture, and Uses, with Some Observations upon Cement Testing.* By GILBERT R. REDGRAVE, A.M.Inst.C.E., and CHARLES SPACKMAN, F.C.S. Second and revised edition. London: Charles Griffin & Co., Ltd. 1905.

OWING to the radical changes made in methods of manufacture during recent years, and notably by the introduction of the rotary kiln and the tube-mill, nearly all plant of the kind which was in general use by makers of Portland cement ten years ago has become practically obsolete. Hence a good deal of the descriptive matter contained in the first edition of this useful manual has ceased to be of practical value, and is only interesting from the historical point of view. For these reasons, the appearance of the present edition is most opportune. The authors have found it necessary to re-write several chapters so as to deal adequately with latter-day manufacturing practice, and also to place on record the results of recent investigation by British and foreign experimentalists into the chemistry of cement reactions. The first four chapters are largely retrospective, but make clear some essential conditions that ought to be duly appreciated by all who have to deal with calcareous cements. The next three chapters are of far greater practical importance, as they deal with the composition of Portland cement, analyses of raw materials, Portland cement and lime, the calculation of proportions, and rapid method of making determinations. In Chapters VIII. and IX. the treatment of raw materials by the wet and dry processes is discussed at length, the former being more suitable for the materials obtainable in the London district, and the latter for those yielded by the lias formation. It may further be mentioned that the dry process has attained its most extensive development in the United States, where cement is very largely produced from limestone occurring in the Lehigh Valley, Pennsylvania. These chapters contain accounts and illustrations of the machinery and appliances employed in different parts of the world, and it should be noted that the tube-mill is growing in favour

for wet grinding, being already used for this purpose in several American and Continental works where the wet process is employed. The application of the rotary drier is another modern innovation, this apparatus being somewhat like the rotary kiln, inasmuch as it consists of an inclined slowly-rotating cylinder, from 30 ft. to 40 ft. in length, and from 4 ft. to 5 ft. in diameter, in which the material is dried by the products of combustion and heated air from a furnace placed at its lower end. The rotary drier is frequently employed in connexion with the treatment of slurry in the wet process, and for drying the raw materials in the dry process. Various modifications of the procedure adopted in different countries are described in these two chapters, to which the reader is referred for full particulars. Passing on to Chapter X, on crushing, grinding, and other machinery for the dry method, we must express regret that the authors should have thought it appropriate in a scientific work to include so many blocks evidently lent by manufacturing firms. Most of these blocks present the maker's name in prominent type, and some of them are far too large for the pages on which they are printed. The proper place for illustrations of this kind is in the advertisement pages and not in the body of the book. Moreover, no useful purpose is served, from the standpoint of the reader, by the inclusion of mere pictures. Apart from this criticism the only fault to be found with the kind of treatment adopted in this chapter is that when prominence is given to selected examples of certain types of machinery, injustice is inadvertently done to the makers of similar, and very often of equally meritorious, appliances. Writers of technical works cannot be too careful in matters of this kind, if they wish other people to believe in the absolute impartiality by which we do not for a moment doubt they are imbued.

In Chapter XI. we come to a very important subject, "The Calcination of the Cement Mixture." The chemistry of this process is an interesting study, its general objects being the expulsion of  $\text{CO}_2$ , and the production of compounds of silica, lime, and alumina, at a point nearly approaching that of fusion. The authors point out that the experiments of Fremy are relied upon to prove the existence in Portland cement of the so-called aluminates of lime, and to controvert the theory that the alumina continues in combination with silica in the form of a double silicate of lime and alumina. If the accuracy of his investigations be admitted, it must be evident that we must give up those theories of cement action which depend for their explanation on the behavior of compounds of lime and silica. Subsequent experiments by M. Fremy led him to regard Portland cement as a highly complex body, comprising aluminates of lime formed at extreme temperatures and notable proportions of puzzuolana-like substances, all capable of becoming indurated in the presence of lias after treatment with water. The authors quote the conclusion of M. Landrin, another patient observer, that in an early salt water formula  $5\text{CaO}, 3\text{SiO}_2$ , we have the basis of all good Portland cements. M. le Chatelier has supplemented his earlier investigations by researches conducted with the aid of the polariscope, and has identified various substances, built up by synthetical methods with the compounds found in cement clinker. His microscopic investigations upon the setting process, M. le Chatelier discovered that the addition of water leads to the formation of several different compounds, the most important of which was a crystalline substance, probably a derivative of the calcium or the silicate. In quick-setting cements there is a copious formation of crystals which shrink greatly when exposed to dry air, break up into fragments if heated in water to 50 deg. Centigrade, and become partly decomposed in salt water. The last-mentioned phenomenon suggests that the disruption of these crystals may account for the injurious action of salt water upon Portland cement concrete. Evidence is made also to the experiments of the Messrs. Newberry, who arrived at the conclusion that the essential constituents of Portland cement are tri-calcium aluminates. This composition may be expressed by the formula  $\text{X}(3\text{CaO}, \text{SiO}_2) + \text{Y}(2\text{CaO}, \text{Al}_2\text{O}_3)$ , leading to the result that "the correct proportion of lime by weight in Portland cement is 2.8 times the silica + 1.1 times the alumina. Other conclusions drawn by Messrs. Newberry are



also quoted. But neither these nor the other theories mentioned indicate that a final solution of the various problems presented by the chemical aspect of Portland cement is within measurable distance.

Turning to the practical processes of calcination, the authors give an excellent account of several types of kilns and drying chambers carefully and appropriately illustrated. In Chapter XII, they describe some types of the rotary kiln, and give four illustrations of the Lathbury-Speckman kiln. Near the end of this chapter it is said that "Messrs. Lathbury & Speckman, of Philadelphia, have allowed us to reproduce four illustrations explanatory of their rotary kiln system." The reader may be influenced by the fact that one of the joint authors bears the name of Speckman. Such a surmise may be right or wrong, but we think it would have looked better if the authors had included illustrations of other rotary kilns in this chapter. A very successful type is used in the cement works by Messrs. Martin Earle & Co. of Rochester, and manufactured in the engineering works of the same firm. Surely this deserved mention equally with the American apparatus to which the authors have devoted so much attention. After short chapters on "Grinding, Storing, and Packing Cement" and "The Composition of Mortar and Concrete," the subject of cement testing is treated at some length, and in an entirely satisfactory manner. Then follow some notes on the employment of slag in cement manufacture, and on various special forms of cement, including those of the plaster variety. In the final chapter various specifications for Portland cement are set forth, but as the Engineering Standards Committee have now issued the British Standard Specification, the information in this chapter is only useful for the purpose of comparison.

The volume is concluded by a series of appendices, containing matter of general interest, and, considered generally, may fairly be described as a thoroughly reliable manual on those aspects of the cement industry which have been selected by the authors for description and discussion.

*Gas Engines and Producer-Gas Plants.* By R. E. MATHOT, M.E., Member of the Société des Ingénieurs Civils de France. Translated by Waldemar B. Kaempfert, with a Preface by Dugald Clerk, M.Inst.C.E., F.C.S. London: Crosby Lockwood & Son. 1905.

A WELCOME addition to the literature of gas engines is made by the appearance of this treatise from the pen of an engineer, who, as Mr. Dugald Clerk justly remarks, possesses special qualifications for dealing with gas engines and auxiliary plant. Internal-explosion motors certainly require much greater care on the part of attendants than do steam engines. Machines of the latter type are continuously subjected to comparatively low pressures and temperatures, and those of the former are intermittently exposed to high pressures and temperatures. These conditions are trying, and, in addition to the necessity for adopting artificial means of cooling the cylinder, the user must pay careful attention to numerous points of efficiency and economy are to be observed and maintained. The object of this treatise is to state the elementary precautions for observation and to set forth the manner in which repairs should be executed, engines of moderate power being particularly considered.

In the present day gas engines are produced at lower prices and in greatly-improved forms, so that they are capable of being applied to a wider range of work for which they were formerly used, while the introduction of producer-gas engines and improvements in suction gas engines have placed at the disposal of engine users extremely cheap forms of fuel. But even when illuminating gas is employed, the internal-combustion motor compares favourably with the steam engine. The author is not far wrong in stating that the efficiency of a 15 to 20-h.p. steam engine is approximately 45 per cent, more than that of a gas engine of equal power, and that the efficiency of a gas engine is something like 23 per cent. When all charges be taken into account, the efficiency of a gas engine is something like 23 per cent. The author on page 18 showing the floor areas required for a 30-h.p. gas engine and a suction gas-producer, should be very directly to architects as an argument in favour of the latter type of power installation.

"The Selection of an Engine" is discussed in Chapter II., and in such a manner that even those previously ignorant of the essential points will find no difficulty in arriving at a satisfactory conclusion.

The installation of gas engines is considered in three chapters. The first of these, Chapter III., bears the title, "The Installation of a Gas Engine," and deals with the fixing of such essentials as gas pipes, meters, pressure regulators, air pipes, and exhaust pipes. Chapter IV., entitled "Foundation and Exhaust," is a contribution of much interest, for, in addition to illustrating foundations suitable for industrial installations, it includes an instructive discussion of the best methods for preventing the transmission of vibration from the moving parts of the engine to the foundation, and for obviating the air vibration caused by the action of the piston.

In Chapter V. will be found several useful diagrams showing correct and incorrect arrangements of tanks and pipes. Taken together, these three chapters constitute an admirable set of directions for the proper installation of a gas engine, and we are pleased to bear witness to the very thorough and able manner in which the author has discharged this part of his task.

Some characteristic features of "Producer-Gas Engines" are set forth in Chapter X., and in Chapters XII. and XIII. M. Mathot gives a complete description of apparatus for the generation and purification of producer-gas by the pressure and suction methods, and supplements this information by fully-detailed directions for the management of the plant and of the engine in which the gas is used.

Although not mentioned in the title-page of the treatise, "Oil and Volatile Hydrocarbon Engines" are accorded a few pages, after which the author concludes by a second chapter on "The Selection of an Engine."

In conclusion, we desire to acknowledge the conspicuous ability and care displayed so prominently throughout this treatise, which deserves to be accepted as a standard work on the subjects to which it is devoted.

*Gas and Oil Engines Simply Explained: An Elementary Instruction Book for Amateurs and Engine Attendants.* By WALTER C. RUMDOLM. Fully illustrated. London: Percival Marshall & Co.

AS AN elementary explanation of the rationale of the internal-combustion engine this little book should be acceptable to many users of small gas and oil engines. The author describes the main features characterising the design of such machines, and explains, so far as space permits, the principles and essentials of satisfactory running. The book is well illustrated, chiefly by reproductions of sectional drawings, and the treatment throughout is of practical character. Hence this work is one we can recommend as a useful primer on the subject.

*Private House Electric Lighting.* By F. H. TAYLOR, A.M.I.E.E. London: Percival Marshall & Co. This book is written for those who "though not necessarily electrically trained, yet wish to gain an intelligent and accurate idea of good modern practice in the electric lighting of private houses." The author is evidently thoroughly familiar with his subject, and useful hints and warnings are given in connexion with electric wiring. We think, however, that the little technical information in this work is useless to anyone but electricians, and that too much stress is laid on the importance of the consulting engineer. As a rule, the engineers of the supply companies are always ready to give all the information an intending consumer may require, and they will not connect his installation with the supply mains until they are satisfied that it has been put up in accordance with the rules of the Institution of Electrical Engineers.

*Repairs: How to Measure and Value Them.* By GEORGE STEPHENSON. Fourth edition, revised and corrected. (London: B. T. Batsford, 94, High Holborn. 1905.)

THIS work is obviously the outcome of practical experience, and, as such, is especially welcome. There are few departments of builders' pricing that are carried out in a more haphazard fashion than that of repairs. This haphazard pricing is responsible for those embarrassing tenders sent in for this class of work—amazing discrepancies that make it difficult for an architect to advise a client: on the one hand having a price that he knows

cannot possibly cover the cost of the work, and so will be a source of trouble the whole time the work is on hand, and dissatisfaction on all sides at completion; and on the other the difficulty of persuading a client that anything up to 50 per cent. greater expenditure will be money well laid out. With a work such as this, any builder, with the most elementary knowledge, should be able to prepare and price an estimate for any ordinary repairs. Mr. Stephenson commences with a typical specification for this class of work—one that leaves some imagination to the builder, as these specifications often do—and then takes the reader through item by item, showing him the method of measurement, and then analysing the prices of each item. If every builder who has to estimate for this class of work would follow the system herein set forth, it would be to the advantage of all concerned, client, architect, and builder. Being essentially practical in every particular, we have every confidence in recommending this work.

#### BOOKS RECEIVED.

AN INTERMEDIATE COURSE OF MECHANICS. By A. W. PORTER, B.Sc. (London: John Murray. Price 5s.)

A PRACTICAL TREATISE UPON WARMING BUILDINGS BY HOT WATER. By Frederick DYE, M.R.I. (London: E. & F. N. Spon, Ltd.)

THE CATHEDRALS OF ENGLAND AND WALES. By T. FRANCIS BUMPUS. (London: T. Werner Laurie, Clifford's-inn.)

PRACTICAL GILDING, BRONZING, AND LAQUERING. By F. SCOTT-MITCHELL. (London: The Trade Papers Publishing Company, Ltd., Birkbeck Bank-chambers. Price 3s.)

THE PAINTERS' POCKET-BOOK. By P. MATTHEWS. (Manchester and London: John Heywood.)

CALENDAR OF THE GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE for 1905-1906.

BRITISH STANDARDS FOR TROLLEY GROOVE AND WIRE (Interim Report of the Engineering Standards Committee, Leslie S. Robertson, Secretary). (London: Crosby Lockwood & Son. Price 1s. net.)

BRITISH STANDARD SPECIFICATIONS AND TABLES FOR TELEGRAPH MATERIALS (Interim Report of the Engineering Standards Committee, Leslie S. Robertson, Secretary). (London: Crosby Lockwood & Son. 10s. 6d. net.)

#### Correspondence.

##### SECRET COMMISSIONS.

SIR,—I have recently heard of a case where an architect had selected some goods from a firm of manufacturers for use on a building in course of erection. The price was agreed, and the builder was instructed to order the goods, 10 per cent. being allowed to the builder for so doing.

The order in due course was sent by the builder, but with it a note that he expected a further 15 per cent, or 25 per cent, in all, but that this 15 per cent, was not to figure on the invoice, as in due course the same would come before the surveyors. The suggestion was that the 15 per cent, should be arranged by a credit note, of which the architect would not know anything.

I am told that this is the general method. The firm in question declined the order, and so the matter was out.

It seems to me absolutely dishonest, and if the subject could be discussed in your columns a little of the evil might be remedied.

C. H. B. QUENNEL.

##### OLD BUILDING, BROAD STREET.

SIR,—On passing through New Broad-street a few days ago, I noticed a very quaint bit of architecture, recently laid bare through the demolition of the south side of this street. I refer to the old building adjoining and used as vestry to All Hallow's Church, London-wall. In the old stone walls there are several very small windows and an ancient door, evidently the remains of a very much older edifice than the present church. It would be interesting to know to what period this old work belongs, and also the probable date of two windows on the west side, of I should say, a much later period.

Possibly you might think this worth a corner in your esteemed paper. J. STANNAN.

##### COST OF WIDENING ROAD.

SIR,—I should be much obliged if any of your readers could throw any light upon the law of the following case:—

A road, admitted to be an ancient highway,



but of a less width than demanded by the by-laws in the case of new streets, is being built upon by different owners upon both sides, and plots are offered for sale for building by different owners on both sides. The local council demand that the road must be widened to the width required under their by-laws, and the cost of the work borne by the frontagers in proportion to their frontages. The council contends that decisions have been given under the Public Health Act in precisely similar conditions, in which the frontagers have been forced to pay the cost of the widening. The frontagers contend that, being an ancient highway, the cost must be borne by the council, and they are advised by various legal gentlemen that their contention will be upheld in court. Can any of your readers cite the cases which support the two diverse contentions?

ENQUIRER.

#### EARTHY MATTER IN SAND.

SIR.—Will you kindly oblige by letting me know, through your columns, what is the greatest percentage of dirt or earthy matter in sand that an architect or engineer will allow to be used without being washed, and also the method of calculating the same.

W. S. A.  
\* As some difference of opinion still exists with regard to the effect of earthy matter mixed with sand upon cement mortar and concrete, we cannot predict what any given architect or engineer might demand. Sand employed in masonry construction often contains 5 per cent., and sometimes 10 per cent., of foreign material, and, speaking generally, engineers have been in the habit of requiring the proportion to be limited to 5 per cent. Recent investigation shows that the presence of clay and loam to the extent of 15 per cent. may be beneficial to cement mortar. If, however, the mortar is to be placed immediately under water, the proportion should not exceed 8 per cent., owing to retardation of the final set. Mortar containing a moderate percentage of clay is superior in respect of plasticity and watertightness. We must qualify the foregoing by the remark that some tests of unwashed sand and loam have given entirely satisfactory results, and other tests unsatisfactory results. The reason for this is to be found in the different character of the materials described as loam and earth. Without precise information as to the nature of the foreign matter and the intended use of the mortar, which we assume our correspondent is proposing to make, we cannot give a more definite opinion. The proportion of earth in sand can readily be ascertained by shaking up a given quantity with water until the sand is clean, when the difference of weight will give an index to the proportion of foreign matter removed.—Ed.

### The Student's Column.

#### STEAM BOILERS AND PIPES.—VIII. BOILER SETTING (continued).

**T**HE cross flue of a Cornish or Lancashire boiler, giving access right and left from the bottom to the side flues, is bounded at each end by a continuation of the side walls of the brickwork, the back of the flue is formed by fire-brick lining built up in front of the bottom flue walls and of the concrete or brick filling behind these, and the front of the flue is formed by the lower portion of the front cross wall and the blow-off recess. All the inner surfaces are lined with fire-brick, and the floor is of the same material, laid on the concrete foundation bed.

The right and left hand portions of the cross flue are often made with a floor sloping up to the level of the side flues, as in Fig. 13 *ante*, with the object of facilitating the draught. This method of construction is not necessary, but tends to prevent the formation of eddies in the corners of the flue. It has the disadvantage, however, of preventing the fixing of a soot door at each end of the cross flue, by means of which flue dust can be raked into the blow-off pit for removal. Bull-nosed fire-brick should be used for finishing the top of the lining over which the gases pass on their way to the side flues.

The front cross wall of the setting is usually 9 in. thick, the inner half of fire-brick and the outer half of any suitable brick, preferably glazed or hard-pressed brick set in cement so as to guard against the infiltration of air.

We have already shown (see Figs. 13 to 15 *ante*) alternate methods of arranging the blow-off recess in the front cross wall, the

sides of the recess being there shown 9 in. thick. If bricks of the ordinary shape be used for building the recess, it may frequently be desirable to make its walls only  $4\frac{1}{2}$  in. thick, thereby reducing the brick only 4 in. in contact with the boiler shell. As surface in fact, this thickness is frequently considered to be quite sufficient for any size of Cornish or Lancashire boiler, as the recess has no weight to carry and is primarily intended for shielding the blow-off connexion from the hot gases. The reduced thickness makes the form of the cross flue somewhat more favourable for the passage of the furnace gases into the side flues. It should not be forgotten, however, that a 9-in. wall is better calculated to reduce the outward transmission of heat and the inward penetration of cold air through the brickwork. By using special bricks with a semi-circular section at the top, the width of bearing surface can be reduced to a mere line. If bricks of ordinary shape be used for a 9-in. recess wall, the top courses should only be  $4\frac{1}{2}$  in. thick, so as to reduce the surface in contact with the boiler shell.

Neither the recess wall nor the front cross wall should be built up too close to the boiler shell, or expansion will afterwards have the effect of cracking the brickwork, with consequent infiltration of air. A good plan is to carry the work to about  $\frac{3}{4}$  in. of the plates, and to insert a strip of asbestos

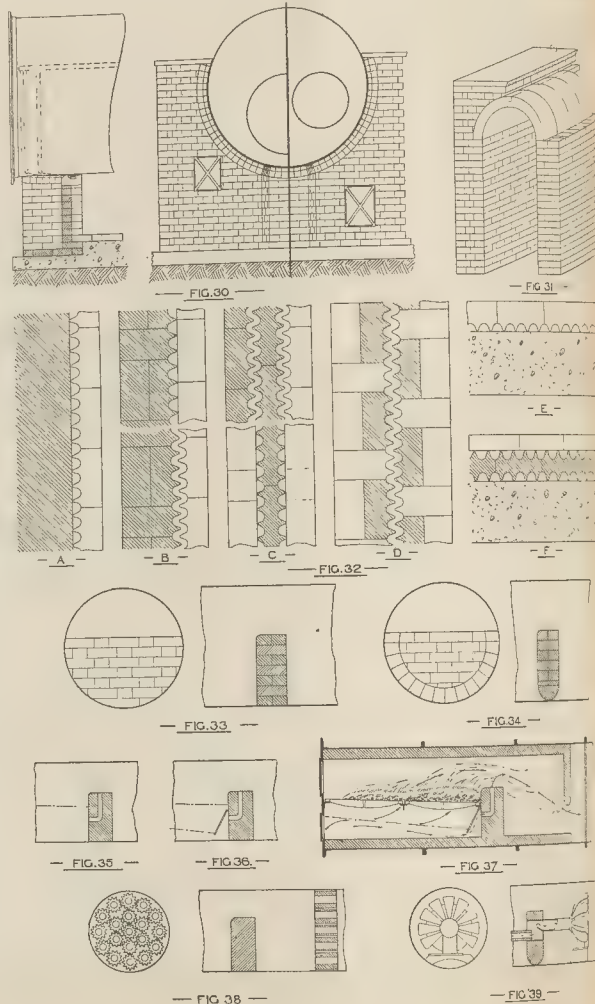
or slag wool to form an elastic cushion for taking up expansion.

Special fireclay blocks are made for the top course of the recess wall and for the inverted arch ring of the front cross wall.

One variety, illustrated in Fig. 30, has a recess at the top for receiving a layer of slag wool or other packing material, the top surface of the block being built about  $\frac{1}{2}$  in. clear of the shell, as shown. The right-hand drawing in Fig. 30 shows a front view of the blocks in position, and also represents half the front cross wall and blow-off recess for a Cornish and a Lancashire boiler, the elevations being taken just behind the front angle ring of the boilers. The roof doors are here shown in the most convenient positions for the boilers in question.

The main flue is sometimes arched over with brick, but can be covered far more expeditiously by special fireclay blocks with interlocking joints, and made in various patterns for flues of any width. Fig. 31 sufficiently illustrates the convenient manner in which blocks of this kind can be employed in the construction of a main boiler flue.

In building fireclay linings it is generally sufficient to use heaters only in the upper course. By adopting this method of construction the linings can be removed and renewed without affecting the stability of the other brickwork. Care should be taken not to use too much fireclay in laying the



Illustrations to Student's Column.



firebrick flue linings, which ought not to have more of this material between successive courses than may be necessary for setting the work.

As already stated, the use of hard brick and cement mortar is advisable for the outer walls of boiler settings. Besides preventing the infiltration of air, impermeable materials are particularly suitable for building walls with internal air spaces intended to reduce the outward transmission of heat from the boiler. Porous bricks and lime mortar are of comparatively little use for hollow wall construction, owing to their inability to conduct a cushion of perfectly still air as a non-conducting material.

In boiler-houses where limitations of space do not permit hollow walls to be built in the ordinary manner special bricks made for the purpose in clay and fireclay can be used with advantage.

Fig. 32 illustrates various applications of Poulton's serrated anti-radiation bricks, specially made for boiler-setting work. In these drawings the hatched bricks are of ordinary clay and the plain bricks of fireclay.

Furnace design is a matter that scarcely comes within the scope of the present chapter. A Cornish and Lancashire boiler as ordinarily supplied has a complete set of furnace fittings, the construction of which is usually in accordance with the standard practice of the boiler maker, but the setting of such fittings comes to some extent within the province of the architect.

Sometimes the firebridge consists of a cast-iron trough in which fire lumps are fitted, the trough having suitable metal supports. But the bridge is more often formed by a brick wall, built up from the bottom of the furnace tube, and in such cases the aid of the boiler-setter is required.

A firebridge built as shown in Fig. 33 has the defect that a large surface of the tube is covered by brickwork.

This fault is avoided by the construction represented in Fig. 34, where the use of fire-bricks with a semi-circular cross section reduces contact between the wall and the furnace tube to a mere line, while the raised outer ring adds to the strength of the construction.

The firebridge is occasionally built as shown in Fig. 35, which is a simple form of "split bridge," the object of this arrangement being to admit air at the back of the fire to promote secondary combustion. This drawing represents a very bad type of split bridge, permitting air to pass into the flue without regard to the requirements of the furnace. To improve the arrangement it is only necessary to add two dampers, one in front of the air passage in the bridge, as shown in Fig. 36, and the other on the boiler front, so that the regulation of air supply may be effected in a proper manner.

As the air reaching the flue behind the bridge cannot be efficiently heated during its passage beneath the fire-grate, it necessarily has a cooling effect, and the split bridge is not to be recommended unless employed in connexion with a supply of air heated by auxiliary apparatus. To discuss appliances of this kind would carry us far away from the subject now under consideration.

However excellent the design of a Cornish or Lancashire boiler furnace may be, its environment must necessarily be bad, owing to the fact that the tube is surrounded by water-cooled surfaces. Consequently, where gaseous fuel is used the temperatures of the gases evolved may be so much reduced

as to interfere with the process of combustion to a serious extent. To provide against this disadvantage it has been proposed to surround the furnace with fire-brick and to construct the lining so as to form a secondary combustion chamber behind the firebridge, as shown in Fig. 37. This arrangement is good theoretically, but, for reasons already stated, it would be extremely inadvisable to cover up the plates by brickwork in the manner suggested.

There are, however, other simple methods of improving the combustion in the furnaces of Cornish and Lancashire boilers to which the same objection does not apply.

Fig. 38 includes an elevation and section of a Cornish secondary bridge, which consists of a series of tubular blocks of refrac-

tory material placed behind the usual firebridge so that the entire products of combustion must pass through the tubes. These tubes become incandescent in a very short time, and, attaining a white heat, have the effect of completing the combustion of the furnace gases. The tubular bridge is generally used in conjunction with a split firebridge, provided with dampers so that the supply of air for secondary combustion can be regulated in accordance with requirements.

Fig. 39 illustrates a boiler fitted with Poulton's regenerative cones, split bridge, and hollow fire-bars, the object of this arrangement being to maintain a high mean temperature in the furnace tubes of Cornish and Lancashire boilers by securing complete combustion of the gases. The ordinary air supply is admitted in the usual way, and the secondary air supply passes through the hollow fire-bars, where it is heated, and is afterwards delivered through the split bridge and a pipe to the first regenerative cone. This cone is built up of fireclay lumps having parabolically curved surfaces, by which the stream of heated air is broken up and distributed over the whole cross section of the furnace tube. The cone is seated upon a fireclay block, which reduces the bearing surface to a minimum. Provision is made for turning the cone on its support to the right or left hand, so as to give room for boiler inspection and cleaning.

The number of cones used in a boiler depends upon the length of the flue. In a 30-ft. Lancashire boiler five cones, spaced 1 ft. 9 in. apart centre to centre, would be a suitable arrangement. As each of the nine lumps in one cone is capable of storing some 6,000 heat units, the storage capacity of five cones would be 270,000 heat units, available for absorption by the relatively cold and partly-consumed gases proceeding from the furnace when the fire has been freshly stoked. By contact with the incandescent material these gases are ignited, and secondary combustion is established, thereby maintaining a high mean temperature in the tube and obviating the emission of black smoke from the chimney.

These cones and the incandescent bridge described above can be applied to the furnaces of Cornish and Lancashire boilers in a few hours at any time when the fires have been drawn, and without involving structural alterations of any kind.

The consideration of brickwork for special and combined forms of Cornish and Lancashire boilers must be reserved for the succeeding article.

#### METROPOLITAN ASYLUMS BOARD.

THE recently issued annual report of this authority contains some interesting information respecting the works carried out during the year. Referring to the amalgamation of the offices of engineer and surveyor, the report states that the new arrangement has proved very successful. Both departments have now been under the supervision of Mr. Hatch for nearly two years, and during that time, the work having grown very largely, a considerable increase in the staff has been made. The total value of the cleaning and painting works carried out at the various institutions of the Board during the year amounted to 13,838*l.*, of which 2,150*l.* represents the value of the work carried out by direct labour and 11,213*l.* the value of that carried out by contract. Mechanical stokers had been installed at a number of the Board's institutions, including Brook Hospital, Tooting Bee Asylum, North-Western and Western Hospitals, and Grove, Park, and the Northern Hospitals. The approximate value of the works carried out under the supervision of the engineer-in-chief during the year was 95,888*l.* Of this sum 58,238*l.* was for engineering work and repairs and 37,650*l.* for building work and repairs. Of the more important schemes which have been matured and approved by the several committees concerned during the twelve months were the planning of new workshops and the re-modelling of the school laundry at the Darenth Asylum, the provision of additional buildings at the Tooting Bee Asylum, the planning of the new Central Stores, of a new boiler-house at the Eastern Hospital, of a new boiler-house and workshops at the works of the North-Eastern Hospital, together with the preparation of schemes for engineering work at the Southern Hospital, the remodelling of hot-water supplies at the Brook Hospital, the heating of the Gore Farm (Upper) Hospital, and engineering and other works at the Belmont Asylum. The total value of these works is estimated at about

120,000*l.* The total cost on completion of the erection and fitting up of the office of the Board has been 57,290*l.* 6*s.* 2*d.*, which sum included an amount of 1,664*l.* 5*s.* 5*d.* for authorised extra works. Dealing with the mode of carrying out minor works and repairs, the report mentions that some time ago attention was called to the considerable diversity of practice existing in the manner in which instructions to carry out works and repairs not exceeding 100*l.* were conveyed to the Works Committee by the other committees. The Works Committee expressed the opinion that if they were to be held responsible for the efficient and economical execution of any works or repairs it should be left to them to determine in what manner and to what extent the same should be carried out. This opinion was endorsed by the Board, who subsequently decided that, except in cases of emergency, no work involving alteration or repairs to any drains, gas or water pipes, boilers, machinery, electric light installations, etc., should be authorised until the same should have been reported upon by the engineer-in-chief, and that any work so authorised should be carried out under his supervision.

#### OBITUARY.

MR. WATERHOUSE.—We greatly regret to announce the death, after a long illness, of Mr. Alfred Waterhouse, F.R.I.B.A., R.A., LL.D. He died on Tuesday last at his country residence, Yatendon Court, near Newbury, where he was lord of the manor, patron of the living, and a large landowner. He was the son of the late Mr. Alfred Waterhouse, of Whiteknights, Reading, and formerly of Liverpool, where he was born on July 19, 1830, and senior member of the firm of Messrs. A. Waterhouse & Son, of No. 20, New Cavendish-street, W. Having received his earlier education at Grove House School, Tottenham, he entered upon his career as an articled pupil of R. Lane and P. B. Alley (Lane & Alley), and continued his studies in France, Italy, and Germany. He began to practise in Manchester in 1853. He was elected a Fellow of the Royal Institute of British Architects in 1861, and in 1866 a member of the Architectural Association. He served as President of the Institute, 1888-91, and during some while as member of Council, and as member, and chairman, of the Art Standing Committee. The Royal gold medal was awarded to him in 1878; on January 16 of that year he was elected Associate of the Royal Academy, and on June 4, 1885, Royal Academician. In 1887 Mr. Waterhouse won the "Grand Prix" for Architecture at the Paris Exhibition, an honour followed with that of a "Reppell" at the Exhibition of 1878; for the Paris Exhibition of 1889 he was appointed an International Juror in the section of Architecture; in 1900 he was appointed one of the Fine Arts Committee of the Royal Commission for the Paris Exhibition. He was elected a member of the Royal and Imperial Academy, Vienna, in 1869; he was an Associate of the Académie Royale des Sciences, des Lettres, et des Beaux-Arts de Belgique; and member of the Royal Academies of Arts at Brussels (1886), Antwerp, Berlin, and Milan; he was also Correspondant d'Académie des Beaux-Arts, Institut de France. He served as a member of the Organising Committee for the Imperial Institute, and of the Westminster Abbey Commission. In 1896 he received the honorary degree of LL.D., Victoria University.

Examples of Mr. Waterhouse's work will be found in so many parts of the kingdom that to economise space we group several of our citations under their locality or subject, instead of arranging them throughout in chronological sequence. We give, within brackets, the dates of publication in the *Builder* of views, or drawings, with plans; some of the illustrations belong to our two series "The Architecture of our Large Provincial Towns" and "Sketches of London Street Architecture," denoted by Roman numerals. As architect during many years to the Prudential Assurance Company, Mr. Waterhouse planned and designed numerous buildings for them in London and our principal provincial towns. Of those in the latter we should mention the offices at Cardiff, Leeds, Liverpool, Manchester, Nottingham (August 28, 1897, No. IX.), Newcastle-on-Tyne, Portsmouth, and Sheffield. In London the first block of the Company's head offices was built in Holborn and Brooke-street (November 9, 1878), an enlargement was made upon the site of property in the rear in Brooke and Greville streets in 1885-6, and for a further extension were acquired Furnival's Inn, Ridler's Hotel, Holborn, and much house property in Leather-lane and Greville-street (September 2, 1890, and April 13, 1901). After the Company had purchased the Staple Inn property, Mr. Waterhouse carried out the reparation of the hall and of the wood-work of the gabled front in Holborn, and removed the later plastering from the half-timbered work. In 1901 he planned and designed No. 335, High Holborn and Staple Inn-buildings, with the raised footway to the terrace of the garden court of the Inn. In



Dundee (August 13, 1898, No. XVII.), Bristol, Huddersfield, Oldham, Bradford (February 19, 1898, No. XIII.), Edinburgh (September 28, 1896), Hull, Southampton, and Plymouth, 1901-2, the Company's offices are by Messrs. Waterhouse & Son. Of Mr. Waterhouse's other works most of the following are illustrated in our journal:—"Hinderton," Cheshire, for Mr. O. Bushell, of Liverpool (January 15, 1859); the New University Club-house, St. James's-street, S.W. (May 16, 1868); the Natural History Museum, South Kensington, of which the main block was opened on Easter Monday, 1881—the designs included, we understand, two north wings, as yet unbuilt (January 4, 1873; June 7, 1879, entrance hall; April 1, 1882, with details; and May 19, 1883, with entire ground floor plan); New Court in Carey and Portugal streets Improvement Company (July 6, 1878); No. 1, Old Bond-street, at the corner, east, of Piccadilly, now Scott's Limited (January 29, 1881, No. 1); St. Paul's School, Hammersmith (August 26, 1882); the City and Guilds of London Technical Institute, Kensington (January 5, 1884, elevation and ground floor plan); the National Liberal Club, Whitehall (May 9, 1885, and May 21, 1887, with seven plans); the pedestal of Mr. Hamo Thornycroft's statue of General Gordon in Trafalgar-square (October 20, 1888); the King's Weigh House Congregational Chapel, Institute, and minister's house, Thomas and Duke streets, Grosvenor-square (January 18, 1890; and August 20, 1898, the parsonage-house, No. XXVII.); the Jenner (formerly the British) Institute of Preventive Medicine, Chelsea-embankment, 1895; the University College Hospital, Gower-street, for 300 patients, begun in June, 1898, at the charges, 100,000*l.*, of the late Sir J. Blundell Maple (October 17, 1896); the Surveyors' Institution in Great George-street, S.W. (April 1, 1899); and in 1893 the reconstruction and decoration of the interior of the Atlas Insurance Offices, Cheapside (by Cubitt, 1839). In Bradford: The Old Bank, an early work. Cambridge University: Gonville and Caius College, the new buildings, of Anson's stone, begun in 1868 and comprising the east side of Gonville Court, with the buildings on the side of Gonville Court, with the buildings on the side of Trinity-street and Senate House-passage (July 12, 1873); New-court, Trinity Hall, on the east side of the (old) Porter's Court, 1872-3; a block of students' rooms on the north side of Pump, since New Court, Jesus College, 1869-70; Pembroke College: the Master's Lodge, 1871-3; the Hall, 1876-8; library and lecture-rooms, 1876-7; with "rooms" on the site of Pembroke-place, Trumpington-street, 1871-2; and the University Union, opened in October, 1886, and since enlarged and improved, with a renovation of the debating-room in 1888, after his designs. Oxford University: Balliol College, the new Hall, opened January 18, 1877; renovation of Fisher Buildings, by Henry Keene, 1789 (October 4, 1887); and the south front, including the tower, 1867-9; and the debating-room, University Union, At Bushey: the Clergy Orphan School. In Leeds: Messrs. Wm. Williams, Brown, & Co.'s Bank, Park-row, and the Royal Insurance Offices, the Master's Lodge, 1896, No. III.; the Yorkshire College of Science (December 19, 1896), since extended for the cloth-workers', dyeing, and laboratory departments, after designs by him and the firm. In Liverpool: the Seamen's Orphan Institution (May 25, 1872); the Seamen's College, and the Engineering Laboratories, with the Royal Infirmary (June 1, 1899, Brownlow-hill front; and September 26, 1896, No. I., a general bird's-eye view by the late H. W. Brewer), and the Thompson-Yates Physiological and Pathological Laboratories; the London and North-Western Hotel, 1871 (September 26, 1896); and the granite pedestal for Mr. Bruce-Joy's statue of St. John's-churchyard of the late Alexander Balfour. In Manchester: the Assize Courts, 1863-4, for which his designs were selected after a severe competition, this being, we believe, his first considerable architectural work (November 7, 1896, No. II.); the Town Hall, 1888-9 (May 2, 1888; September 30, 1878; and November 7, 1896); Owens College, 1873-86 (February 4, 1871, and November 7, 1899), and the adjacent Whitworth Hall in Oxford-street—his designs for the latter being carried out by his son, Mr. Paul Waterhouse, in 1901; and the Christie Library opened on June 22, 1898 (November 14, 1896); the National Provincial Bank of England (November 7, 1896); and the Refuge Assurance Company's offices. The Municipal Buildings, Reading, and all the furniture (February 3, 1877), since enlarged; re-construction of Eaton Hall for the late Duke of Westminster, with the chapel, and the Caxton memorial in the library (July 3, 1877, August 9, 1879, and December 11, 1880); the Town Hall, Hove, Sussex (April 23, 1881); St. Mary's Church, Twyford; and his sketch-plan (July 31, 1884) prepared for the guidance of the competing architects in the Birmingham Law Courts competition, for which he was assessor. To the foregoing should be added—Girton

College, near Cambridge, 1887, the Chapel (1901) in conjunction with Mr. Paul Waterhouse; the County Gaol, Manchester; the Turner Memorial Home, Liverpool; the Hotel Métropole, Brighton, 1888-9; St. Nicholas Church, Heythorpe, Oxfordshire, 1878-80; Iwerne Minster House, Dorset, 1880, for Lord Wolverton; Allox Hall and Public Library, 1888; St. Peter's Church, North Hagbourne, Berks, 1890, the tower added in 1898 and the interior decorated by him in 1894 and 1898; Foster's Bank, Trinity-street, Cambridge; "Villa Allerton," on the street, Cambridge, for the late John Grant California Hills, Cannes, for the late John Morris; additions to and improvements of the Grand Hotel, Charing-cross, including a new banquetting-room, with other rooms *en suite*, grill-room, ground-floor reception and reading rooms, and conversion of the apartments hitherto occupied by Grillon's Club, opened on December 6, 1899; and in conjunction with Mr. Morgan, Engineer to the London, Brighton, and South Coast Railway Company, extensive structural alterations of the Grosvenor Hotel, Piccadilly, 1890-1900. St. Mary's Hospital, and a restoration of St. Anne's Church, Manchester, 1886-91; the administrative block and extension of the Royal Alexandra Hospital, Rhyl, 1899; the Public Offices and covered Market, Darlington, 1882; St. Bartholomew's of the chancel and side-chapels recently added by Mr. G. F. Bodley, R.A., and at Yattonend in 1882-96, partly at his own charges, a restoration of the parish church, with a new roof and spire, and the reading and coffee rooms, which he built and maintained for the parishioners, whose well-being he in many ways warmly promoted. Mr. Paul Waterhouse with his house associated, Mr. Paul Waterhouse with his architectural practice, under the title of Messrs. A. Waterhouse & Son. Of the principal works carried out by them at about and since that time we may mention the National Provincial Bank, Piccadilly, at the corner of Eagle-place (May 27, 1893); Girton College, addition of the dinner-hall, chapel, kitchens, rooms for twenty-five students, library, and swimming-bath, 1899-1901; additions, for the Leather Trades Department, to the Yorkshire College of Science, Leeds, 1897-8; a block for shops and offices in Melville-square, Edinburgh, 1897-8; the Medical School buildings, Liverpool University College, opened on November 12 of last year; Salford Lying-in Hospital, Manchester, begun in October, 1899; the new operation-theatre, Liverpool Royal Infirmary; a swimming-bath for the Collingwood-street Board School, Ratcliffe, E. (1900); and the new wing of the Nottingham General Hospital, with three circular wards, for eighteen beds apiece, sanitary tower, out-patients' department, and laundry buildings, 1900. In January, 1900, Mr. Waterhouse was nominated to prepare competitive designs for the re-construction of the Royal Jubilee Fund. On March 2, 1887, and November 29, 1884, respectively, we published and described his competitive plans and designs for the Royal Courts of Justice; and for the proposed Admiralty and War Offices (first competition). Amongst the many important competitions for which Mr. Waterhouse acted as assessor are the Birmingham Law Courts, 1886 (Sir A. Webb and Mr. E. Ingress Bell\*); Sheffield Town Hall and Municipal Offices, 1889 (Mr. Mountford\*); Royal Halifax Infirmary, 1902 (Messrs. Worthington & Elford\*); Newcastle-on-Tyne New Infirmary, 1899 (Mr. W. L. Newcombe and Mr. H. F. Adams jointly\*); Cardiff Town Hall, 1897 (Messrs. Lancaster, Stewart, & Rickards\*); Fountain Fever Hospital, Tooting Graveney (Mr. A. H. Tiltman\*), and Hither Green and Park Fever Hospital, Lewisham (Mr. E. T. Hall\*), for the Metropolitan Asylums Board, 1894; London County Council Municipal Lodging-house, Parkers-street, High Holborn, with the late Thomas Blashill (Messrs. Gibson & Russell\*); Muburn-Cartwright Memorial Hall, Lister Park, for Bradford Corporation, 1899 (Mr. J. W. Simpson and Mr. E. J. Milner Allen jointly\*); General Hospital, Birmingham, 1892 (Mr. W. Henman\*); the Bell Tower, St. Michael's Church, Coventry, with Mr. R. Norman Shaw, R.A., and the late Ewan Christian, 1891 (Messrs. Paley & Austin\*); Hotel at Newcastle for the Belfast and County Down Railway Company, 1896 (Mr. J. J. Farrall of Dublin\*); Fine Art Galleries, Glasgow, 1892; Free Library (Mr. G. W. Browne\*), and Municipal Buildings (Mr. Leeming\*), Edinburgh, 1887; Leys School, Cambridge, 1882 (Mr. R. Curwen\*); Victoria Institute, Worcester, 1891, for which he placed as first for their architectural merit the designs of Mr. Theodore Moore and Mr. W. H. White; Wolverhampton Free Library, 1898 (Mr. H. T. Hare\*); City Hall, Belfast, with the City Surveyor, Mr. Bretland, 1896; Sunderland Municipal Buildings, 1886 (Mr. Brightwen Binyon\*); Gloucester Municipal Buildings, 1899 (Mr. G. H. Hunt\*); and the Board-room and Offices for the Mersey Docks and Harbour Board, 1900 (Messrs. Briggs & Wolstenholme, and Messrs. F. B. Hobbs and Arnold

\* First premium awarded by him.

Thornely jointly\*). Mr. Waterhouse was also a member of the jury to decide on the international competition for the proposed facade to Milan Cathedral, and, with Leighton and others, of the Committee of Selection, Imperial Institute (Mr. T. E. Collett\*).

Upon his enforced retirement, at the close of the year 1901 Mr. Waterhouse resigned the Presidency of the Society for Checking the Abuses of Public Advertising, which in a great measure owed its foundation to his efforts. In 1903 he retired from the Royal Academy, as son took charge of the business of the firm, and carried out some works which his father was disabled from completing under his own superintendence. Mr. Waterhouse was President of 1902 of the Polytechnic School of Architecture, and Treasurer of the Artists' General Benevolent Institution; he made a liberal donation to the New Premises Fund of the Architectural Association. Mr. Waterhouse was author of the essay upon "Architects," in a volume edited by Miss Piteam, entitled "Unwritten Laws and Ideals of Active Careers," 1880. Of the occupations of his little leisure we may refer to that of painting, which he exhibited in the Royal Academy rooms in 1900 "A Cotswold Manor-house," a study in oils. His portrait, painted by Mr. W. Q. Orfordson, R.A., is in the possession of the Institute.

MR. JOSEPH TONG SKINNER.—The death of Mr. Joseph Tong Skinner, builder and contractor, took place on the 15th inst., at his residence at Wright-street, Hull. Mr. Skinner, who was seventy-four years of age, was one of the first presidents of the Hull Builders' Association.

MR. J. HOWE.—The death took place, on the 21st inst., at his residence, Wilton-place, West Hartlepool, of Mr. Joseph Howe, Mr. Howe was in his fifty-fifth year, was a native of Canada, and about a quarter of a century ago, what associated with the firm of Messrs. Walter Scott & Co., of Newcastle, he took a prominent part in the construction of one of the largest of the West Hartlepool docks, and the largest of the connected with it. Something over twenty years ago the deceased gentleman settled in West Hartlepool, then founding the firm of Messrs. Joseph Howe & Co., which has since carried out many extensive and important undertakings in all parts of the kingdom. Mr. Howe was for some years a member of the West Hartlepool Town Council.—*Newcastle Chronicle.*

#### GENERAL BUILDING NEWS.

CHURCH, HORWICH.—On the 5th inst., the Bishop of Salford laid the foundation-stone of Our Lady of the Rosary Church at Horwich, which is being erected to accommodate over 600 worshippers, at a cost of about 5,000*l.* The building is to be of Yorkshire stone, and the design is English, the architects being Messrs. Aschall & Holt, of Manchester, and the contractor Mr. Gerard, of Swinton.

MISSION CHURCH, ST. IVES.—The new mission church, erected as a memorial to the late Canon Jones, was opened by the Bishop of Truro on the 10th inst. The building consists of a nave and chancel, with a small south tower, and as the church stands on a hill, advantage has been taken of the formation of the ground to provide various under the chancel and a parish room under the nave. The church is 89 ft. long, and the width of the nave 25 ft. Throughout granite has been used, and the ashlar stonework is from the Polyphant quarries, near Lamecun. Accommodation is provided for 270 persons. The cost has been about 1,600*l.*, and the architect was Mr. E. Sedding, of Plymouth.

INSTITUTE AND CHURCH, BARRY.—Lord Windsor laid the memorial-stone recently of the new Seamen's Church and Institute, in connection with the Missions to Seamen, at Barry Dock. The scheme, when completed, will comprise a church to accommodate 150, a recreation-room, officers' room, apprentices'-room, coffee bar, billiard-room, baths, &c. About 2,000*l.* will be required to defray the cost of the portion at present in course of erection. The new institute is erected at the junction of Dock View-road and Castleland-avenue. The elevations are in red Rusbon brick, with terracotta mouldings and dressings. On the basement floor is a cellar for storage and heating-chamber, as well as a floor leads to a flat vaulted roof over the institute, where a garden will be laid out. There is a square tower on the roof, with look-out and flagstaff. The buildings are being carried out from plans designed and prepared by Mr. C. H. Kemphorne, Barry Dock. The contractor is Mr. M. H. Rendell, Cadoxton, and the clerk of works Mr. W. Augustus, Cardiff.

\* First premium awarded by him.



**PRIMITIVE METHODIST CHURCH, NEW WINTON.**—The ceremony of laying the top stones to the new Primitive Methodist church in New Winton recently took place. The work has been carried out by Mr. Crab, builder, from designs by Mr. T. E. Grimes, architect, at a total cost of £1,600.

**CHURCH, CARRAV.**—A new chapel is being built at Carrav by the Elgo English Baptist Church at a cost of about 2,000. The designs are by Mr. W. Beddoe Rees, architect, Cardiff, and the contractor is Mr. Joseph Davey, Aberavon.

**MEMORIAL HALL, SUNDERLAND.**—The congregation of the Trinity Presbyterian Church, Sunderland, are having a memorial hall erected next to the church, and on the 18th inst. the stone-laying ceremony was performed. The total cost of the structure will be 2,400. The ground floor will be a parlour, and behind that a minister's vestry. The floor above will consist of a hall, accommodating 130 people, while the building will also contain three or four classrooms. Mr. William Milburn is the architect and Mr. R. J. Hudson the builder for the work.

**MUSICAL HALL, HULL.**—The Queen's Hall, a building which the Wesleyan Methodists of Hull have erected in Alfred Gelder-street for religious purposes, at a cost of about 33,000, will shortly be opened. The central hall has a floor space of 75 ft. by 72 ft., exclusive of the platform, and is flanked by each with floriated principals, the span being 48 ft. in front of the orchestra. Below the great hall there is a schoolroom 72 ft. by 66 ft. wide, as well as a series of connecting classrooms. Messrs. Gelder & Kitchen are the architects, and Mr. Biely has carried out the contract.

**WESLEYAN PRESBYTERIAN HALL, NEWPORT.**—A new central hall, to accommodate 2,000 people, is being erected for the Welsh Presbyterian Church at Newport. The building will consist of a large hall, suitable for concerts and public meetings, classrooms, and lesser halls to hold 800 persons, with entrances from Commercial and Fishergill streets. The contractor is Mr. W. A. Linton, Messrs. Habershon, Fowler, & Co., being the architects.

**FREE LIBRARY, BRIDGWATER.**—On the 10th inst. the foundation-stone was laid, on a site in Blaise Gardens, of the new Bridgewater Free Library. Mr. E. Godfrey Page was the architect, and Mr. Charles Bryer the builder for the work.

**FRANCIS LIBRARY, WEM, SHREWSBURY.**—The Morgan Public Library and Reading-room at Wem was recently opened. The building is erected in Aston-street. It has been designed by Mr. Thomas Jervis, Wem, from plans designed by Mr. Frank Shayer, Shrewsbury, at a total cost, including the site, of about 2,000.

**PAVILION, DUNOON, N.B.**—The new pavilion in connection with the Castle Gardens at Dunoon was recently opened by H.R.H. Princess Louise. The building is erected on the Pier-road, the front building consisting of a row of shops, with reception-rooms above, the back building being the hall, polygonal in shape. It is constructed of stone and brick, with steel roof covered with tiles. Accommodation is provided for between 3,000 and 4,000 persons, and the whole hall is furnished with very good chairs. The cost is expected to reach £10,000. The architect was Mr. J. Fraser, of Dunoon.

## STAINED GLASS AND DECORATION.

**ST. BRIDE'S CHURCH, LIVERPOOL.**—A large three-light chancel window has just been completed in stained glass at the studio of Messrs. Barry Brown & Brothers, of London and Edinburgh, and fixed in this church. The central light represents the Ascension, while in those on either side are St. Barnabas and St. Bride. This window is erected to the memory of the late General Haw, by his wife and children.

## APPOINTMENT.

**EASTERN-TYNE.**—A meeting of the committee of Newcastle Corporation was held on the 18th inst. The principal business was to receive the seven candidates who had been chosen out of sixty by the office of city engineers, rendered vacant by the resignation of Mr. Edge. The qualifications of the candidates were considered, and a decision asked of each of them, after which the committee proceeded to reduce the number from six to three. It was agreed to recommend the following three to the ensuing meeting:—Mr. W. J. Gray, city engineer, Bristol; Mr. K. T. Marshall, engineer, Radcliffe; and Mr. C. R. S. Marshall, engineer, Newcastle.

## ART AND ENGINEERING NEWS.

**ARTIF, ABERDEEN.**—A new bridge is being erected over the River Bogie at Gartley, and leading to Kinnethmont and Huntly, by Mr. Smithson. The design adopted is a cantilever bridge of one span with a clear waterway of 30 ft. There are two side piers or abutments founded on rock at a depth of

5 ft. below the bottom of the river; the outside faces of piers and wing walls are of hammer-dressed ashlar, and the parapet walls are ashlar. The whole of the stones, with the exception of the granite girder blocks, are from Auchindoir quarries. The roadway has a total width of 16 ft. between the steel lattice parapets, and it is carried on cambered steel trough flooring resting on two plate girders, the troughs being filled with Portland cement concrete, on the top of which 4-in. granite cubes are set and run in with asphalt. The bridge has been designed for a uniformly distributed live load of 112 lbs. per sq. ft. The girders and trough flooring are all of mild steel made by the Siemens Martin process. The access at both ends of the bridge have been straightened and the gradients improved. The contractor was Mr. John McConnachie, Huntly; the sub-contractors being Mr. Cormack, Huntly, for mason work, and Messrs. Somervell & Co., bridge builders, Dalmuir, Glasgow, for the steel and ironwork. The plans for the structure were prepared by Mr. James Barron, M.Inst.C.E.

**PROPOSED WIDENING OF UNION BRIDGE, ABERDEEN.**—Mr. William Dyack, the Burgh Surveyor of Aberdeen, as the result of his consultation with Sir Benjamin Baker, has now submitted a report to the Improvements Committee of the Aberdeen Town Council in reference to the widening of the Union Bridge. The bridge, between, Trovise, Norwich. The new double-line swing bridge over the river Wensum at Trovise was, on the 14th inst., opened for railway traffic. Of the balanced cantilever type, the structure is 122 ft. over all, with the two opening spans of 44 ft. clear, and two viaduct spans of 23 ft. 6 in. It will be worked by electrical motor, geared up to the rack for turning the bridge, and one geared up to a set of hydraulic pumps for working the jacks which lift the bridge ends. Mr. J. A. Radley, district engineer to the Great Eastern Railway Company, had the general superintendence of the work, and the contractors were Messrs. Handyside, of Derby.

**PROPOSED BRIDGE REBUILDING, BATH.**—A special meeting of the Bath Surveying Committee was held at the Bath Guildhall, on the 18th inst., for the purpose of considering a proposal to reconstruct the old Midland Bridge, which has been replaced by a new structure over the river leading to the destructor works, and to connect the two properties of the Corporation on either side of the river. The surveyor submitted a detailed report, in which he stated that the approximate cost of the work would be about 2,000, including abutments and approaches. He recommended the committee to acquire the bridge. An amendment was moved to the effect that the report be adopted, and this was carried by thirteen votes to three.

## FOREIGN.

**FRANCE.**—The Société Nationale des Architectes Français has opened its twelfth annual competition. The subject is "Offices for a Daily Paper." The "Union Internationale des Beaux-Arts" has organised an interesting exhibition at Angers, under the direction of a committee of artists, among whom Rodin is included. M. Monod has completed the model for a statue of Général Dumas, to be erected in the Place Malesherbes, between the monument of Alexandre Dumas père (by Gustave Doré) and that of Dumas fils, which M. de Saint-Marceaux has nearly completed. A competition is to be opened at Lyons for a block of artisans' dwellings. The Prefecture at Quimper is to be rebuilt, at a cost of 555,000 francs. The municipality of Grenoble has opened two competitions, one for the rebuilding of the Ecole Vaucanson, and the other for a scientific laboratory in the Jardin des Plantes. By a decree of the President of the Republic a district school of architecture has been opened at Marseilles.

A new bridge is to be built over the Rance, on the model of that intended for the Paris Metropolitan Railway near the Pont d'Austerlitz. M. Harel de la Noë is the engineer. The cost is estimated at half a million francs, and the bridge is to be completed in 1907. The new municipal museum at Gray has just been opened. The death is announced at Cherbourg, at the age of 84, of the sculptor and archaeologist Le Vél, a pupil of Rodin. He was curator of the Cherbourg Museum, and author of the "Antiquarian status of Napoleon by the margin of the sea." He had made a very fine collection of ancient faïences, which the Government purchased, a few years ago, for the Cluny Museum.

**SOUTH AFRICA.**—Forty-six sets of designs were received by the Southern Life Assurance Co. in response to an advertisement for competitive plans for their new chief offices in Capetown, the successful competitors being (1) Mr. John Lyon, (2) Mr. George Ransome, and (3) Messrs. Howe & McKinlay, all of Capetown. Mr. B. W. Eastwood's tender for the erection of the new town hall for Kronstad is 10,877, 11s. 3d. The time limit for building the hall is ten months. At a meeting of the Pietersburg Municipal Council the town engineer reported that in the construction of Asiatic buildings locally not one structure

had been so far erected without his having to request the builders to pull down defective parts and to substitute important matters omitted, so as to have same in conformity with the plans and specifications passed by the council. It was resolved that a by-law be framed with a penalty for infringement of the plans and specifications passed. "The local building trade continues active," reports "S. A. Mines" of Johannesburg. "Plans of buildings estimated to cost 690,402, were approved by the municipality last quarter (April-June). For the first half of this year buildings estimated to cost 1,313,967, were approved. Thus, on the half-yearly figures, new buildings are being proposed at the rate of 2,827,934, per annum, which figure compares with 2,057,229, in respect of 1904. The improvement thus shown is considerable, and it is still greater if we compare the figure of the last half year (1,313,967) with that of the first half of 1904 (871,708)."

## MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Mr. F. R. Farrow's telephone number has been altered to 2,328 Holborn. Mr. Noel Barwell has removed to 14, Stafford-mansions, Buckingham Gate, S.W. Mr. W. L. Griffiths has removed his offices from Oswaldestree House, Norfolk-street, Strand, to Oakley House, Bloomsbury-street, London, W.C.

**THE PROTECTION OF IRONWORK.**—Considerable attention has been devoted by American engineers to the question of protecting iron and steel work from the effects of atmospheric action, and especially from the corrosive influence of the fumes given out by locomotives. In a previous issue\* we gave some of the results obtained from an exhaustive series of tests conducted by the Bureau of Surveys of the Public Works Department of Philadelphia. It was then found that red lead and linseed oil appeared to afford as much protection as any other form of paint.

Within the last few weeks Mr. Louis H. Barker read a paper, before the American Society for Testing Materials, giving some interesting notes relative to the use of paraffin paper and paint as a protective covering for steelwork at the New Jersey terminus of the Pennsylvania Railroad. More than ten years ago an investigation was commenced into the merits of numerous paints with the object of determining by exposure tests the most reliable material for resisting the mixture of sulphurous gases and steam affecting the steel work of the station mentioned. Fully fifty preparations have been tried, among them being various forms of asphaltum, indiarubber, graphite, carbon lead and iron oxide paints. A noteworthy point is that even with three coats, not one of the paints used could preserve the metal from rust for more than twelve months. Recognising the facts that rust cannot form in the absence of moisture, and that no paint is impervious to moisture, the conclusion was drawn that the surface of the metal must be sealed by some impenetrable substance. After many experiments it was found that a cheap form of paraffin paper best complied with the required condition.

Preliminary tests were made on bars of steel, and afterwards a number of eye-bars, supporting a floor over salt water, were treated in the same way. Notwithstanding the fact that these bars were exposed to constant damp and sewer gases, they remained for more than a year without the least evidence of rust. The experiments seem to demonstrate the fact that, in the case of smoke and gases, corrosion commences behind the paint and not from the front after the disintegration of the material. Although the permanent value of paraffin paper is not definitely determined, there is reason to believe that it should prove a most useful aid to all who have to adopt measures for the preservation of iron and steel work. When applying the paper all rust is carefully removed from the metal, a sticky kind of paint is then applied, upon which the paper is pressed with overlapping joints. It is then ready for the outer covering of ordinary paint. In connexion with this subject, we may mention a useful result recently obtained in another way at Cannon-street station. During the forty years that have elapsed since this structure was built the wrought-iron roof has suffered much from corrosion and the glazed covering has required frequent washing. The ironwork at the south end of the station was in particularly bad condition, owing to the quantities of steam and sulphurous gases given off by locomotives in getting up speed. In damp and foggy weather these vapours were found to hang about for some time, hugging the back of the vertical glazed screen at the outer end of the station. Additional ventilation has been effected by installing twelve 30-in. Boyle's "Air-pump" ventilators, the result being that the atmosphere is much clearer, and that the inside of the glazing requires no cleansing. It follows naturally that the destructive action of the fumes should be greatly reduced with a correspondingly longer duration of the paint.

\* The Builder, Vol. lxxvii, p. 482.



Wentnor, Sakop.—Adstone East, 1881—  
0 r. 37 p., f. . . . .



## 241



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITIONS

Nature of Work.	By whom Required.	Premiums.	Desig- ne Br.
• DESIGNS FOR DOUBLE & SINGLE SHOP FRONT	W. H. Smith & Son.....	75l.	
• SECONDARY SCHOOL FOR GIRLS .....	County Borough of Preston .....	50l., 30l., and 20l.	Oct.

## CONTRACTS

[illegible]

## CONTRACTS.—Continued.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
150 tons of 14-in. Broken Granite	Bishop's Stortford U.D.C. ....	T. Swatheridge, Clerk, Council Offices, North-st., Bishop's Stortford	Sept. 25
120 bags of 4-in. Granite Chippings	do.	do.	do.
Plans of BLDG. AT WESTMINSTER, TECHNICAL SCHOOLS, & Class-rooms, Dewsbury-road, Leeds	L.C.C. ....	Superintending Architect's Dept., 15, Pall Mall East, S.W.	Sept. 28
Refrigerator for Dairy (200 yds. long)	.....	Dauby & Simpson, Architects, 73, Albion-street, Leeds	No date.
Restoration of Wesleyan Chapel, Pitt-street, Barnsley	.....	The Manager, Gelli Colliery, Ystrad, Rhondda	do.
Restoration of Wesleyan Chapel, Pitt-street, Barnsley	.....	G. Moron, Architect, 26, Church-street, Barnsley	do.
Plans, SIMON LANGTON SCHOOLS, CANTERBURY	.....	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	do.
Coal and Tar, Inside of Roof, Delight Ironworks	.....	L. D. Whitehead & Co., Tredgar	do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
GENERAL FOREMEN (2)	Northern Nigeria P.W. Dept. ....	250l., etc.	Aug. 31
MAN OF WORKS	Gold Coast P.W. Dept. ....	250l., etc.	Sept. 2
CHIEF OF BUILDING CONSTRUCTION	Middlesex Education Committee ....	10s. per evening	do.
BUILDING INSPECTOR	Northamptonshire C.C. ....	150l. per annum	Sept. 4

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. viii. x.

Public Appointments, xvii.

## PRICES CURRENT.—Continued from page 241.

METALS (continued).	Per ton, in London.
Galvanized Corrugated Sheets—	
Ordinary size 6 ft. to 8 ft. 20 g.	12 10 0
“ “ 22 g. and 24 g.	13 0 0
“ “ 26 g.	13 15 0
Best Steel Sheets, 6 ft. by 2 ft.	
30 g. by 20 g. and thicker	11 0 0
Best Steel Sheets, 22 g. & 24 g.	13 0 0
“ “ 26 g.	13 10 0
Galvanizing, 5 in. to 6 in.	9 0 0
(Under 8 in., usual trade extras.)	9 10 0

LEAD, &c.	Per ton, in London.
s.    d.    c.	s.    d.    c.
Lead Sheet, English, 3lb. and up	16 10 0
Pipe in coils	17 0 0
8 in pipe	19 10 0
6 in pipe	19 10 0
4 in pipe	19 10 0
2 in pipe	19 10 0
1 in pipe	19 10 0
1/2 in pipe	19 10 0
1/4 in pipe	19 10 0
1/8 in pipe	19 10 0
1/16 in pipe	19 10 0
1/32 in pipe	19 10 0
1/64 in pipe	19 10 0
1/128 in pipe	19 10 0
1/256 in pipe	19 10 0
1/512 in pipe	19 10 0
1/1024 in pipe	19 10 0
1/2048 in pipe	19 10 0
1/4096 in pipe	19 10 0
1/8192 in pipe	19 10 0
1/16384 in pipe	19 10 0
1/32768 in pipe	19 10 0
1/65536 in pipe	19 10 0
1/131072 in pipe	19 10 0
1/262144 in pipe	19 10 0
1/524288 in pipe	19 10 0
1/1048576 in pipe	19 10 0
1/2097152 in pipe	19 10 0
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**LLANDOVERY.**—For building a cottage at Cynghard, for Mr. J. M. Lloyd, London, N.W. Mr. D. Jenkins, architect, Llandover, N.W. D. Price, Llandover\* ..... £297

**LONDON.**—For sanitary work at the Infirmary in Brook-street, Kensington-road, S.E., for the Lambeth Guardians. Mr. S. R. J. Smith, architect, 15, York-buildings, Adelphi, W.C.—

H. King & Son	£595 0 0	P. B. Evans & Co.	£355 0 0
E. A. Williams	456 1 7	D & V & Co.	351 10 0
F. W. Brock	456 13 9	Roberts	344 0 0
S. G. Crook	447 9 6	W. M. Glendinning	327 0 0
H. Bragg & Sons	439 0 0	J. Knight & Sons	326 4 2
F. Kinnaird	429 0 0	G. H. James	326 15 0
P. H. Allin & Sons	425 0 0	W. Lawrence & Son	324 0 0
R. Harding & Son	416 0 0	Crabb & Son	319 15 0
J. Johnson	410 0 0	G. Jennings	318 0 0
M. Calman & Son	379 0 0	E. Wall	270 0 0
S. Kind	367 10 0	H. Kent	259 0 0
Victoria Sanitary Engineering Co.	367 10 0	Albion-road, Lewisham	
J. Penn Scott	359 16 0		

**LONDON.**—For making-up and paving Finland-road, etc., for the Deptford Borough Council—

E. J. Etheridge, Rollin's-street, Deptford, S.E.	£1,203
E. J. Etheridge, Rollin's-street, Deptford, S.E.	£1,566
E. J. Etheridge, Rollin's-street, Deptford, S.E.	£266
E. J. Etheridge, Rollin's-street, Deptford, S.E.	£627
Road leading from Knowle-street to Collesbrook-street, Deptford, S.E.	£579

**LONDON.**—For the conversion of the front block of the Norwood Old School premises into a home for aged poor, for the Lambeth Guardians. Mr. E. C. Quantities by Messrs. Dow, White, & Ges, 12, Craven-street, Strand, W.C.—

E. Mills	£2,901	Patman & Potheringham, Ltd.	£5,703
C. Byron & Sons	6,860	G. Godson & Sons	5,993
C. Ansell	6,448	H. Groves	5,055
Spreckley & Co.	6,590	E. Kent	5,412
J. T. Messon & Sons	6,293	C. Dearing & Son	5,393
C. Wales	6,145	L. F. Lamplough	5,389
J. Bowyer & Co.	6,123	B. C. Nightingale	5,364
S. Pocock	6,000	Marriott & Salter	5,160
H. Bragg & Sons	5,993	G. Wales & Co.	5,030
F. Bryen	5,923	W. Lawrence & Son	4,884
J. Barker & Co.	5,920	J. Parsons	4,775
Marrison & Harvey	5,800	E. Wall	4,655
Martin, Wells, & Co.	5,350	B. Moss & Co.	
U. Smith & Son	5,774	Bournemouth Park-road, South-end-on-Sea	4,500

**LONDON.**—For alterations and additions to I. Stanley & Co.'s premises, Lavender-hill, S.W. Mr. W. C. Poole, architect, 42, Bullewell-road, Wandsworth-common, S.W. Quantities were supplied—

Hudson Bros.	£1,270	Wills	£1,120
Laxby Bros.	1,209	Spencer, Santo, & Co.	1,100
Johnson & Co.	1,256	Tripps	1,100
Heather	1,172	Tucker, Lavender-hill, S.W.*	1,089
Chinchin & Co.	1,169		
Turley & Appleton	1,187		
Dearing & Son	1,160		

**MARCH.**—For erecting temporary iron building, for the sale of Ely Education Committee. Mr. R. S. Perkins, architect—

F. Smith & Co.	£275 0	C. Redhead	£488 16
Ginger, Lee, & Co.	688 0	B. Shanks	485 0
T. J. Hawkins & Co.	886 5	J. Swann	484 0
Boulton & Paul, Ltd.	657 0	A. Christmas & Sons, St. Peter's-road Steam and Joinery Works, March	482 10
W. Harbrow	612 10		
G. W. Heath	566 0		
J. Lindall & Son	550 0		

**MIDDLEWICH.**—For erecting school buildings, King Edward-street, for the sub-committee for the Winford and Middlewich District. Mr. J. Cawley, architect, Bull-ring, Northwich—

H. Fairclough, Warrington	£9,410
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[Accepted subject to the approval of County Education Committee.]

**PORTLAND.**—For alterations and additions to the Jubilee Hall, for the South Portland Working Men's Conservative Club. Mr. Wilfred Wright, architect, Portland—

Jesty & Baker	£395 0 0
E. Winter, Park-road, Portland	321 10 0

**RHOSODN.**—For constructing a 9-in. stoneware pipe sewer, for the Wrexham Rural District Council. Mr. J. Price Evans, engineer, Argyle-chambers, Wrexham—

Jameson & Son	£393 0 0
R. Williams	265 0 0
H. A. Jones	263 10 6
G. Halbert, Rhosodn, Wrexham	225 0 0
	210 19 5

**RUGBY.**—For outside staircase, 3-in. water main, etc., at the Workhouse, for the Guardians. Mr. T. W. Willard, architect, Rugby—

A. Harris, Dunchurch-road, Rugby	£107
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**SULLY.**—For erecting two houses, for Mr. A. T. Stephen. Mr. R. B. Batchelor, architect, 19, Duke-street, Cardiff. Quantities by the architect—

F. Bond	£1,229 0 0	G. H. Eiking-ton	£826 0 0
J. Humphries	880 10 0	J. Britton, Dinas Powis	802 0 0
W. Vanguan	830 0 0		

**THAMES DITTON.**—For constructing forty loose boxes at Inner Court Park, for the Association of Trotting Horse Owners, Ltd. Mr. J. M. H. Gladwell, architect, Stratford, E.—

Biggs & Outh	£857 0	Sycamore Works, Ltd.	£589 15
Walle	744 0	Sansom & Bishop	580 0
Harbour & English	739 0	F. Deacon & Co.	544 0
J. Barker	699 0	Wrobley & Co.	499 0
Pearce & Co.	593 0	Working	
Penn & Co.	593 0		

**WHITLEY.**—For private street improvement works, for the Whitley and Monkseaton Urban District Council. Mr. J. Moore, Surveyor, Council Buildings, Whitley Bay—

Thornton & Co.	£2,407 4 3	M. D. Young	£2,227 6 9
J. W. Robson	2,308 19 0	G. E. Simpson, Newcastle	2,200 6 4

[Surveyor's estimate, £2,399 19s. 7d.]

**WREXHAM.**—For new infirmary buildings, extension of laundry, etc., at the Workhouse, for the Guardians. Mr. G. Morison, architect and surveyor, King-street, Wrexham—

Dryland & Preston, Littleborough, near Manchester	£10,469
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[Nine other Tenders were received.]

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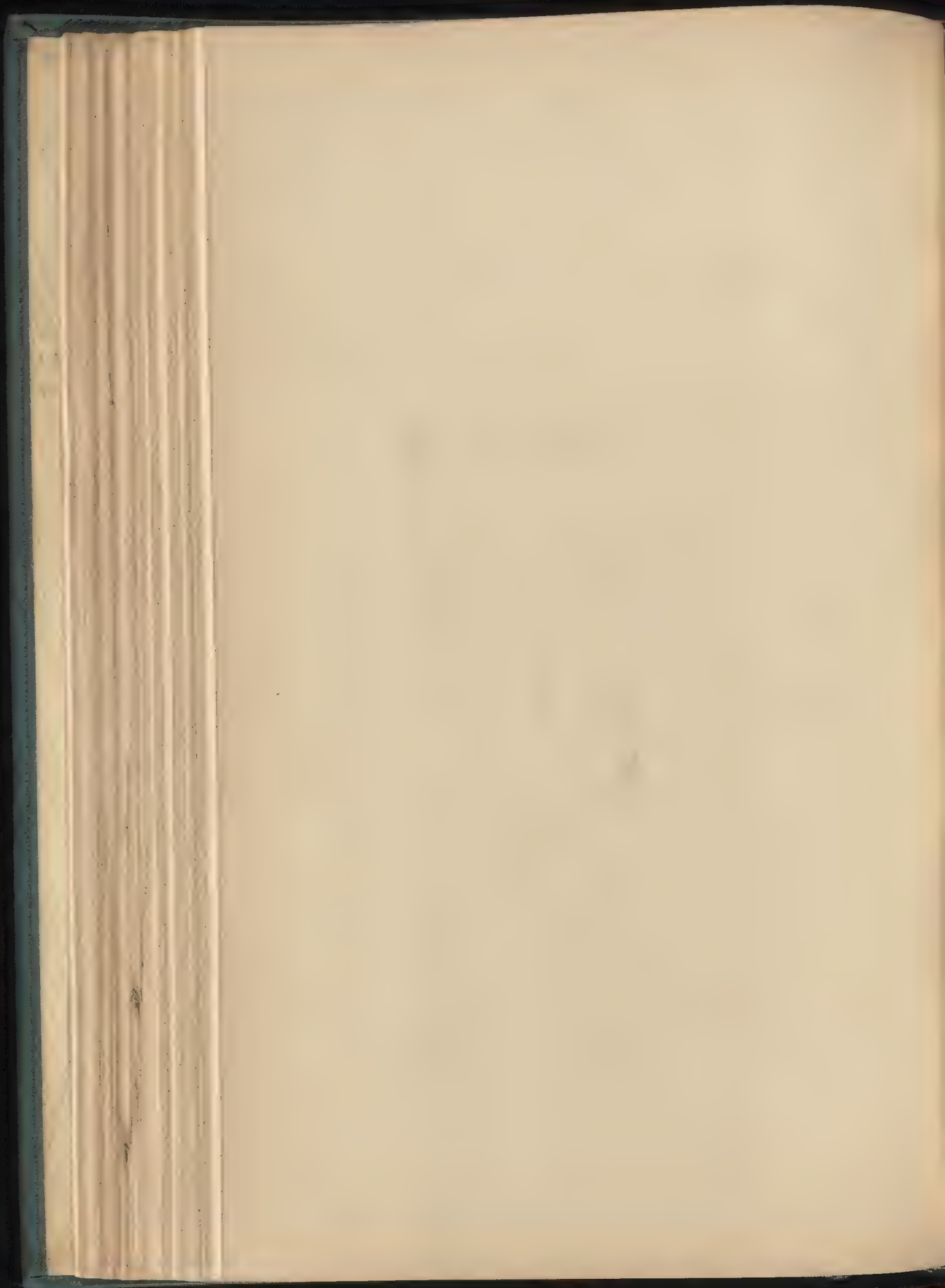
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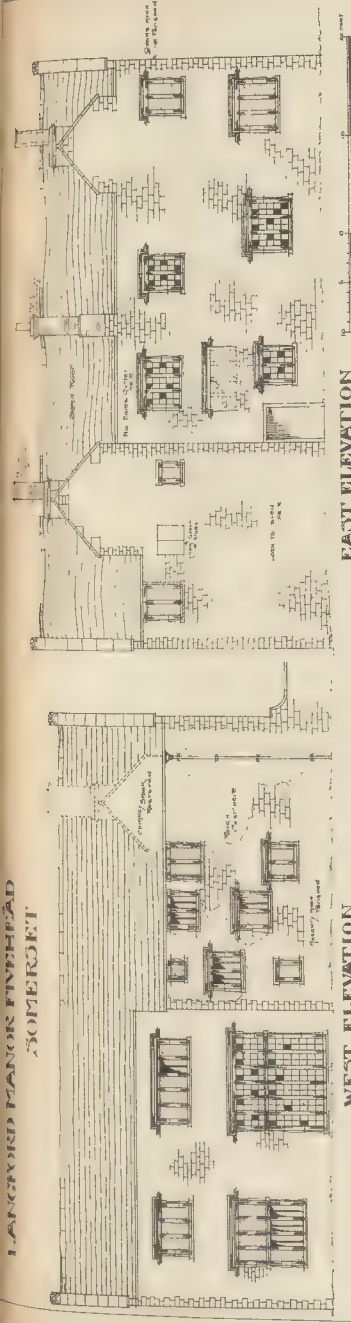


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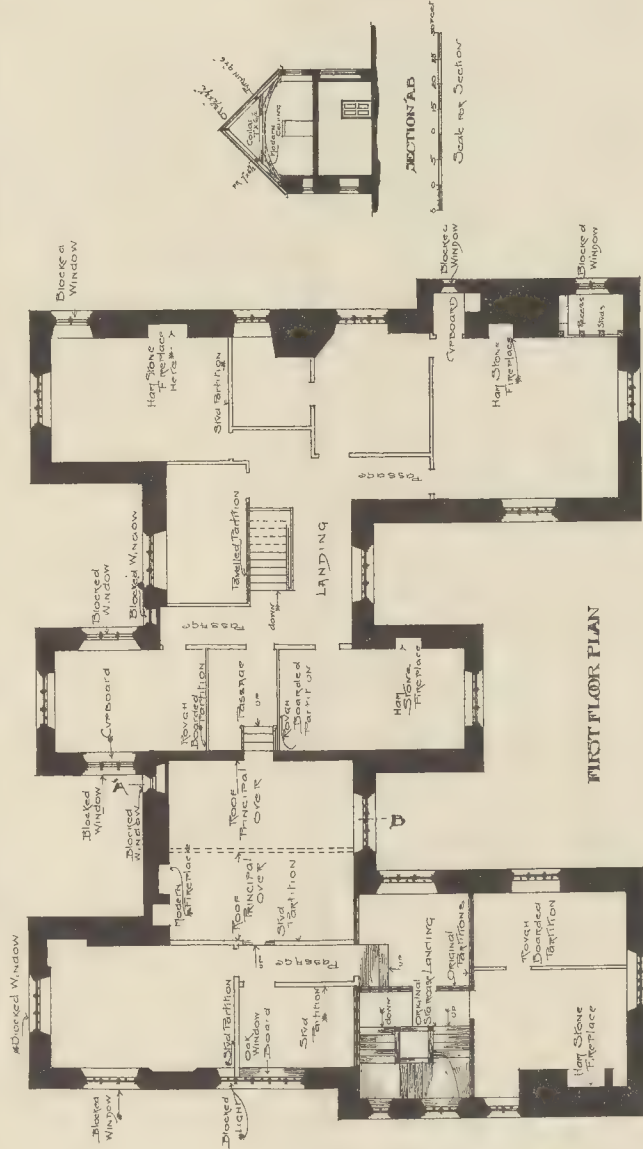






WEST ELEVATION

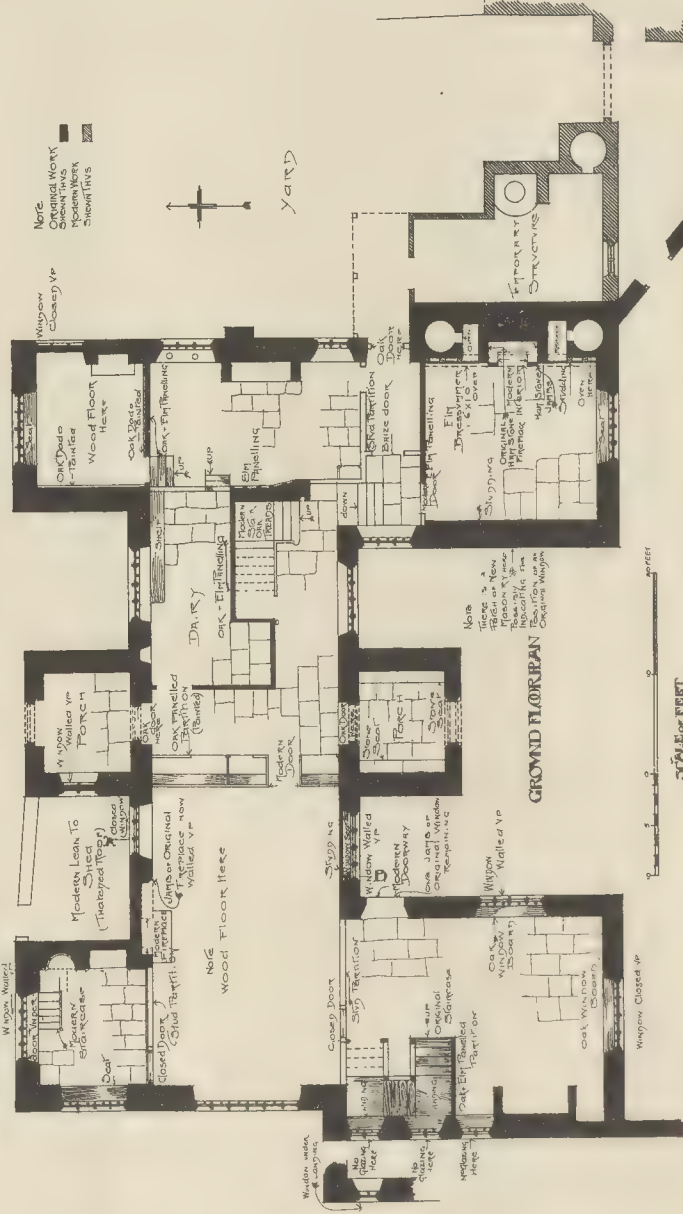
EAST ELEVATION



FIRST FLOOR PLAN

SECTION A-B

Scale 1/4" = 1'-0"

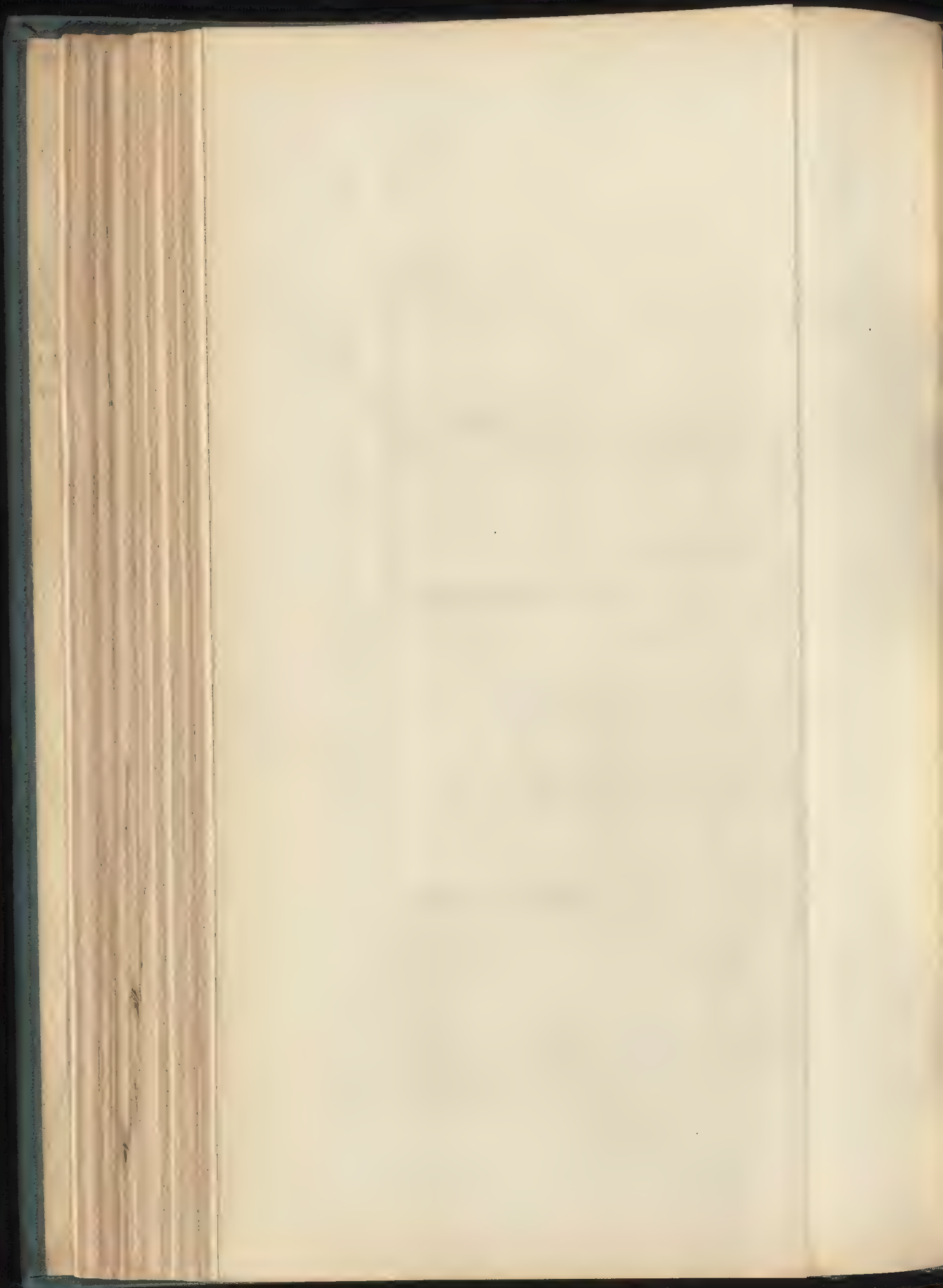


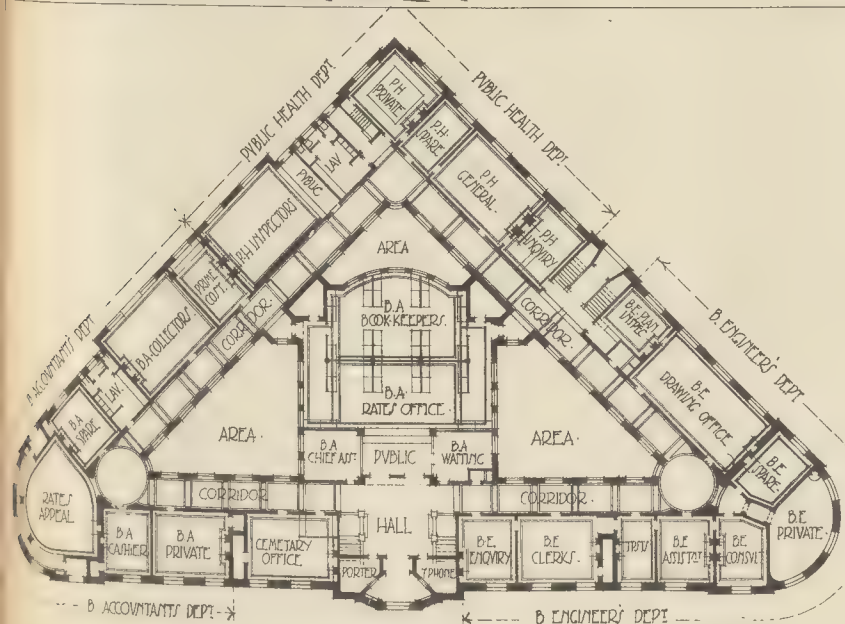
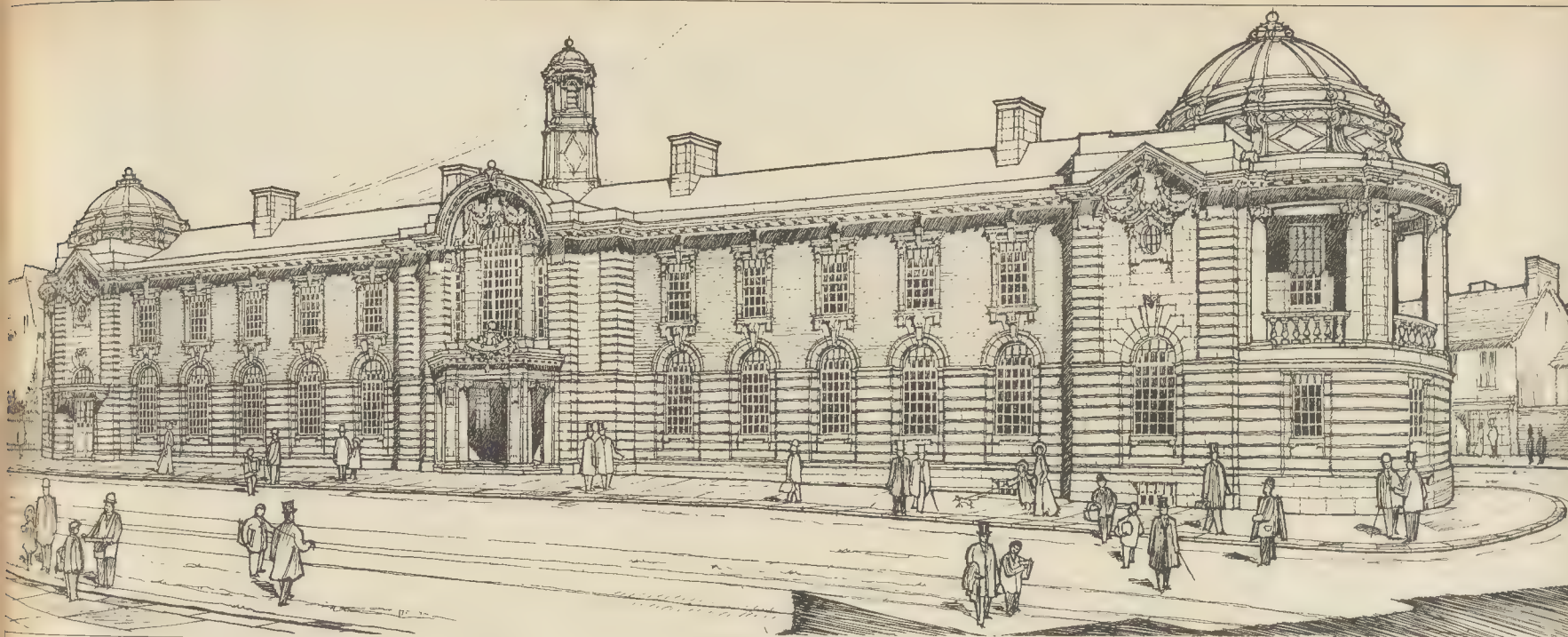
GROUND FLOOR PLAN

YARD

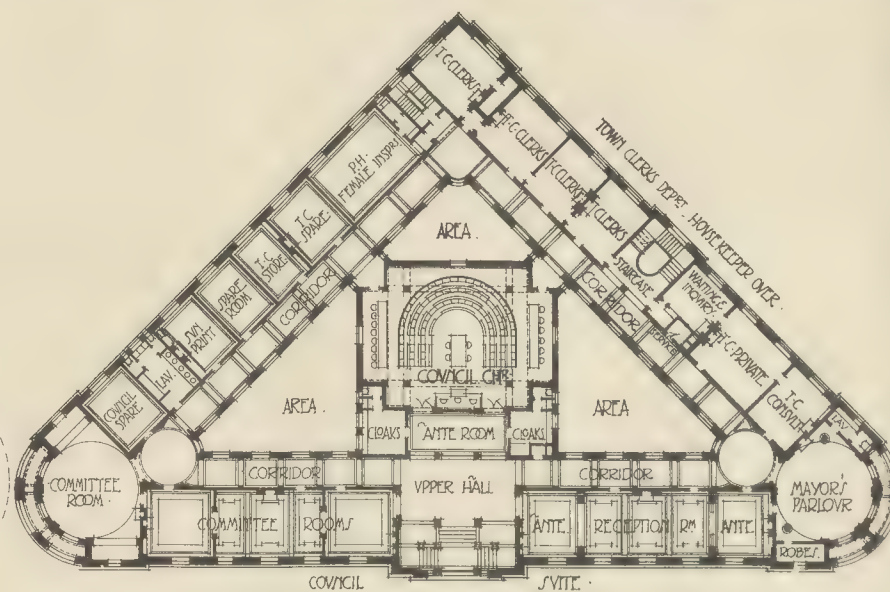
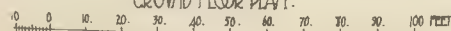
SCALE OF FEET







GROUND FLOOR PLAN.



• FIRST FLOOR PLAN •

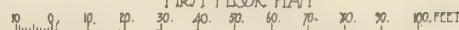
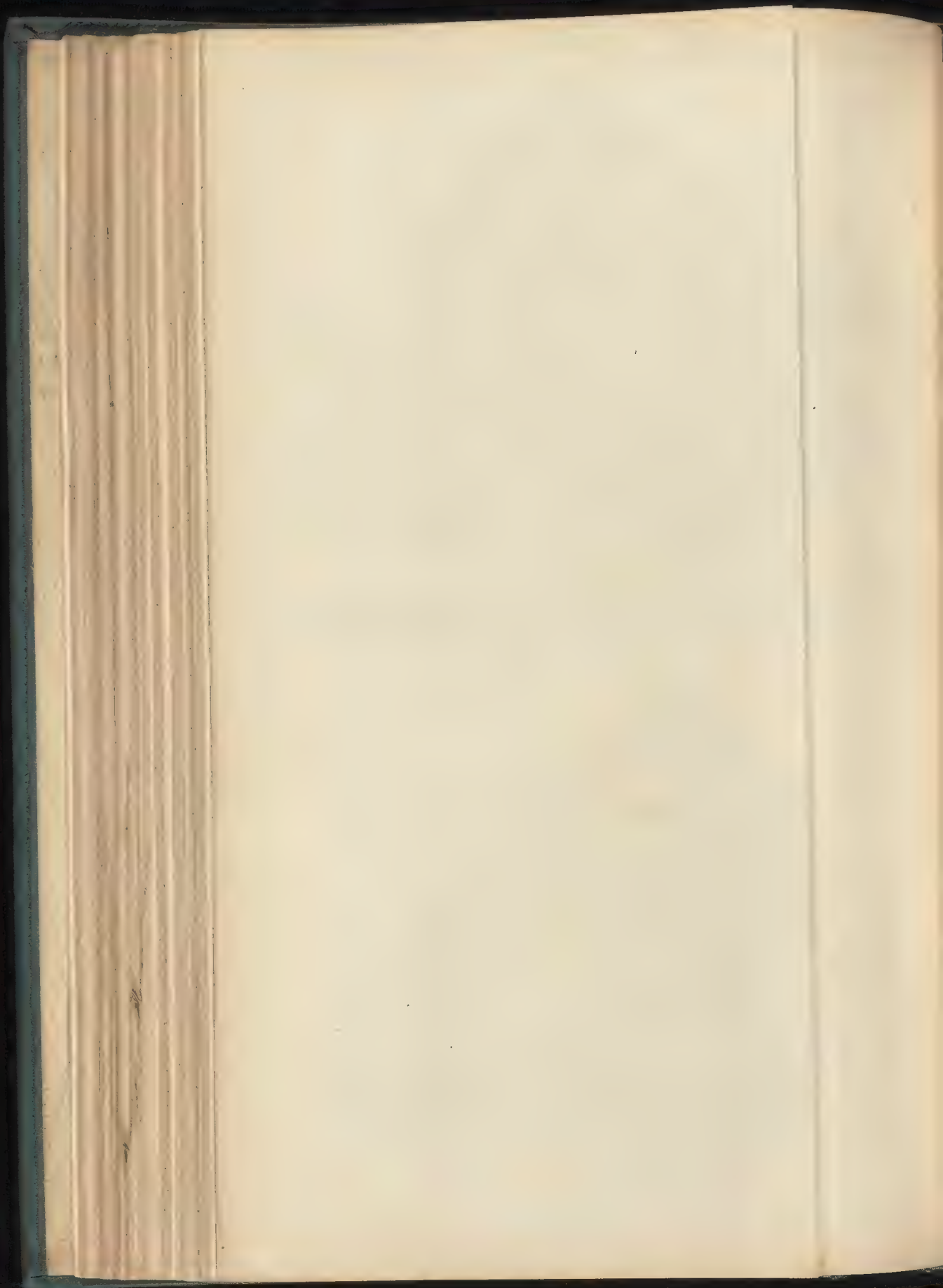
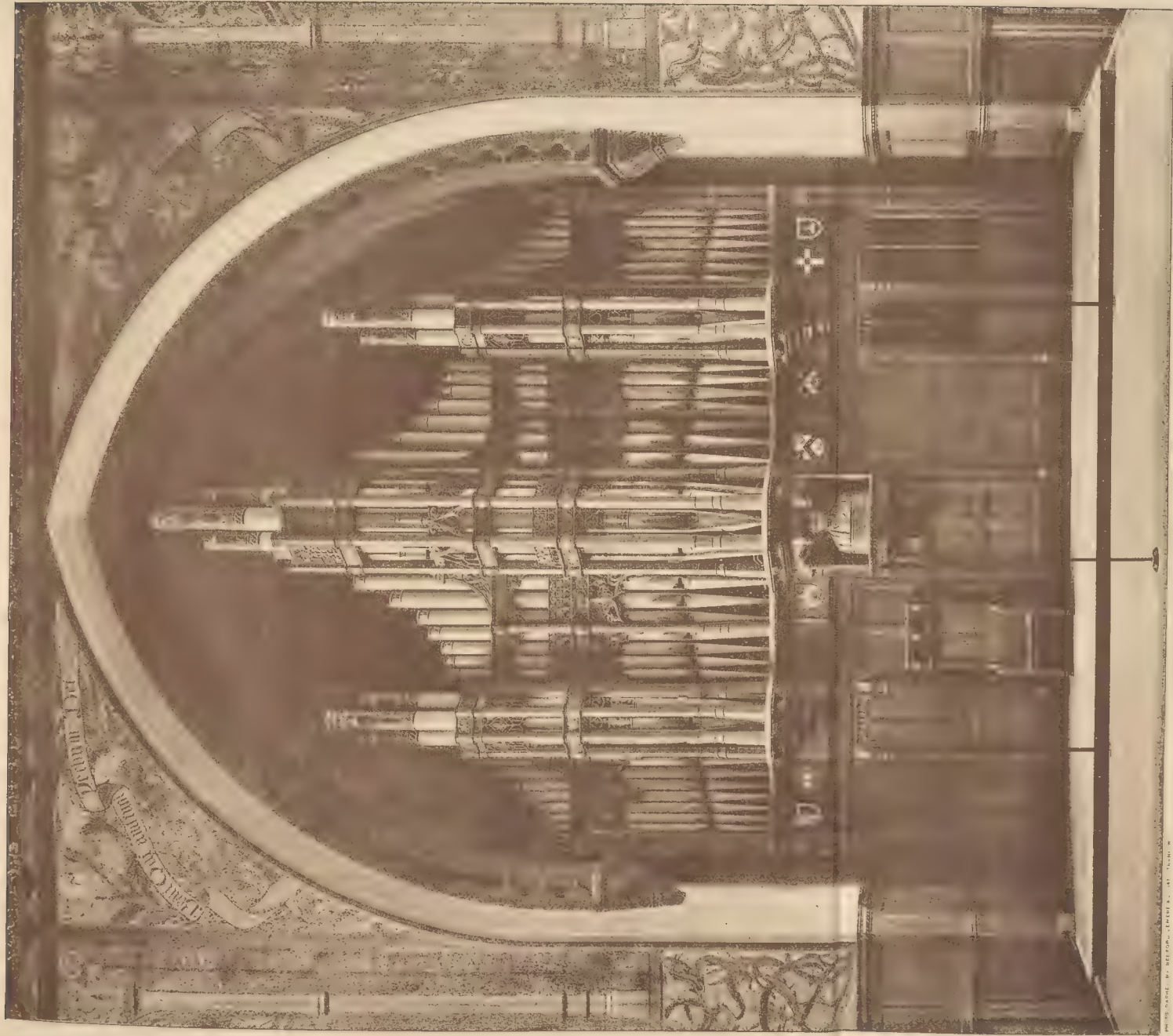


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## ILLUSTRATIONS.

Hull Town Hall and Law Courts .....	Messrs. S. B. Russell and T. Edwin Cooper, F.F.R.I.B.A., Architect
St. Andrew and St. Patrick's Church, Elveden .....	Mr. W. D. Caröe, F.R.I.B.A., Architect.
New Central Reference Library, Bristol .....	Mr. H. Percy Adams, F.R.I.B.A., Architect.
East Window of Chulmleigh Church, Devon .....	Designed and Executed by Miss Caroline C. Townshend.

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### The Port of Antwerp.



SINCE the commencement of last century, when Napoleon laid the foundation-stone of the greatness to which Antwerp has risen in modern times, the commerce of

the port has steadily increased year by year. The works authorised by Napoleon in 1803 included the construction of docks to the large sum of 2,000,000*l.*, served the needs of the city for many years. Two of his docks, the Petit Bassin, or Bassin Napoleon, and the Grand Bassin, or Bassin Guillaume, are still in existence, and among others added by the city authorities are the Bassin du Kattendyk, the Bassin aux Bois, the Bassin Asia, the Bassin de la Campine, and the Bassin du Canal. The most important of these is the Bassin du Kattendyk, built in 1856. About the year 1880 the system comprised eight docks, all in communication, and quays of an aggregate length of 21,000 ft. To the further increase of commerce the dock system soon required enlargement. Hence, in 1887-8, the basins Lefebvre and America were constructed, with a water surface of 54 acres. In 1881 the Bassin du Katten- dyk was lengthened, additional dry docks being built at the same time. The quays along the river were subsequently made, until, including a length of about 2,200 yds., opened in

1903, they now stretch the eastern bank of the river Scheldt for a distance of nearly 2½ miles, and behind them is the connected system of basins, shown in Fig. 1.

Along the quay walls large warehouses have been built, on the top of which is a fine public promenade. In front of and behind the sheds are double railway lines, and on the quays there are about a hundred hydraulic cranes, of capacities varying between 1½ and 2 tons each, as well as numerous hydraulic capstans and other mechanical appliances for dealing with merchandise.

Near the middle of the river quay is the Steen, the only remaining part of the ancient citadel, and opposite this building is a pontoon 328 ft. long by 65 ft. wide, with jetties on either side. Near the Gare du Sud there are three docks devoted to the petroleum trade behind the landing stage used by the Great Eastern Railway steamers. To the foregoing notes we may add that a general system of hydraulic power transmission has been established for operating hoisting and other machinery at all the docks, the central station including boilers and steam engines with an aggregate capacity of 600 horse-power.

At the end of the Grand Bassin are the new bonded warehouses, built to replace those destroyed by the great fire of 1901, the effects of which were discussed in our issue of June 22, 1901, where also will be found a plan of the old warehouses.

After the disastrous experience of that year the authorities very properly determined upon the adoption of fire-resisting

construction, and the warehouses were rebuilt in concrete-steel on the Hennebique system. Moreover, the four blocks of the new buildings were completely separated by courtyards of ample size.

In 1880 the vessels entering the Port of Antwerp represented a total of 3,063,825 tons, and nine years later the total had increased to 6,872,848 tons, an increase of nearly 125 per cent. Consequently it is not surprising that those interested in the shipping industry commenced an agitation for further extension of the port.

The municipalities could not move alone in the desired direction, because the northern line of fortifications, erected in 1860, when the ancient ramparts were pulled down, could not be modified without the consent and co-operation of the Government. By Fig. 1 it will be seen that the fortifications are just outside the existing dock system, and bar the way to any extensions. To build a new line of fortifications would necessarily involve a very large outlay, and in addition to this difficulty some differences of opinion existed between the Government and the city authorities on the subject of the most suitable programme of dock extension.

Although matters remained under discussion for several years, they were not allowed to remain entirely at a standstill.

The new quays, already mentioned were added in 1903, and the line of fortifications opposite the Bassin Lefebvre has been broken, so as to permit the construction of a new dock—the Bassin Intercalaire—a channel connecting it with the Bassin Lefebvre and a new



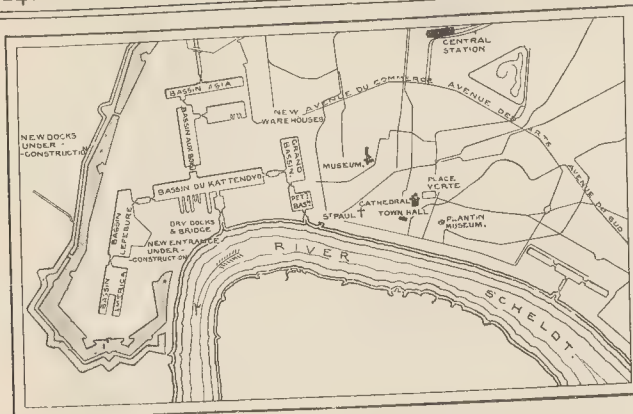


Fig. 1. Plan of Antwerp Docks.

entrance channel from the river to the Bassin Lefebvre. These works are now under construction at an estimated cost of 300,000*l.*, the total area covered being 330,000 square yards.

As announced in our issue of May 6 last, all points of difference between the Government and the city authorities have been adjusted, and the joint scheme for the construction of new docks and fortifications forms the subject of a Government Bill now before the Belgian Chambers for final approval.

In Fig. 2 we show the main features of the port extension scheme, which involves a total expenditure of between five and six million pounds. One of the most important features of the project is the diversion of the Scheldt from its existing bed into a new channel more than five miles in length. The main reason for this work is to be found in the fact that the great bend of the river between Antwerp and a point some 6½ miles on the downstream side contains three particularly sharp angles, and causes some inconvenience and risk to navigators by encouraging the movement of shifting sandbanks.

This bend will be disconnected by means of dams at the two points indicated in Fig. 2, and the new course of the river will follow an almost direct line between Antwerp and the other arm of the bend. A canal, furnished at each end with locks, will provide means of communication with the enclosed area.

This diversion was suggested some years ago by the Government, but the city authorities then feared that its effect might be detrimental to the interests of the port, partly in consequence of interference with traffic during the execution of the scheme, and partly because it was feared that the depth of water in the river might be permanently reduced. The latter objection seems quite untenable, but the former was not without justification. The new project entirely disposes of any risk of the kind, as will be understood by the following particulars:

Before the commencement of the diversion works the Dock Canal, shown in Fig. 2, is to be made, parallel with the proposed river bed, and connected with the present river bed by an entrance channel and three parallel locks, each

Transit sheds and berths will be provided near the entrance to the Erie Canal, on one side of which the new docks are to be constructed, as well as a circular basin surrounded by building yards and a series of five dry docks, the largest dry dock with a length of 820 ft. Seven of the nine docks will be 3,940 ft. long, and the remaining two about 3,150 ft. and 2,110 ft. long respectively. All these docks will be 656 ft. wide, and 39 ft. deep.

A branch railway line will connect the new shipping berths below the triple locks with the system of the Belgian State railways, thus affording direct communication with Holland, Brussels and all parts of Belgium. The quay between the nine new docks and the Bassin Intercalaire will be furnished with sidings, also in communication with the State railways.

The land between the Dock Canal and the new channel of the Scheldt represents an area of 272 acres, which will also be an excellent site for quays and warehouses.

After the completion of the Dock Canal the diversion of the Scheldt will be taken in hand. As shown in Fig. 9, the new channel will pass through the area to abolish the present Bassin America (see also Fig. 1).

As soon as this part of the work has been executed the present bed of the river will be shut off by the two barrages, and the new channel will be opened for traffic. The enclosed portion of the river will be available for use by vessels awaiting instructions or cargo, and it is not improbable that developments may take place that will render the question

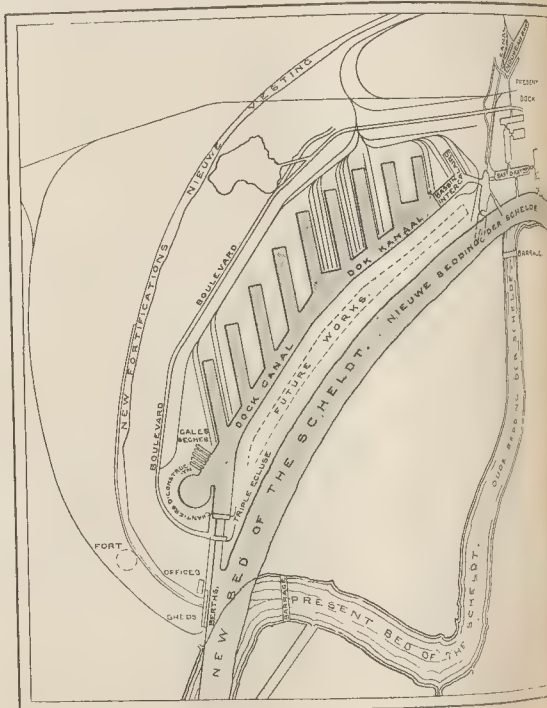


Fig. 2. Plan of Antwerp New Docks.

bordering this water area of considerable importance.

The island between the old and the new channels is at present occupied by several villages, which will be abolished so that the area may be devoted to industries associated with the shipping trade.

The material excavated during the construction of the works will be utilised in raising the level of the low-lying lands about the new docks, thus making them more suitable for building purposes.

Between the new fortifications and the docks a boulevard will be laid out, and the intervening strip of land will form the site for a large extension of the city.

When the entire scheme has been realised, the total length of quays of all kinds in the port will be fully 30 miles. The execution of the works is estimated to occupy about ten years, and Belgians are now anticipating that their completion will have the effect of raising Antwerp to the first place among the great seaports of the world. Whether this result will be achieved or not very much depends upon those who have it in their power to undertake the long-desired organisation and improvement of the Port of London.

#### THE CHEMICAL ANALYSIS OF LIMES AND CEMENTS.

By M. J. MALETTE, Professor at L'Ecole Speciale de Travaux Publics, Paris.

THE rapid progress made during recent years in the manufacture of limes and cements has induced different countries to establish regulations for governing the acceptance of these hydraulic products.

If authorities find it desirable to draw specifications calculated to eliminate defective materials from public works, conscientious manufacturers equally derive advantage from the exclusion of badly-made products.

It is to be desired that, with the same object, an international agreement could be arrived at with the object of standardising all methods of testing such materials of construction. Physical and mechanical tests sometimes present divergencies which are noticed but nevertheless undesirable.

Still, as existing methods have been settled by the co-operation of experts in each country, and, further, as these divergencies frequently relate to mere details, it may fairly be said that a great step has already been made towards future standardisation. As for chemical tests, the methods adopted are practically identical. This follows naturally, as they are based upon recognised analytical procedure. Nevertheless, an undeniable advantage would be attained by precise definition of the conditions to be observed in connexion with such tests. Some chemists are so particular as to repeat a precipitation for the determination of an element, when a single precipitation is sufficient for a satisfactory approximation in simple cases. This care involves an expenditure of time which is not always proportionate with the result obtained.

As far as limes and cements are concerned the following *modus operandi*

may be considered as giving a very satisfactory guarantee of exactitude.

**Silica.**—Upon one or two grammes of the material, finely pulverised and then placed in a porcelain capsule, drop a small quantity of hydrochloric acid diluted with an equal volume of distilled water, thereby causing a brisk effervescence. Then dessicate the contents of the capsule by evaporation. Treat the residue with a little hydrochloric acid, and then with a little water. A second evaporation is next to be conducted as before. Finally, the undissolved residue is to be treated with a little hydrochloric acid and water. It consists of silica, and sometimes includes grains of sand. Filtration permits the separation of the solid particles, which can be dried, calcined, and weighed.

**Alumina and Ferric Oxide.**—To the filtered liquid furnished by the operation described above some drops of nitric acid are added, after which it is boiled. In this manner one makes sure that all the ferrous oxide has passed to the state of ferric oxide. Liquid ammonia is added, with the result that alumina and ferric oxide are precipitated. After cooling the liquid the precipitate is collected by filtration, dessicated, calcined, and weighed.

**Lime.**—To the filtered liquid obtained as above a sufficient quantity of solution of ammonium oxalate is added. Lime is precipitated in the form of calcium oxalate. After dessication the precipitate is calcined by means of a blow-pipe, the product being caustic lime (CaO).

The precipitate can also be calcined at lower temperature over the flame of a spirit lamp. The product then obtained is calcium carbonate. The latter mode of operation is sometimes preferable to the former.

**Magnesia.**—To the filtered liquid obtained as above add a little solution of sodium phosphate. This precipitates ammonium-magnesium phosphate, which, after separation and calcination, gives magnesium pyrophosphate, from which the quantity of magnesia may be deduced.

**Loss by Fire.**—The loss by fire is ascertained by subjecting some grammes of pulverised material to a bright red heat for a period of about six minutes. The difference of the initial and final weights gives the loss by fire, which includes, apart from water and carbon dioxide, all other volatile substances present in the product treated.

**Sulphuric Anhydride.**—This determination is made upon a separate sample of the product to be examined. Two or five grammes of the material for analysis are placed in digestion with a solution of ammonium carbonate. A double reaction takes place, resulting in the formation of insoluble calcium carbonate and soluble ammonium sulphate. The ammonium sulphate is separated by filtration, and treated by barium chloride. Thus is obtained insoluble barium sulphate, which is weighed after calcination.

Another method of operation is as follows: After separation of the silica, in the manner already indicated, barium chloride is added to the filtered liquid. This gives a precipitate of barium sulphate, which is calcined and weighed.

**Alkalis.**—The determination of fixed alkalis (potash and soda) is made upon a separate sample of the material. As alkaline salts must not be introduced during the course of the analysis, it is necessary to avoid the employment of sodium phosphate for the precipitation of magnesia.

This determination is made in a special manner, but it presents no particular difficulty.

**Separation of Alumina and Ferric Oxide.**

—The total precipitate of alumina and ferric oxide, obtained by the operation described above, is re-dissolved in hydrochloric acid. To the solution is added a quantity of tartaric acid, or citric acid, sufficient to prevent precipitation by the ammonia solution subsequently added. Ammonium sulphide is dissolved in liquid ammonia, and the addition of this to the dissolved precipitate causes the deposition of ferrous sulphide, which is collected and calcined, the residue being ferric oxide. The quantity of this is determined directly by weighing, and the quantity of alumina by taking into account the difference of weight.

**Separation of Water and Carbon Dioxide.**

—This operation can be effected in various ways. The apparatus of Berzélius and Rose is frequently employed for the determination of carbon dioxide. The quantity of water can be ascertained either directly or by calculating from differences.

**Sand.**—If the product contains sand in appreciable quantity, as evidenced after treatment by hydrochloric acid, it is necessary to make determination of it, for this inert substance should be considered as silica—that is to say, as an active element.

For determination the process of levigation is adopted. This consists in treating two, five, or ten grammes of the product, according to the presumed proportion of sand, by the application of hydrochloric acid. Energetic agitation of the liquid, followed by rapid decantation, removes the greater part of the silica and clay in suspension. The operation must be repeated as often as necessary, with the addition of water after each decantation. Finally, when nothing but sand remains, this is collected, dessicated, and weighed.

**Manganese.**—If the hydraulic material contains manganese, it is necessary to take account of the quantity.

The determination can be effected by applying nitric acid to the residue remaining after evaporation to dryness, separating from it insoluble substances, and adding minium (red lead) to the solution, the temperature of which should be raised to 90 deg. C. A red colouration thereby results, the intensity of which is proportional to the quantity of manganese present.

Comparison made by means of a colorimeter between this coloured liquid and a standard solution of potassium permanganate, containing a known proportion of manganese, permits the determination of the quantity of manganese in the sample taken.

An analysis, conducted in the manner described above, suffices for all practical purposes, and enables useful conclusions to be drawn as to the nature of the



hydraulic cementing material under examination.

The well-known engineer of the Ponts et Chaussées, Monsieur Vicat, who by his numerous works has contributed so much to the development of the rational manufacture of limes and cements, has adopted for such products the following classification, based upon the value of the index of hydraulicity and upon the time of setting:—

question has given the following results:—

Sand .....	2-10
Combined Silica .....	24-25
Alumina .....	7-35
Ferrous Oxide .....	3-50
Lime .....	52-80
Magnesia .....	1-90
Sulphuric Anhydride .....	1-30
Loss by fire .....	6-80

Total ..... 100-00

#### CLASSIFICATION OF HYDRAULIC LIMES AND CEMENTS (Vicat).

Nature of Material.	Index of Hydraulicity.	Percentage of Clay before Roasting.	Duration of Setting.
Lime, fat or lean .....	0-0-10	0-53	over 30 days
" slightly hydraulic .....	0-10-0-16	53-82	16-30 "
" moderately hydraulic .....	0-16-0-31	82-14-6	10-16 "
" hydraulic .....	0-31-0-42	14-8-10-1	6-9 "
" extremely hydraulic .....	0-42-0-50	10-1-21-8	2-4 "
" limit or Portland cement .....	0-50-0-95	21-8-26-7	10-18 hours
Cement, rapid setting .....	0-95-1-20	26-7-40-0	2-10 "
" poor .....	1-20-3-00	40-0-82-6	—
" pozzolanic .....	above 3-00	above 82-6	—

This classification furnishes a practical means of ascertaining the class to which any given hydraulic product belongs. It is necessary, however, to bear in mind the fact that the index of hydraulicity constitutes rather a presumption than a certitude of the more or less hydraulic value of a product. This qualification is not always remembered, and consequently products are sometimes passed as very hydraulic agglomerants, but which do not strictly belong to the category in which they have been placed.

The index of hydraulicity (I), to which we now direct attention, is, according to Vicat, the quotient of the sum of the weights of silica and alumina by the weight of lime existing in 100 grammes of the product—that is to say, it may be represented by the formula:—

$$I = \frac{P_{SiO_2} + P_{Al_2O_3}}{P_{CaO}}$$

During recent years it has been thought desirable to take into account magnesia, which also is a substance having an influence on hydraulicity.

Thus the modified index takes the following form:—

$$I' = \frac{P_{SiO_2} + P_{Al_2O_3} + P_{MgO}}{P_{CaO}}$$

Some chemists consider that ferric oxide conduces to hydraulicity. Accepting this view, we have two formulæ, either of which can be used according as magnesia is or is not introduced as a factor. Thus:—

$$I'' = \frac{P_{SiO_2} + P_{Al_2O_3} + P_{Fe_2O_3}}{P_{CaO}}$$

$$I''' = \frac{P_{SiO_2} + P_{Al_2O_3} + P_{Fe_2O_3}}{P_{CaO} + P_{MgO}}$$

It should be added that opinion with regard to this theory is by no means unanimous, and that, on the contrary, the more general view is that ferrous oxide contributes in some measure to the solidification of the product, and that the rôle of ferric oxide is nothing in the hardening of Portland cement.

We shall see presently the inconvenience that may result from these diverse interpretations.

Let us take, for example, a brand of product well-known for the constancy of its composition and for its good cementive qualities: The product in

If the essential factors be extracted we have:—

SiO <sub>2</sub> .....	P	=	24-25
Al <sub>2</sub> O <sub>3</sub> .....	I'	=	7-35
Fe <sub>2</sub> O <sub>3</sub> .....	P'	=	3-50
CaO .....	P''	=	52-80
MgO .....	P'''	=	1-90

The indices of hydraulicity calculated according to the preceding formulæ, will be:—

$$I = \frac{24-25 + 7-35}{52-80} = 0-598$$

$$I' = \frac{24-25 + 7-35}{52-80 + 1-90} = 0-578$$

$$I'' = \frac{24-25 + 7-35 + 3-50}{52-80} = 0-665$$

$$I''' = \frac{24-25 + 7-35 + 3-50}{52-80 + 1-90} = 0-642$$

Referring to the table of Vicat, we find that these indices correspond to:—

- (I) Slow-setting cement.
- (I') "
- (I'') Quick-setting cement.
- (I''') "

By this comparison we see at once that, according to the adoption of one or the other formula, the cement may be regarded as slow-setting or as quick-setting.

The maximum divergence in the example chosen is given by the indices I' and I'', which show a difference of 8 to 9 units in the second place of decimals (0-665—0-578 = 0-087), while a single unit in the same position suffices to change the category of the product.

The divergencies between the three last formulæ and the formula of Vicat increase in magnitude with the percentages of ferric oxide and of magnesia in the product considered.

It seems to be useful to point out these divergencies with the view of obviating all false interpretations when the index of hydraulicity is employed exclusively for estimating the character of a hydraulic cementing material.

RE-BUILDING IN OXFORD-STREET, W.—Many more houses have recently been pulled down, and their sites have been taken for new buildings designed after a more elaborated and decorative manner. The latest changes have involved the demolition of Nos. 164-180, for the new premises for Waring & Gillow, Ltd., of which Mr. R. F. Atkinson was appointed architect; and the demolition of Nos. 378-384, together with the adjoining three houses in Bird-street and four in James-street, for premises, nearly completed, erected after plans and designs by Messrs. A. E. Hughes & Son. The new buildings, Nos. 362-4, at the corner of Marylebone-lane, west, are by Mr. George Hornblower.

#### NOTES.

A FEW weeks ago we drew attention in a Note to the number of closed churches all over England.

During the last week or two a correspondence on this subject—so interesting to archaeologists and students of architecture—has continued in the *Times*. It originally arose by complaints of the churches in Kent and Suffolk being kept closed, but the complaint is now made more general—that a number of interesting churches all over the country are not open on weekdays. The clergy have allowed judgment practically to go by default. One incumbent writes that the church plate was stolen sixty-five years ago—probably at night—which is an odd excuse for locking up his church in the daytime now. One might also ask, was the plate kept, as it should have been, in a safe? Another says that if the complaining visitor had called at the vicarage he would have been shown over the church. But, speaking generally, no reply has been made to the point that, as a number of churches are kept open daily without harm, it may be presumed that, except in some exceptional districts, or on exceptional days, those churches that are now closed might properly be kept open.

The popular "quarter-chime" tune "Turn again, Dick Whittington, Lord Mayor of London," will henceforth be played by the famous bells, for which its setting has been harmonised by Sir Charles V. Stanford. New automaton apparatus connected with the clock is in course of being fitted for the chime by Messrs. Thwaites & Read, of Clerkenwell.

Mr. Hughes, of Messrs. Mears & Stannbank, of Whitechapel, has re-hung the twelve bells, of which the tenor, weighing 53 cwt., was cast by that firm's predecessors, Lester & Pack, in 1669, when it is believed was used some metal of the old bells destroyed by the Great Fire, and recast by them in 1738. Nine more bells having been added, by subscription, the ten were rung for the first time on June 4, 1762, in honour of King George III.'s visit on his birthday to the City, two more bells were added twenty-five years ago, though some fears had existed that swinging the bells might weaken the stability of the steeple.

In an article which recently appeared in *La Houille Electric Energy*, *Blanche*, one of the best known of the French technical journals,

there is an account of the "Distribution of Electric Energy in the Department of Aude," which is of special interest in connexion with the many power schemes which are so prominently before the public in this country at present. The power is obtained from the waterfall of the Aude, which is more than 300 ft. high. Turbine alternators are used, and the power is transmitted by three phase overhead wires. The greatest distance of the high pressure network from the power station is 85 miles, but the network extends over 375 miles. The principal distributing station is at Palcazeau, which is connected directly with the power station by overhead wires 43 miles

ing. Owing to the high price of copper, comparatively light conductors are used, and so no less than 20 per cent. of the total power generated is expended in the useless heating of these conductors. Many eagles and other birds of prey have been killed by shock. The momentary short circuits caused by such accidents, and also by mountain rats gnawing at the insulation of transformer windings were some of the difficulties that had to be overcome. In France it is customary for the various communes through whose districts a private company wishes to lead its supply mains to make satisfactory arrangements with the company. In Ande all the municipal lighting is done gratuitously. Twenty-five 16-candle-power lamps are maintained for each thousand inhabitants. On the other hand, the only capital expense the company had was in building the power house, providing the necessary machinery, and constructing the high-tension feeder mains to Fabrezan. The initial cost of the rest of the network, of the distributing stations, and of the transforming and distributing apparatus was defrayed by the various communes. Small kiosques built of stone are used in many places for transformers to convert the energy to lower pressures suitable for transmitting to private consumers. Meters are rarely used; a uniform charge of 32 francs per annum for each 16-candle-power lamp connected being made. The charge for power is much smaller, but is made on a similar basis. Practically every commune has replaced the petrol motors used for pumping water by electric motors, and the use of electric power is rapidly extending. Financially the undertaking has proved successful. It is instructive to notice that the company and the municipalities work harmoniously and to their mutual advantage.

Two circulars have just appeared in the public Press—one issued by a new Society, the National Automobile Society, and the other by the Highways Protection League. In view of the fact that the position of motor cars will shortly be the subject of an inquiry before a Royal Commission, it is instructive to read the views of these two societies as contained in their circulars. The former Society advocates moderation, and, whilst it recognises the fact that the use of the roads has been abused, it attributes this to a limited class of motorists. It advocates the abolition of a speed limit, and upon this suggestion there is much to be said, as there has been a tendency to regard the present limit as a minimum. The use of high-speed cars on roads it deprecates, and it seeks to secure methods of reducing their production. The tone is essentially moderate, but a discordant note is struck when it suggests a canvass of candidates at the next General Election, as this question should not be made a political one. The Highways Protection League, on the other hand, advocates a limit, the maximum being fourteen miles an hour, and it also puts forward practical suggestions as, for instance, that the owner of a car when present shall be made liable, and that a maximum candle-power for head-lights be prescribed. Other suggestions

are put forward, which, though desirable from the point of view of the non-motorist, are perhaps too drastic. At the present time we fear it must be admitted that the inconsiderate motorist is more in evidence than the motorist who usually appears in print—he is too apt to forget that his car can be slowed when approaching other vehicles, and, relying on his own skill, is too apt to cut in between them, overlooking the fact that horses are not mechanical contrivances. He is also forgetful of the dust he raises when passing ladies. We think a mechanical difficulty in connexion with very high-speed cars may often be the cause of excessive speed, as such cars, when running at low speeds, are apt to vibrate unpleasantly. It must be admitted, of course, that a car must have capacity for higher speed than that required on the level, as otherwise hill climbing is an impossibility; but too much attention has been given by those interested in motors to developing their racing capacities. Manufacturers would do well to turn their attention to the manufacture of cars the best adapted to use on the roads, and if motorists will then drive as moderately as they write, we think there is every hope that the motor question will soon pass out of its acute stage.

**Mechanical Stoking for Locomotives.** CONSIDERING the arduous labour imposed upon the fireman of a modern railway engine, it is a little to be wondered at that locomotive engineers have not yet taken to the use of mechanical stokers. The large grate area of a heavy locomotive makes it a difficult as well as a laborious task for the fireman to distribute the coal in an efficient manner over the whole surface, an operation that could be far better performed by mechanical means. We believe that one of two preliminary trials of such apparatus have been made on American railways, and, in our opinion, the time has now come for thorough investigation of the subject. The mechanical stoker has been applied with marked success to stationary boilers of all kinds, and it is tolerably certain that, with necessary modifications, it would be equally useful in connexion with locomotive boilers. One great advantage to be secured by its adoption would be to leave the fireman more time for the discharge of his other duties, the most important of these being to render assistance to the driver in looking out for signals.

**The Ox Bow Tunnel.** AN interesting engineering work of which very little has been heard is the tunnel between the two ends of a loop on the Payette River in Idaho, U.S.A., this loop being known as the Ox Bow. The tunnel has a cross section of 28 ft. wide by 9 ft. high, and is about 1,200 ft. long. Under ordinary conditions the driving of such a tunnel would present no difficulties, but, as occurred during the construction of the Simplon tunnel, hot water was encountered in considerable quantities at distances of 300 ft. and 250 ft. respectively from the ends. The temperature, commencing at about 95 deg. F., increased as the work went on to 132 deg. F., causing much inconvenience to the men employed. After fans of various

kinds had been tried unsuccessfully for the purpose of cooling the air, the resident engineer proposed the simple device of spraying the walls of the tunnel with cold water. Pumps and hose fitted with ordinary roses were then provided and used with entirely satisfactory results. The temperature of the air was reduced to reasonable limits, and the hot water was so much cooled that after being collected in sumps it could be pumped out by the ordinary plant.

**Brick-faced Dams.** THE Cray dam in connexion with the Swansea water-works is a masonry structure

which was originally to have been faced with stone, but it was found that the cost of dressing the available stone would be so considerable that the Borough Engineer proposed brick as an alternative. Before adopting this material he inspected the brick-faced dam at Remscheid, in Prussia, and the similarly treated work at Rhayader, in Radnor. Investigation was also made into the properties of brick with regard to watertightness, durability, and resistance to climatic influences. Finally, the facing was formed with two layers of brickwork laid in 1:3 cement mortar, the inner of brindled brick and the outer of pressed blue facing brick, the average thickness of the facing being 1 ft. 6 in. We have no doubt this type of construction will prove satisfactory, but it is not clear why concrete was not adopted. This is a material which has been largely used for similar works, and if mixed in suitable proportions it is quite as satisfactory, and at the same time less costly, than brick masonry.

**British and Foreign Granite.** It seems an extraordinary thing that Norwegian granite is being extensively used in

the construction of the new docks at Devonport, a place which is close to unlimited sources of supply. The explanation of the contractors is that the stone can be procured at a lower price from Norway, and the suggestion is also made that the organisation of the quarry industry in the same country makes the supply more reliable than that furnished from the granite quarries of Devonshire and Cornwall. Although shipping rates are always low as compared with railway charges, we cannot think that they place Norwegian quarry owners in a more favourable position than their competitors, so far as Devonport is concerned, and it may be open to question whether there is much in the suggested superiority of organisation. The probability is that the contractors have been able to obtain specially low prices by tempting Norwegian quarries with a large order. So far as Government contracts are concerned it certainly ought to be a rule that British materials should be employed whenever practicable, and considerable sympathy will be felt with the resolution passed by the Penryn Corporation requesting the Government to insist on the use of British granite only in all Government works.

**National Co-Partnership Exhibition at the Crystal Palace.** THIS exhibition, opened last week by Mr. William Crooks, M.P., has for its object the furthering of co-operation among the working classes in the various trades in order to give people more



interest in their work and take away the idea that they are merely "profit-making machines." The co-operative housing societies, most of whom exhibited photographs and prospectuses, have done much good work in this direction. The system on which these companies work is to erect houses, let them at ordinary rents, paying a moderate interest on capital from 4 to 5 per cent., and dividing the surplus profits among the tenant members, who can thus in time acquire through investment or by accumulated capital the value of the property. The Ealing Tenants, Ltd., one of the most flourishing of these societies, owns property worth more than 32,000*l*. The Garden City Tenants, Ltd., the latest addition to these, formed this year at Letchworth, has already built a pair of cottages at the Garden City, which are shortly to be followed by a number of others, arranged round a village green. They appear to be excellent examples of this class of cheap cottage, with plenty of accommodation inside, and the exterior pleasant and attractive. Other exhibitors were the Co-operative Builders, Ltd., Kettering; the General Builders, Ltd., who were the contractors for the Garden City press factory; and The Haslemere Builders, Ltd., who showed specimens of sand-faced tiles and stock and facing bricks of good texture and colour, also joinery. The North Wales Quarries, Ltd., had specimens of their slates, and the Mosaic Workers' Co-operative Society had on view several designs in wall and pavement mosaic.

#### LETTER FROM PARIS.

REFERENCE has already been made to a proposed exhibition, at the Château de Bagatelle (formerly the property of Sir Richard Wallace), of an important loan collection of English paintings of the XVIIIth and XIXth centuries. This was very successfully started and was attracting a great deal of public attention, when it was all put an end to in consequence of the susceptibilities of the Paris Municipal Council. It appears that the proposal was made at the time when the Municipal Council was not in session, and the Prefect of the Seine took upon himself to authorise the use of the château for this purpose. In regard to this infringement on its authority the Council has openly shown its offence, and in consequence the owners have all withdrawn their pictures. One of them, M. Camille Groult, has offered to the Louvre three fine Turners (one of them being a view of the Pont Neuf), which would otherwise no doubt have been presented to the municipal collection, so that the Council have been the losers by their ill-timed demonstration of feeling, besides probably discouraging the owners of pictures from lending them in future.

At the Petit Palais the new gallery devoted to the exhibition of the products of the Sévres manufactory is shortly to be opened, and also those in which are to be exhibited the collected works of Dalou in sculpture and of Ziem in painting. There is talk also of exhibiting the collected works of Paul Dubois and of Henner. A competition is to be opened, by the Municipality and the State in conjunction, for the design for the proposed monument to the great French landscape-painters of the past generation, which, as already mentioned, it is proposed to erect on the Cours la Reine, not far from the Petit Palais. The monument to the Paris aéronauts, the last work of Bartholdi, which has been completed since his death, is to be erected, towards the end of this year, at the Porte des Ternes at Neuilly.

A critical estimate of Bongerueau as a painter has already appeared under the head of "Notes" last week; but a few facts in regard to the painter and his works may be

added here. Bongerueau was born on November 30, 1825, at La Rochelle, where also he died. He commenced his studies at the Bordeaux, and went subsequently to the Ecole des Beaux-Arts, where he was the pupil of Picot. Since the time when, in 1850, along with Baudry, he obtained the Prix de Rome, he never ceased working, so that his artistic career extends over more than half a century, for he was still exhibiting at this year's Salon. One of his works sent from the Villa Medici, "The Burial of St. Cecilia in the Catacombs," gained him already a medal in the Luxembourg. Class; the picture is now in the Luxembourg. Among the succession of works which he exhibited subsequently may be mentioned "L'Amour Blessé"; "Le Jour des Morts"; "La Prière Discorde"; "Le Retour des Champs"; "La Sainte Famille"; "Bacchante"; "L'Amour essayant ses Flèches"; "Le Baiser"; "Le Sommeil"; "La Baïgonneuse"; "L'Invocation à la Vierge" (which forms a decoration in the Church of Saint Augustin); "Enfants Endormis"; "Nymphes et Satyre"; "Après le Bain" (bought by the King of Holland); "Floire et Zéphyre" (in the museum at Mulhouse); "L'Enfant Jésus et St. Jean Baptiste"; "La Vierge Consolatrice" (in the Luxembourg); "La Naissance de Venus" (also in the Luxembourg); "L'Adoration des Mages" (in the church of St. Vincent de Paul), which gained him the Medal of Honour at the Salon; "Le Premier Deuil"; "L'Offrande à l'Amour"; "La Perle"; "L'Innocence"; etc. Bongerueau also decorated the Salle des Concerts at the theatre of Bordeaux, and executed the mural paintings in the cupola of the cathedral at La Rochelle. Bongerueau was a Professor at the Ecole des Beaux-Arts, much admired and respected by his pupils, several of whom rose to be eminent artists. He was also Honorary President of the Société des Artistes Français, and was a "Grand Officier" of the Legion of Honour.

It is announced that a group of artists and amateurs of art, among whom are two architects, MM. Bonnier and Bouwens Van der Boyen, have founded a School for mutual practical instruction in art. The object of the School, which is entirely unconnected with any official system of training, is to enable artists to gain acquaintance with the principles of other arts than that which each himself practises, but with which he may find himself frequently in close relations. The programme of the School will include visits to and lectures at museums and private collections, and also a certain amount of travel, with expenses shared in common. The operations of the School are to commence in November, and amateurs as well as artists are invited to join it.

The remains of a Roman theatre have been discovered at Champlieu, near Compiègne, which is reported to be nearly as interesting and important as that of Orange. It is proposed to open it out by clearing away adjoining buildings.

M. Rodin has just completed a bust of the dramatist Henri Beccue, who died a few years ago. The bust will be placed on a stele which is to be erected at the entrance to the Avenue de Villiers, at the intersection of the Boulevard de Courcelles with the Boulevard de Batignolles.

It is proposed to erect a large building on the site of the old Hôtel Dieu in the Rue de la Bûcherie, for the Ecole des Arts Decoratifs, which is at present very inadequately provided for in an old dwelling-house in the Rue de l'Ecole de Médecine.

#### THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ARRANGEMENTS are in progress for the Institute visit to Newcastle-on-Tyne, where the annual dinner is to be held on Friday, October 13, under the auspices of the Northern Architectural Association. The following is a brief preliminary programme:—*Thursday, October 12*.—9 till 11 p.m.: Northern Architectural Association President's "At Home."

*Friday, October 13*.—9.30 a.m.: Excursion on the Tyne in the steamer *J. C. Stevenson*, kindly placed at the disposal of members by the Tyne Improvement Commissioners. 1.30 p.m.: Invitation luncheon. Visits to places of interest in the city. 8 p.m.:

R.I.B.A. annual dinner at the Assembly Rooms, Westgate-road.

*Saturday October 14*.—Excursions to Easingham or Durham, under the guidance of local members. A special visit has been arranged to Durham Cathedral.

Members of the Institute desiring to be at the visiting party, or to be present at the annual dinner, are urged to communicate with the secretary at as early a date as possible.

#### The Intermediate Examination and A.A. Students.

The Council of the Institute, on the recommendation of the Board of Examiners, have resolved that the drawings prepared in the Architectural Association Day School may be submitted to the Board of Examiners for admission to the Intermediate examination in lieu of the testimonies of study as required by the conditions laid down in the Institute programme, and if the work is found satisfactory the candidate may be admitted to the examination.

The Council is shortly to confer with the Architectural Association as to the possibility of exempting from the Intermediate examination students who have completed the four years' course in the Architectural Association School.

#### THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A SCOTTISH district meeting of the Association of Municipal and County Engineers was held at Ayr on Saturday, August 26. The meeting was the first held in Scotland since the completion of the amalgamation between the Scottish and English engineers. The members assembled in the Town Hall, where they were received by the Provost on behalf of the Town Council of Ayr. The President (Mr. A. E. Collins, of Norwich) presided, and there were present Messrs. A. H. Campbell (East Ham), J. R. Wilson (Helsburgh), J. Mallinson (Skipton), J. Lees (Paisley), F. G. Holmes (Govan), D. Dunn (Pollokshaws), C. Massie (Falkirk), J. I. Lumsden (Kirkcaldy), T. Nisbet (Glasgow), R. H. Dorman (Armagh), J. Bryce (Partick) hon. secretary, and others.

The Provost, on behalf of the Corporation, offered the Association a hearty welcome to Ayr. He trusted that the meeting would be profitable, and the discussion result in mutual benefit.

The President thanked the Provost for his kind reception, and said they were very proud that the Scottish Association was amalgamated with them.

Mr. Bryce, Hon. Secretary, presented a report upon the progress of the preparation of by-laws for Scotland, and suggested that a circular should be issued to the boroughs asking them to contribute towards the cost of the work, which would be considerable.

On the proposition of Mr. H. G. Helms (Govan), it was resolved that the borough of Scotland be asked to contribute towards the cost of preparing by-laws for Scotland.

Mr. Bryce (Partick) was unanimously re-elected hon. secretary for Scotland.

Mr. Van Lint (Waterworks Engineer at Brussels) then made a statement, as to the formation of an association on similar lines for French-speaking countries.

The President expressed gratification at the decision of their *confères* in France and Belgium to establish an association.

#### Municipal Works of Ayr.

Mr. J. Young (Town Surveyor and Water and Tramway Engineer) read a paper on some of the municipal works of Ayr. He said the population of Ayr, Newton, and Wallacetown was, at 1901 census, 28,687. At the present time it was about 30,100. The gross valuation of the burgh was 197,000*l*. Ayr, and vicinity, had, for a long number of years, been a popular holiday resort. The population was occasionally increased by anything from 1,000 to 8,000 excursionists in one day during the summer months. The climate of the town was very mild and healthy. The death rate for last year was 18 per 1,000. The rainfall was about 38 in. per annum.

The net cost of maintenance only of the roads for the year ending May, 1904, was 3,288*l*, or about 89*l*. per mile of the white streets, paved and macadamised, within the burgh.

The River Ayr was spanned by six bridges



within a distance of three-quarters of a mile. The principal road-traffic bridge was the New Bridge, built in 1879 to replace the former bridge, erected in 1788. It was 84 yds. in length by 50 ft. in width, and constructed with red sandstone piers and sandrill walls, and granite arches and parapets. There were five spans, of 43 ft. to 4 ft. each. The bridge was of very heavy proportions, massive in design, and cost £5,000. The engineers were Messrs. Blyth & Cunningham. The Victoria Bridge, opened in 1898, was designed and carried out by Mr. John Eaglesham, late town surveyor, at a cost of 9,500. It was 70 yds. long, with arched-rib spans supporting a steel deck-decking for the roadway. The sandrills and parapets were of ornamental design, in cast-iron work. Two bridges crossed the railway traffic; the one at the bottom being for goods only, was of steel construction, and the other to the passenger station was a stone structure of great strength. This latter bridge had a narrow foot-bridge overhanging on the west side. Of the two foot-bridges, Turner's Bridge was a light and elegant steel structure, also on the arched-rib principle, gifted to the town by Mr. A. M. Turner, of Ayr, and erected by him from the designs of Messrs. J. & H. V. Eaglesham, C.E., Ayr, at a cost of about 3,000. The other foot-bridge was the Brig of Ayr, which had recently had a large degree of attention drawn to it from all parts of the world on account of the proposal to take down and rebuild it. The history, historical and literary associations of the Auld Brig, together with the peculiarities in its construction, and a description of its defects would require a paper of itself. Originally erected in the XVth century, it was a splendid example of the constructive skill of the period. It now presented a structure of venerable charm and unique value from an antiquarian standpoint. It had been immortalised in Burns' poem, "The Brigs of Ayr." The Town Council found it necessary, acting on the advice of Mr. B. Hall Blyth, M.Inst.C.E., to close the bridge temporarily last summer, and the laborer was instructed to put in timber centring and supports to obviate any risks of a sudden collapse. This work, as well as the condition of the bridge, the members would have an opportunity of examining for themselves. Many years ago Mr. Templeton, watchmaker, Ayr, left the whole of his estate-at the expiry of certain life-rents-for the rebuilding of the bridge. The amount available for this purpose was about £10,000. The Town Council, after every consideration of detailed reports from Mr. James A. Morris, F.R.I.B.A., architect, Ayr; Mr. John Eaglesham, C.E.; and the Town Surveyor, submitted these to the final consideration of Mr. B. Hall Blyth, M.Inst.C.E., and Sir William Arrol, M.P. Acting on the recommendations of these gentlemen, who, with the exception of Mr. Morris-were in favour of rebuilding the bridge, the author has recently preparing plans and specifications for the taking down and rebuilding of the bridge. The main idea was to produce an exact replica of the old bridge, using the same materials as far as they could be obtained in the new structure-in the same situation as they formerly were in the original bridge. This task was no light one, as the exact position of every stone in the original would have to be ascertained, and great care exercised in replacing it in its proper position. The foundations of the piers, which rested on oak cradles, were previously, several feet above the river bed, and new foundations would be put in at a depth of about 8 ft. lower. It was proposed to centre the present centering in the reconstruction of the bridge. A temporary foot-bridge was constructed for the convenience of the public during the rebuilding. The streets were lighted by 120 electric lamps, 174 electric incandescent lamps, and 290 gas lamps. The cost of the arc lamps of 2,000 candle-power was 230l. per lamp, and of the 16-candle-power incandescent lamps 20l. 10s. per annum, and of the 34 cubic ft. per hour gas lamps 10s. each per annum, which included renewal of carbons, burners, electrodes, etc. Energy was obtained from the Corporation electricity works. The price paid for electric current for lighting was 2d. per unit, and that for

gas was 3s. 4d. per 1,000 cubic ft. The lighting hours per annum were 3,050.

The street sweepings and house refuse were formerly tipped into a quarry within the burgh, but on this being filled up, about two years ago, other means of disposal had to be found. As no places, within a reasonable distance of the burgh, could be obtained, the Town Council decided, after careful inquiry, to erect a destructor on a site adjoining the Corporation electricity works in Mill-street. It adjoined the electricity works, where the steam raised by the destructor boiler was utilised. The buildings were of a plain and substantial character, arranged in two levels, the lower being the furnace floor level, and the upper being the tipping platform level, which was practically at the same level as the adjoining street, and was connected therewith by a bridged roadway. On the lower, or furnace, floor, a Meldrum's "Simplex" Regenerative Refuse Destructor of six grates, arranged in one unit of four grates, and one unit of two grates, with space left for extension to four grates. The grates had an area of 25 sq. ft. each, and could consume 12 tons of refuse per twenty-four hours.

The clinker-crushing plant consisted of a breaker, bucket, elevator, and inclined revolving screens. The capacity of the plant was guaranteed at 3 tons of clinker crushed and screened per hour, the sizes made being 3-16 in., 1/2 in., and 1 in. from thirteen screens, and "tailing" from 2 in. to 2 1/2 in. from the end of the screen. With the exception of the fine stuff and dust, which came through the 3-16-in. screen, the material was very clean, and had a ready sale in the town. The price obtained was 1s. 6d. per ton at the works.

The average cost of consuming the refuse was 1s. 1d. per ton, which included labour and tools.

The cost of the work was as follows:-Buildings, 4,450l.; destructor, plant, and machinery, 5,598l.; chimney, 706l.; total, 10,754l.

The original waterworks of Ayr were constructed in 1855, and acquired by the Corporation from the Ayr Water Company under the Ayr Corporation Act of 1873. This supply was derived principally from springs on the Milton and Grange farms, about eight miles to the south of Ayr.

In August, 1899, the Corporation obtained powers under the Ayr Burgh Act, 1899, to supplement the water supply to the burgh and district by the pumping of the water in the Carluise reservoir to Knockjarder, and the construction of a service reservoir there together with all other necessary works.

The storage capacity of the reservoirs at Carluise, was Carluise reservoir No. 1, 15,000,000 gals.; Carluise reservoir No. 2, 21,000,000 gals.

The two reservoirs had been connected by forming a junction between the two original outlet pipes.

The construction of a service reservoir at Knockjarder had long been found necessary, as the main source of water supply (Loch Finlas) was about seventeen miles distant. The new reservoir would store three days' supply for the burgh and district, and obviate all risk to consumers through accident to the piping feedlock.

The service reservoir was 300 ft. in diameter, and averaged 17 ft. 6 in. deep, and contained, when full, about 7,000,000 gals. It was divided in the centre by a cross-wall 10 ft. high, which enabled the reservoir to be periodically cleaned out, and still retain one day's supply on hand. The floor of the reservoir was of cement concrete, and the walls were of brick in cement, faced with brown glazed bricks.

The water from Loch Finlas was very soft, brown in colour, and contained peaty and suspended matter. Carluise water was moderately hard, derived from springs, and consequently very clear. The mixture of the two waters, subsidence of the peaty suspended matter, and aeration in the service reservoir had a beneficial effect, and rendered the subsequent filtration more rapid and effectual. The water was drawn off through two floating arm pipes, which decant the water 6 in. below the surface, thus ensuring only the purest water being passed on to the filters.

The water was conveyed to the six filters,

or to the two clear-water tanks, by two cast-iron pipes, partly 16 in. and partly 12 in. in diameter. These pipes were controlled by valves at the outlet well, which was also provided with overflow weirs, and a drain 18 in. in diameter.

A new screening apparatus had been fitted up in the pressure-regulating well. The main supply pipes had also been fitted with by-pass pipes so as to allow of this well being emptied for cleaning and repairs.

A new main water supply pipe, about five and a quarter miles in length, partly 15 in. and partly 12 in. in diameter, had also been laid from the filters to Whitellets-road for the supply of the high-level districts of Castle Hill, Craigie, Hawkhill, and Whitellets.

The whole of the extension works had been carried out under ten different contracts, from the author's designs, at a total cost of about 37,000l.

The daily supply delivered to the burgh and water district was about 2,250,000 gals. Besides the supply to the burgh and outlying districts, large quantities of water were supplied to institutions, railways, shipping, public works, estates, etc. The annual revenue was about 9,200l., and the present water-rate within the burgh was 10d. per pound on rental.

Mr. A. H. Campbell (East Ham) proposed a vote of thanks to Mr. Young for his valuable contribution to the Association, which was supported by Mr. R. H. Dorman (Armagh) and others, and carried.

The Corporation entertained the members to luncheon, and the afternoon was devoted to visits to the electricity and destructor works, the "Auld Brig," the infectious diseases hospital, and the Burns' memorial and birthplace.

#### ADMINISTRATION BY MUNICIPAL ENGINEERS.\*

ONE of the prime essentials to the efficient administration of a municipal engineer's department is a sufficient and qualified staff. Unfortunately, some local authorities do not appreciate the importance of the former, but the author is fortunate in serving a corporation who, demanding a high standard of efficiency, recognise that the expenditure required to provide a sufficient staff is money well spent, and is necessary if the work is to be carried out with the greatest economy. It is, however, of the utmost importance that the greatest care be exercised in selecting each member of the staff-from the office boy upwards-and it is the author's practice before making an appointment to insist upon a personal interview, and to make careful inquiries as to the ability and, where possible, the personal character of the prospective assistant. Strict discipline is undoubtedly of the greatest advantage to both employer and employed.

In most of the larger offices a time book is kept, and each member of the staff is required to sign his name on and to enter the time of arrival and departure. It is suggested by some that a system of this kind involves some sort of hardship, but in the author's opinion it is of the greatest value, especially to those who have to sign.

To ensure the highest degree of efficiency, it is essential that, as far as practicable, every member of the staff should have his duties clearly defined. These should be set out in writing, and a copy handed to each man on appointment. By this means individual responsibility is fixed, the work can be fairly divided, and any shirking is soon detected.

In the preceding paragraphs the office staff has been specially referred to, but even greater care should be exercised in the selection of the outdoor staff, as they cannot be kept under such close supervision, nor can their work be checked so effectively. Moreover, in their case any neglect of duty may remain undetected for a considerable time, with serious results.

It is unreasonable to expect the best results from badly-paid employees of any grade, and the author has found by experience that it is the highest economy to pay even more than other people and so get the best.

\* Part of a paper read by Mr. E. J. Elford at the annual meeting of the Incorporated Association of Municipal and County Engineers, held at Norwich, June 22, 23, and 24.



pick of the men than to pay less and have to take what others leave.

The author is no believer in too much red tape, but a certain amount of this useful article is indispensable in any business if it is to be successful. Everything must be done in order, proper records must be kept, necessary rules enforced, and the details of the organisation so arranged that each individual knows his duty thoroughly and does it effectively.

One book which is neglected in some offices, but which the author has found to be of great value when properly kept, is the "call book." . . . A large number of the books used in the author's department are arranged on the "manifold" principle. For instance, each of the clerks of works, foremen, and inspectors is provided with a printed manifold report book, and is required to send to the office a daily report containing such particulars as the number of men employed, the work completed and in hand, and other details. These reports are filed as received, and the book is returned to the office when full or when a contract is completed, thus providing a complete and permanent record of the work. A form from a small special report book, printed on pink paper, is used when reporting any matter of special importance or urgency. This attracts immediate attention.

Each foreman is provided with a "manifold" requisition book, from which requisitions are sent to the office. These are examined and, if approved, countersigned by the engineer.

No orders for goods are issued except upon official order-forms, to which are attached printed invoice-forms, which must be returned by the suppliers as soon as the order is executed. This invoice must be signed by the person receiving the goods, and, after being checked by the chief clerk, it is certified by the engineer before being passed to the borough accountant for submission to committee.

A "general record" book, if properly kept, will be found of great convenience for reference. The book should contain, in concise form, particulars of the various works under the control of or constructed by the engineer's department.

For instance, the size, stroke, revolutions, capacity, cost, age, and other information in regard to various engines, pumps, and other machinery should be given; also the number and character of lamps, street trees, hydrants and standpipes of various kinds; the length of tramway track, size and weight of rails, points, fish-plates, bolts, bonds, and so on.

An important section of a municipal engineer's department is the drawing office, which at Southend is placed under the immediate supervision of the chief engineering assistant. After each council and committee meeting particulars of the drawings, etc., required are entered in a "drawing office instruction book," and it is the duty of the chief engineering assistant to see that these are prepared, and when allocating the work to enter into the book the following particulars, viz.:—(1) Description of work, (2) date of instruction, (3) when required, (4) name of draughtsman, (5) date commenced, (6) date completed.

In most cases when a drawing has been prepared in pencil a linen tracing is taken, and from this are made photo-prints as required, the drawing being finished off afterwards. Every drawing is numbered and indexed as soon as it is commenced, and on completion is filed in the plan-room. The tracings are carefully preserved, so that photo copies can be taken at any time if and as required. Plans deposited in respect of proposed new streets and buildings are filed in linen-lined envelopes. These are 12 in. by 5 in., each containing one set of plans, particulars of which, with the date deposited, date approved, official number, etc., are entered on the front in spaces provided for the purposes. Each of the drawings is also marked with the official number, and stamped with the date received. The numbers run consecutively, and the envelopes are filed in pigeon-holes side by side in that order. Each pigeon-hole has marked below it the first and last number contained therein, so that any plan can be found in a few moments.

In the author's borough the drains of every new house are twice tested—first by water before they are covered in, and again, on the completion of the building, by smoke. The building inspectors are required to enter regularly in a book provided for the purpose a complete record of all visits paid to new buildings, with particulars of the size and inclination of drains, nature of foundation, size of timbers, and other details of importance. As an adjunct to a drawing office a camera is most useful. The author makes it a practice to keep a photographic record of every job of importance. The photographs are taken during the progress of the work at regular intervals, and the negatives are carefully dated and indexed. A large number of photographs are also taken from time to time in connexion with building prosecutions and other litigation, and to assist in meeting objections under the Private Streets Works Act and other statutes.

In most towns of any importance it is now usual to have annual, biennial, or triennial contracts for the supply of stores of various kinds and of team labour. This system is probably the best yet devised, although it is not free from imperfections. It is essential that specifications and contracts should be drawn with the greatest care and exactness, and that all goods should be thoroughly examined and tested on delivery, as, unfortunately, there are a number of firms who make it a practice to tender at cutting prices for the supply of goods of this kind, and who, having secured the contract, endeavour to make it pay them by procuring the acceptance of the most inferior and unreliable materials.

Inferior picks of foreign manufacture, bolts and nuts of low-grade iron that fracture under the slightest pressure, brooms of the "best Bahia bass" (sic) that wear out in a week, castings of maximum weight and minimum quality, and many other articles of the cheap and nasty kind, most of which can only be detected by experienced men after careful examination. The contractor knows that in many cases the materials are required for immediate use, and that, if not too obviously worthless, they are likely to be accepted to avoid the inconvenience and delay which would be occasioned by their rejection. The author has endeavoured to meet the difficulty to some extent by stipulating that the contractor shall repay to the corporation the cost incurred by them in receiving, testing, and returning rejected goods, and that, in addition, the engineer shall be entitled to purchase elsewhere in materials equal to the quality specified in place of the rejected goods, and to charge the extra cost to the contractor. These conditions, if strictly enforced, have a very beneficial effect. Samples of each article to be included in the contract are provided for the inspection of persons tendering, and this saves much subsequent difficulty, though it does not entirely prevent disputes.

One of the most troublesome contracts is that for the supply of team labour. It is hardly practicable to provide a sample horse and driver, and the difficulty is not generally in regard to the carts supplied. The author has found the usual cause as to the rejection of inferior horses quite ineffectual. Assume, for instance, that half a dozen horses are rejected on arrival in the morning. They are sent back to the contractor, whose only loss is, say, from half an hour to an hour on each horse. On the other hand, the work of the corporation, having been previously arranged for the day on the assumption that the six hired horses referred to would be available, is disorganised and thrown into confusion, and portions have to be neglected, because by the time the defective horses have been discovered and sent home it is too late to obtain suitable substitutes elsewhere. In consequence of this difficulty the author has introduced into his specification a clause stipulating that the contractor shall forfeit the sum of 2s. 6d. in respect of every horse rejected. This has had a most satisfactory effect, as only those firms who are able and willing to supply proper horses care to submit tenders. With such a clause consistently enforced, there is no temptation to others to tender, and in consequence the rejections are now practically nil. Of course, the rates charged are somewhat higher, but this extra cost is covered

many times over by the higher quality and greater quantity of the work, for in this respect, as in most others, the best is the cheapest.

The author includes as much work as possible under the piece work or "mileage" part of the contract, as he finds that, where the quantity of the material to be carted can be accurately ascertained, the work is generally done cheaper and more promptly when the contractor is paid a fixed price per unit of measurement or weight according to the distance carted.

One of the author's most important contracts is that for the supply of stoneware drain and sewer pipes. The Southend Corporation purchase direct from the maker all pipes of this kind required for use in their works, and issue them to the contractor where one is employed. The pipes are required to be issued at the corporation depot, where they are thoroughly examined and tested before being accepted. Under this system it is possible to make a more effective examination of the pipes than if they were supplied by the contractor and sent directly on to the works. The cost of delivery to the depot is more than covered by the saving which results from dealing direct with the maker. Tender forms for pipes, ironmongery, tools, cast and wrought iron, and other contracts covering a large number of items contain a fixed schedule of prices, and persons tendering are required to state in their tenders the percentage above or below these schedule prices at which they are prepared to supply. This facilitates comparison and saves considerable trouble in allotting the contracts, and it is less open to the objection that those who are familiar from experience with the quantities generally used have an advantage in tendering. The harness contract is divided into two parts. The first includes the repair of all harness in use in the stables at a fixed price per horse per annum, based upon the average number of horses sleeping in the stables during each quarter. The second portion includes new harness and sundries, such as halters, bandages, brushes, combs, nose bags, composition, and other minor requirements.

Probably many of those present have experienced more or less difficulty in securing the prompt rendering of accounts payable by an authority. The author includes in all his contracts a clause stipulating that accounts shall be delivered by the second day of each month for the goods supplied and work done during the preceding month. Failure to comply with this requirement results in a deduction of 5 per cent. being made.

It has often occurred to the author that something might be done—possibly by this Association—to provide at a reasonable cost analytical reports and expert advice as to the quality of various materials used in corporation work. The author refers more particularly to such materials as engine and other oils, paints, red and white lead, petroleum for lighting and for use in internal combustion engines, disinfectants, varnishes, creosote, and other materials, which only a qualified chemist can properly test. Buyers of such materials are undoubtedly exposed to much fraud, and the matter is certainly of great importance to local authorities. Portland cement, stoneware pipes, and a few others are generally the only materials the testing of which engineers themselves might take, and unless samples of the other materials supplied are submitted to a qualified expert from time to time for examination the authority is likely to suffer serious loss. Anyone who has had much experience in the use of engine oils, for example, knows what an enormous waste of money is the intrinsic value of various samples of this material, and how difficult it is without an analytical report to establish adulteration and fraud. The author is in the habit of obtaining analytical reports in respect of samples of mortar, taken under the building by-laws, and in connexion with any important painting contracts he always specifies that the whole of the white lead shall be delivered on the works at one time, so that he may take samples from the bulk for analysis. This procedure is also adopted in regard to some other materials.

Much has been written and said lately



in regard to the "burden of the rates." As municipal engineers are responsible for a large proportion of the expenditure of the local authorities throughout the country, the amount of these rates must be influenced to an appreciable extent by the efficiency or otherwise of the engineer's administration. The whole subject is undoubtedly of considerable importance, and, although as an association it is not our province to discuss the political or economic aspects of the question, it is both our duty and our interest to do all in our power to prevent wasteful or unnecessary expenditure, and to see that the ratepayers receive full value for their money. To effect this, it is necessary that every item of expenditure should be carefully watched, and the greatest care taken to prevent slackness in any department.

The author finds that the simplest and most effective method of doing this is by means of what he may term "expenditure charts." Enlarged copies of some of the charts—kept in his office—are before the meeting. Practically every branch of expenditure by the author's department is now the subject of a chart of this kind. It will be observed that, upon the chart relating to the removal of house refuse, are plotted curves, representing the variation in the total cost of the work month by month, and the relative cost of manual and team labour, also the number of men and horses engaged; and this is called the "estimate line," which represents the amount allowed in the estimate for the year spread evenly over the whole period; and a "population curve," which indicates, for comparison, the growth of the population. On the "scavenging" chart is plotted the manual labour curve, team curve, and total expenditure curve, as well as the estimate line. On the "steam rolling" chart is plotted the number of days worked and the cost of fuel, etc., and on the "pumping station" chart the curves represent the gallons pumped, gas consumed, and rainfall.

A glance at any one of these charts is sufficient to show how the cost compares with the estimate, and to enable the engineer to detect and investigate immediately any appreciable variation in the former. The reason for such variation is noted on the chart, so that, should it be found at the end of the year that the estimate has been exceeded, an explanation can at once be given. The chart is also of value in connexion with the preparation of estimates for the ensuing year.

In regard to expenditure on new works, carried out by direct labour, a prime cost book is kept. This is not only of great help in connexion with the preparation of estimates, but it also enables the engineer to follow closely the cost of various jobs during their progress. The author has found it convenient to have two or three sets of the general conditions, specification, and quantities, relating to the various contracts in hand, bound up in cheap covers, as soon as they are received from the printers. After the acceptance of a tender the copies of the quantities are priced out, and the whole of the documents relating to any contract are as available for reference at any time. The author also has several sets of the annual estimates for stores and cartage bound in a similar manner, and priced out as soon as the contracts are let. This is found a great convenience in checking accounts, and for reference generally.

The efficient scavenging of a town is now recognised as having an important influence upon the health of the inhabitants. In carrying out this work, it is well to divide the town into districts, and to appoint to each a sufficient number of scavengers to work under the direction of a district foreman. Where possible, each district foreman should be provided with a small office or room, in which his men can start, and in which his tools, books, and other accessories can be kept. A drawing of the district office used for this purpose at Southend is before the meeting. It will be observed that it is about 7 ft by 5 ft., and 6 ft. 6 in. high, with a desk at one end, and a cupboard to contain the foreman's books. It is convenient, economical, and satisfactory to make each district foreman responsible for reporting such matters as the following—viz., damage to carriage-ways,

footpaths, street trees, or tree-guards, overhanging trees, obstructions, defective gulleys, and other matters of a like character.

In towns where a large number of street trees have been planted, it is advisable to keep scavengers supplied with a small quantity of yarn, and to instruct them to tie up any trees that may have become unsecured. By this means valuable trees may often be saved. Another matter, which the author finds it of advantage to make the district foreman responsible for, is that of openings in public roads and footpaths. Probably most of those present have had more or less trouble in dealing with this matter, and have suffered both in time and temper by having roads disturbed immediately after they have been nicely made up and repaired.

In the author's borough, every person who desires to open a public road or path is required to pay a deposit, and to sign a printed form containing an undertaking to execute the work expeditiously and with care, and to be responsible for the lighting, guarding, and condition of the trench, and for the restoration thereof, and for any accident or damage caused thereby.

Deposits in respect of carriage-way openings are returned after the expiration of six months, if the road surface has been properly restored and maintained in a satisfactory condition during that period. The deposits in respect of openings in footpaths are retained by the corporation, who insist upon executing all repairing work by their own staff.

Before making up a road, or executing any extensive repairs, it is the author's practice to give notice of his intention to the gas and water companies, and others having mains, etc., in the road, with the request that they will carry out any alterations or extensions of their plant they may have in contemplation, before the road works are commenced. This often results in a saving both to the ratepayers and to the company affected.

Each of the district foremen is supplied every morning with a list of the openings sanctioned in his district on the previous day, and it is his duty to report immediately any unauthorised openings or dangerous trenches.

In many towns considerable difficulty is experienced in disposing of road sweepings, and frequently they have to be conveyed long distances. Street orderly bins are in common use as temporary receptacles for road sweepings, which are collected at intervals by ordinary carts. It has always appeared to the author that these bins are open to grave objection. They are obstructive, unsightly, and insanitary. They are not economical, because their contents have to be handled two or three times; they cannot be kept thoroughly clean, and are, in consequence, often most offensive. These objections led the author to devise a system for the collection and removal of road sweepings. A short description of it may be of some interest to the members of this association, as in practical work at Southend it has been found to give very satisfactory results. For the collection of the sweepings, there are made, in the corporation workshops, specially-designed hand-carts.

The subject of street watering has been much discussed lately, as a result of the introduction of various preparations alleged to possess the quality of preventing dust. The author must admit that his own experience has not very favourably impressed him in regard to the efficacy of these dust layers. By their use the dust is certainly kept down longer than by the use of water alone, but there appears to be a tendency to exaggerate their capabilities in this direction, and, in the author's opinion, the cost must be greater than usually stated.

Apart, however, from any question of expense, there is, in the author's opinion, much to be said in favour of the use of water alone as a dust-laying agent. In a thoroughfare used to any appreciable extent by vehicular traffic, there must be, even with the most impervious surface, a more or less constant deposit of offensive matter, which is quickly ground to fine particles by the passage of the traffic, and which, in dry weather, becomes dust of a highly dangerous and unpleasant kind, unless the road is kept in a moist condition. This can only be done by constant

watering, which not only prevents dust, but also cleanses the road surface. In addition to this, the water cools the air and increases its humidity—two effects which are both pleasant and healthful. This, of course, is of special importance in residential districts.

In regard to road maintenance, the author has found that the highest efficiency and greatest economy are attained by making the district foremen personally responsible for the condition of the roads in their respective districts. It should be the duty of the district foreman to attend promptly to any patching and repairs, and he should be provided for the purpose with sufficient suitable material at convenient positions in his district. For macadam roads the patching material should be small, and the work should be carefully, skilfully, and regularly executed. If this is done the life of the roads will be very much extended. They will wear more evenly, the concussion resulting from the passage of traffic over an excessively rough surface will be avoided, and water will run off more quickly.

The labour question is one of great importance to local authorities, especially having regard to the tendency to increase the proportion of work executed by direct labour, in consequence of which a larger number of towns employ a considerable staff of workmen of various grades, the wages bill frequently reaching 10,000*l.* to 20,000*l.*, or even more, per annum. The municipal engineer has, therefore, in addition to his other duties, to manage and direct an extensive and important business undertaking. Success in this direction can only be attained by the efficient organisation and strict supervision of labour, and by the possession of thorough experience of the value and character of materials and plant. It is somewhat difficult to deal generally with the question of organisation, as each town must be considered, to a great extent, on its own merits, in view of its special circumstances and local conditions. Perhaps the most important principle of general application is that of individual responsibility. As far as possible each man's duties should be clearly defined, and he should be given as much work as he can efficiently perform—but no more. It is generally found that the best results are obtained by placing one man in charge—under the engineer—of the whole of the outdoor work. Under this one man are district and depot foremen and inspectors in charge of various sections of work, and they, in their turn, are assisted by sub-foremen and gangers. The appointment of a supreme head promotes co-ordination, prevents friction, and saves waste of labour and materials. The author is aware that in some towns this principle is not followed. The work is divided into a number of, more or less, separate and independent departments. For instance, one man is in charge of road work, another of scavenging, another of the collection of house refuse, and so on. Such an arrangement must, in the author's opinion, militate against efficiency, and result in more or less waste. It means, probably, that carts are often loaded one way when they might be loaded in both directions; that one department will, at times, be paying for the removal and disposal of material which would be of value to another department; and that on occasions there is, in one department, a temporary surplus and consequent waste of labour which might have been profitably employed elsewhere.

#### THE LATE MR. WATERHOUSE.

THE funeral of the late Mr. Alfred Waterhouse, R.A., took place on Monday in the churchyard of Yattendon, some six miles from Pangbourne. Unfortunately, heavy rainstorms prevailed during the day, but, in spite of the weather, a numerous body of relatives and friends assembled from all parts at the graveside. The coffin was borne on a hand bier by the estate workmen from Yattendon Court. Among the members of the family present were Mr. and Mrs. Paul Waterhouse, Miss Waterhouse, Mr. Amyas Waterhouse, Mr. Michael Waterhouse, and Mr. and Mrs. Edwin Waterhouse. Others present included Sir Edward and Lady Fry, Mr. G. Redmayne, Mr. Thomas Hodgkin and Miss Hodgkin, Mr. Elist Hodgkin, Mr. Howard Hodgkin and Mrs. Hodgkin, Miss Hodgkin,



Miss A. M. Hodgkin, Mr. Wilson Crewdson, Mr. Crewdson Waterhouse, Mr. Leonard Redmayne, Mr. Paul Bevan, Mr. Wilfred Hardcastle, the Rev. J. Forrest, past and present members of Mr. Waterhouse's architectural staff, Professor Elsey Smith and Mr. Driver (representing the Architectural Association), Mr. Alexander Graham, Mr. G. Northover, and Mr. J. C. Tanner (representing the Royal Institute of British Architects), Mr. Thomas W. Cutler (representing the Royal Sanitary Institute), Rev. Canon Beeching and Rev. H. Bowden Smith (former Rectors of Yattendon), Sir W. Cameron Gull and the Hon. Lady Gull, Mr. Acland, K.C. (Recorder of Oxford), and Mr. George William Palmer.

To the list of works given in the obituary notice in our columns of August 26 should be added No. 18, Lincoln's-inn-fields, north side, the offices of the Equity and Law Life Assurance Company. The elevation of stone is an example of his earlier work in London.

#### ARCHITECTURAL SOCIETIES.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—The exhibition of drawings and photographs, illustrating researches in the higher refinements in the architecture of mediaeval buildings, will be held in the National Portrait Gallery, Queen-street. It will be opened on Wednesday, September 6, at four o'clock, by the Right Hon. the Earl of Wemyss and March.

#### Correspondence.

##### SECRET COMMISSIONS.

Sir,—We are not a little surprised at Mr. Quennell's letter in your last issue.

That such an attempted dishonest transaction as he refers to may have occurred we do not question, but we do emphatically affirm that, if the instructions were "that this 15 per cent. was not to figure on the invoice, as in due course the same would come before the surveyors," and that this is the general method," such instructions would certainly not be acted on by any respectable quantity surveyors in settling up the variations.

After a long experience we can say that we have never known of such an attempt being made, and we regard the statement that the "general method" of surveyors in making themselves parties to swindling transactions of this sort is a libel on the profession. **YOUNG & BROWN.**

#### 'OLD BUILDING, BROAD-STREET.'

Sir,—With reference to Mr. J. Stannah's letter to you in last week's issue of your paper, inquiring as to the period of the "old" work laid bare through the demolition of the adjoining buildings, I shall be pleased to give Mr. Stannah access to the site to enable him to examine the work to which he refers. I am, however, afraid that the disappointment will be in store for him, for the stone walls to which he refers are only bricks painted white, and the windows only stucco decorations on the wall, and, in fact, the whole "very quaint bit of architecture" is only a decorative device of no very "ancient" date to hide the plain brickwork of the adjoining church. **PAUL HOFFMANN.**

Sir,—Some time ago I was asked by the Rev. Montague Fowler, the Rector of All Hallows-on-the-Wall, to examine what Mr. Stannah supposes to be ancient architecture.

I found it to be a whimsical romance in stock bricks and plaster.

I understand it was "stock up" by a dentist, who had chambers in the buildings now being pulled down, and who wished to make his back yard "pretty." So he plastered over the circular vestry, which Dance had built on the bastion of London Wall, and ornamented it, and some sheds in his yard, in the Gothic manner. **A. W. VENN.**

Sir,—The "quaint bit of architecture" mentioned by Mr. J. Stannah in the letter you printed on August 26 is of brick, and stands against the north wall of All Hallows Church, which is in alignment with a piece of the old City wall. It is not an integral part of the church, nor is it the vestry. The adjoining vestry, on the west side, projects much further from the church, and, it is supposed, takes its rounded shape from being raised upon a bastion of the City wall. The fragment comprises a curved wall, only one brick in thickness, which abuts against a long and thicker brick wall built out at a right angle from the north wall of the church. At the return of the long wall, remoter from the church, is a fireplace. The long wall, the curved wall, and another modern curved wall (for the stairs from the vestry to the pulpit) extending from the church wall, enclose a small space, which is entered, through a door in the curved wall, from the cleared ground which was formerly the town ditch, since traversed by New Broad-street. The walling of the fragment is white-washed; courses and festoons of large pebbles or unchipped flints are fantastically embedded in its face; and it is pierced—with no regard to symmetry of arrangement—with several small pointed windows, blocked openings, and, at the upper stage, a slightly convex two-light pointed window, unglazed. At the sill of each of the two lancet-shaped openings is a projection in the form of a half-bowl or stoop; a similar pointed window is inserted in the brick wall of

the vestry. Of the houses just pulled down on the south side of New Broad-street, two or three abutted, it is evident, against the City wall and the church, but a space intervened between the other houses and the vestry and the fragment in question. **D.M.**

#### THE ARCHITECTURAL ASSOCIATION PHOTOGRAPHIC COMPETITION.

Sir,—I wish to bring to your notice the photographic competition is held annually by the Architectural Association Camera and Cyclist Club, and is open to all members of the architectural profession.

The Council of the Association offer a prize of three guineas for the best set of prints submitted. The main conditions are as follows:—

(1) The competition is confined to sets of photographs adapted for the purposes of architectural study.

(2) Each set should consist of not more than twelve prints, and should illustrate one subject or class of subjects.

(3) Copies of the winning prints by a permanent process must be deposited with the Architectural Association before the prize is presented to the winner.

(4) Photographs must be sent to the Secretary of the Architectural Association Camera and Cyclist Club at 18, Tufton-street, Westminster, not later than October 1.

(5) The judging will be first of all by the Committee of the Camera and Cyclist Club as in the prints having reached a fair standard of technical excellence, and will then be finally adjudged by an authority on architecture (not a photographer) appointed by the President of the Architectural Association.

The judge appointed by the President this year is Mr. Arthur Stratton. I shall be pleased to send further particulars to intending competitors. **FRANCIS R. JAY.**

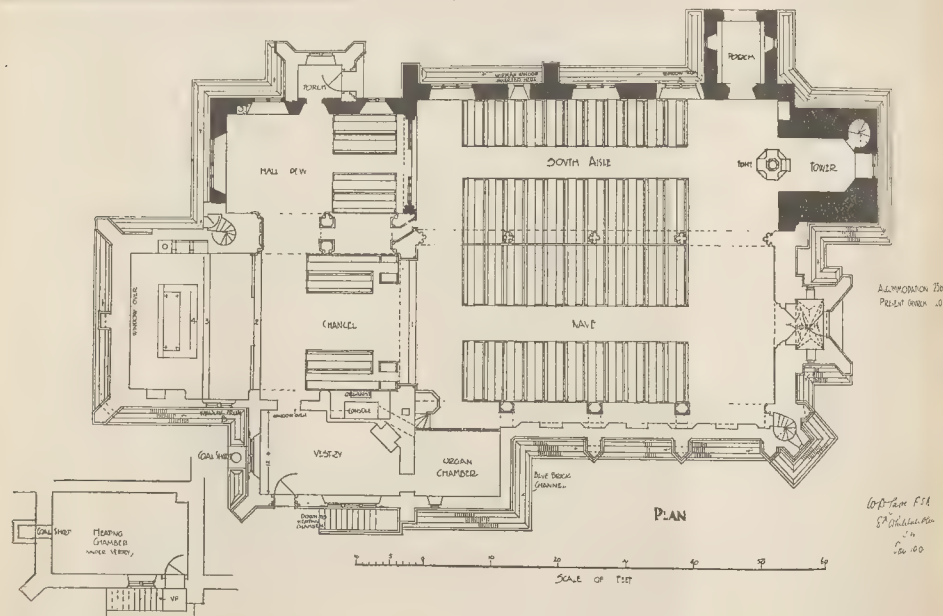
Hon. Sec. A. A. Camera and Cyclist (L.).

#### Illustrations.

##### HULL TOWN HALL AND LAW COURTS.



WING to the demand of the authorities for four law courts on the ground floor, instead of three on the first, the whole of the building has had to be remodelled, thus enabling the architects (Messrs. Russell & Cooper) the opportunity of designing this and the municipal portion as one composition, the centre of which is treated with a deeply-recessed arch over entrance, with sculpture symbolical of the interests of the city.



St. Andrew and St. Patrick's Church, Elveden: Plan.

The exterior is in Ancaster stone; the columns, which are entirely detached, are of Darley Dale.

The Law Courts are now being built, and the remainder will follow at their completion. Messrs. Quibell, Son, & Greenwood, of Hull, are the builders, and Mr. J. Fraser the clerk of works. The drawing was exhibited in this year's R.A.

#### ST. ANDREW'S, ELVEDEN.

The Church of St. Andrew, Elveden, went through a process of XIXth century restoration some thirty-five years ago, which sadly effected its antiquarian interest.

The growth of the parish has involved an extension of the accommodation, which has been undertaken by Lord Iveagh. The old nave will become an aisle, and the chancel a side chapel, the interesting early XIVth century features of the old chancel being maintained.

The work is being executed by Messrs. Crouch & Gaymer, of North Walsham, from the design of Mr. W. D. Caröe.

#### Bristol CENTRAL REFERENCE LIBRARY.

The principal feature of this building is the large reference-room in the first floor extending along the whole front to Deanery-road.

The Bristol-room, for the reception of old MSS., etc., adjoins the reference-room, and will be fitted with the old oak fittings (including a carved fireplace by Grinling Gibbons) from the old King-street library.

The librarian's offices and workrooms are on this floor, and face towards Lower College-green. On the ground floor are the news and magazine rooms, and the lending department.

The entrance-hall has a vaulted ceiling, covered with sky-blue mosaic. The walls and piers are lined with marbles, Greek cipolino being used for the dado, Irish green for the dado, and grande antique for skirting. The floors are covered with slabs of Piasenza marble. The basement contains newspaper-room, specification of patents room, book store, etc.

In designing the building, an attempt was made to mass the new work harmoniously with the old abbey gateway adjoining.

The three large figure panels over the central bays are the work of Mr. Charles Flower, and represent Chaucer (with his Canterbury Pilgrims), Bede, and Alfred.

The carved enrichments and shields are by Mr. W. Ammonier. The heraldic glazing to the hall, staircase, reference-room, and newspaper-room is by Mr. Benjamin Nelson.

The furniture and fittings are specially designed by the architect.

Messrs. Willcocks & Co., of Wolverhampton, are the builders. H. PERCY ADAMS.

#### CHULMLEIGH CHURCH, DEVON.

A window to the late Rector of Chulmleigh was put up in 1903, was designed and executed by Miss C. C. Flower.

Central light—St. Martin of Tours dividing his cloak with the beggar, and in the predella below the parable of the Good Samaritan.

Side light—St. Boniface of Crediton representing the Southern Church. In his hand he holds an axe, emblematic of the burning down, single-handed, of a huge sacred oak of Thor, whereby he converted a pagan multitude.

Side light—St. Cuthbert of Lindisfarne representing the Northern Church; and below, the parable of the Sower, typifying the preacher.

The canopy is silvery in effect, being composed of a variety of glasses, very light in tone, so mingled as to be neither predominantly green, nor grey—an attempt to produce in tone what passes for white in XIVth century glass. Glass of that period was fully as much to the pearly quality of modern as to the purity of its brilliant tints.

St. Martin is in steel and leather, St. Boniface's cope is in green, running to orange in places. St. Cuthbert's cope is green, with a border of red. The figure panels containing scraps of red, green, and blue.

The background behind the

figures is purple, and behind the canopies blue. The window is heavily leaded, most of the glass being in very small pieces. This produces a very mosaic-like effect.

With the exception of the cutting, leading, and firing, the window was carried out by the designer. She superintends the cutting of the glass herself, chooses the actual pieces, and makes her own "outlines." She also does all the painting on the glass herself.

The illustration of the Gateshead window should have been given on December 17, 1904, when we published a double-page plate of the east window.

#### BOOKS RECEIVED.

LEATHER FOR LIBRARIES. By E. W. Hulme, J. G. Parker, A. Seymour-Jones, C. Davenport, and F. G. Williams. (London: The Library Supply Company, 181, Queen Victoria-street, E.C. 1s. 6d. net.)

THE BRASSWORKERS OF BERLIN AND BIRMINGHAM: A COMPARISON. Joint Report of R. H. Best, W. J. Davis, and C. Perks. (London: P. S. King & Son, Westminster. 1s. net.)

BRITISH PROGRESS IN PUMPS AND PUMP-ING ENGINES. By P. R. Björling (National Engineering and Trade Lectures, Vol. II.,



Window, Chulmleigh Church, Devon.



Edited by Ben H. Morgan. (London: Archibald Constable & Co., Ltd., James-street, Haymarket. 6s. net.)

BRITISH PROGRESS IN GAS WORKS' PLANT AND MACHINERY. By C. E. Brackenbury, A.M.Inst.C.E. (National Engineering and Trade Lectures, Edited by Ben H. Morgan, Vol. III.). (London: Archibald Constable & Co., Ltd., James-street, Haymarket. 6s. net.)

ORGAN CASE, ST. PAUL'S SCHOOL.—In reference to the organ case illustrated in our last issue, the name of the firm who executed the work is inaccurately stated. The work was carried out by James Garvie & Sons, of Aberdeen, and Little Britain, E.C.

## The Student's Column.

STEAM BOILERS AND PIPES.—IX.  
BOILER SETTING (continued).

**H**IS week we deal with the setting of various forms of cylindrical boilers, which are treated in a manner somewhat resembling that adopted for the Cornish and Lancashire boilers.

Special varieties of Cornish and Lancashire boilers are seated in very much the same way as ordinary types, but with such modifications in matters of detail as may be demanded by distinctive features of design.

The setting for the Cornish multitubular boiler, illustrated in Fig. 5, p. 18, and the Lancashire multitubular boiler, mentioned on the same page, ought to be arranged so that the furnace gases pass through the large and small tubes in succession, proceeding next beneath the bottom of the boiler, and finally along each side to the main flue, and illustrated in Articles VI. to VIII.

A less expensive, but, at the same time, far less efficient, method is to allow the products of combustion to pass through the furnace and fire tubes, and from the latter direct into the main flue.

This arrangement is illustrated in Fig. 40, where it will be seen that the boiler is supported on seating blocks incorporated in the dwarf cross-walls, so that the bottom of the shell is very little above floor level, and that the downtake flue leads to the main flue, which in this case, is shown below the same level. A shallow blow-off pit is the only other detail requiring brickwork, and as no bottom or side flues are required the body of the boiler can be left without other covering than an adequate lagging of non-conducting material. If preferred, the boiler could be supported entirely by brickwork, or the brick walls between the seating blocks might be omitted.

The cross-walls need not be more than 9 in. thick for small boilers, and 14 in. thick for the larger sizes. It is very important that the bearing surface should be reduced as far as possible by using bricks of semi-circular cross-section at the top of each cross-wall. These walls may be connected longitudinally by brick paving, or, better still, by a finished floor surface over the concrete foundation slab.

The construction and dimensions of the blow-off pit, the downtake flue, and the main flue will be proportionate to the size of the boiler, and generally in accordance with the particulars given in preceding articles.

For temporary installations, a still more simple and inexpensive mode of setting can be adopted by dispensing with brickwork altogether, as represented in Fig. 41, where the boiler is simply placed on cast-iron cradles. For the conveyance of furnace gases from the fire tubes, a steel plate back flue, or smoke-box, is riveted to the boiler, and at the top of this flue is a steel plate smoke pipe. The back flue should be lined with firebricks or blocks to protect it from flames. The supporting cradles are made of sufficient height to obviate the necessity for a blow-off pit.

If this mode of setting be adopted, care should be taken to provide adequate support for the cradles, as well as a perfectly dry bottom beneath the boiler, which, as in the preceding case, must be properly lagged with non-conducting material.

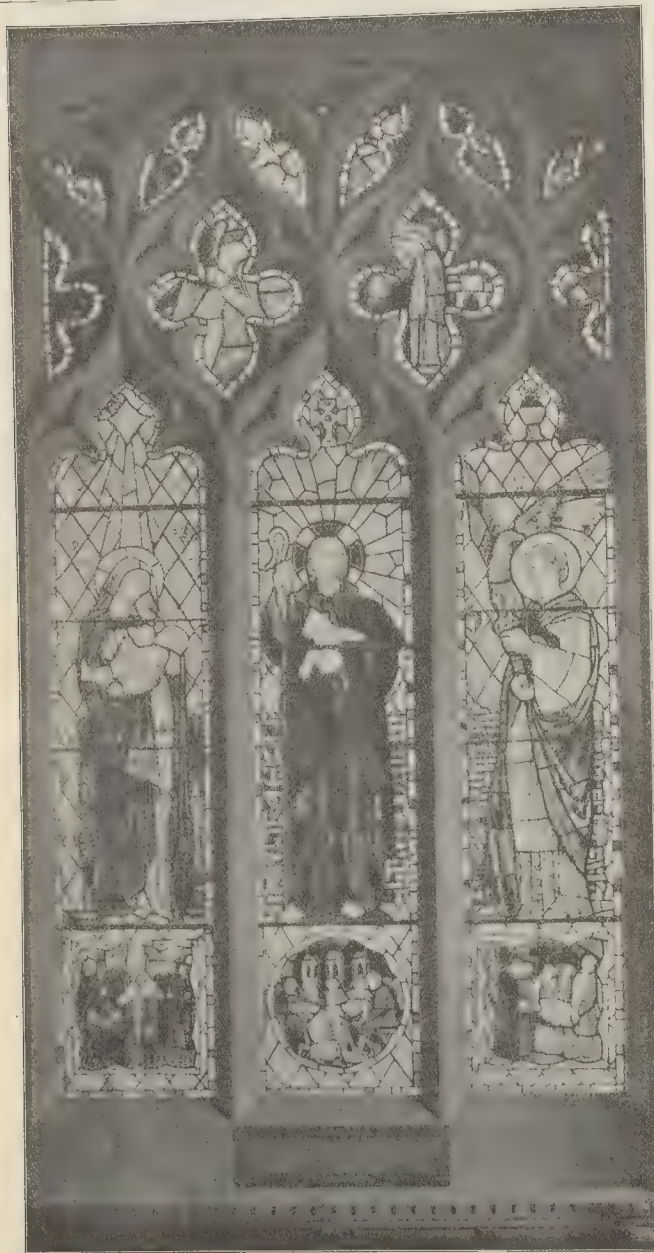
We now come to a different type of boiler combining the distinctive characteristics of Lancashire and multitubular boilers, in the manner illustrated in Fig. 6, p. 18. Three distinct methods of setting can be adopted for the boiler in question.

(1) The furnace gases may be caused to proceed through the furnace tube, or tubes, to the combustion chamber at the back, thence through the return tubes to the front smoke-box, and along side flues to the main flue.

(2) The furnace gases may proceed through the furnace tube, or tubes, and the return tubes to the front smoke-box, as before, and then divided so that part of the gases pass below the boiler and part along the sides, both streams meeting near the main flue.

(3) The boiler can be installed without brickwork, being provided with a steel plate combustion chamber at the back, lined with firebrick, whence the gases pass through the return tubes to the front smoke-box, and thence into a steel plate chimney at the front of the boiler.

Fig. 42 illustrates the first mode of treatment. The boiler is supported on cast-iron saddles, between which is a low masonry wall for the purpose of separating the side flues. The combustion chamber at the back end corresponds, so far as dimensions and construction are concerned, with the downtake flue of an ordinary Lancashire or Cornish boiler. The side walls of the brick work are built up from the concrete foundation slab, which we assume to have been provided as a preliminary essential. It will be observed that these walls are carried somewhat



Window, All Saints' Chapel, St. Chad's, Gateshead. Designed by Miss C. C. Townshend. (See page 255.)

higher than in the case of an ordinary Lancashire boiler, this being necessitated by the higher level of the internal heating surface represented by the return tubes. No special features occur in the constructive details of these flues, which are floored, lined, and covered in the manner fully described in preceding articles.

On reference to Fig. 42, it will be noticed that the side flues are sloped down at either side so as to provide conveniently for access to the main flue.

The front cross-wall, the recess wall for blow-off connection, and the blow-off pit are built and proportioned in general accordance with the particulars previously stated.

Fig. 43 illustrates the second method of setting this class of boiler, which is here shown supported on seating blocks fixed at the top of the walls forming a bottom flue.

The combustion chamber is built of brick with flue covers, substantially as described in connection with Cornish and Lancashire boilers. The height of this chamber is governed by the level of the uppermost return tubes and its width by the measurements from side to side of the furnace and return tubes.

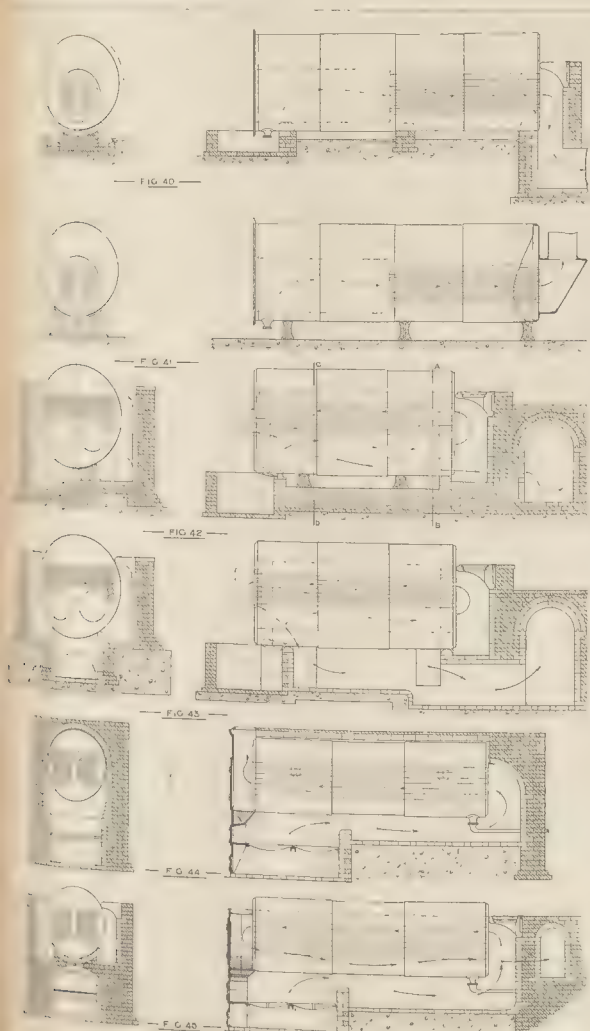
From the back of the front smoke-box, the products of combustion pass to the side and bottom flues. Instead of affording a passage directly to the main flue, as in the setting of an ordinary Lancashire or Cornish boiler,

TABLE XII.—APPROXIMATE DIMENSIONS OF BRICK FURNACES AND FLUES FOR MULTITUBULAR BOILERS (WITHOUT SIDE FLUES).

Diameter of Boiler Shell.	Furnace.		Ashpit. Height at Front Below Grate.	Back Flue. Front to Back.	Smokebox. Front to Back.
	Width at Top.	Width at Bottom.	Height. Grate to Bottom of Boiler.		
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
8 0	8 4	8 0	1 6	1 9	1 0
8 6	8 10	8 6	1 9	2 0	1 0
4 0	4 4	4 0	1 9	2 0	1 0
4 6	4 10	4 6	2 0	2 3	1 3
5 0	5 4	5 0	2 0	2 3	1 3
5 6	5 10	5 6	2 3	2 6	1 6
6 0	6 4	6 0	2 3	2 6	1 6

TABLE XIII.—APPROXIMATE DIMENSIONS OF BRICK FURNACES AND FLUES FOR MULTITUBULAR BOILERS (WITH SIDE FLUES).

Diameter of Boiler Shell.	Furnace.		Back Flue.		Side Flues. Width.	Smokebox. Front to Back.
	Width.	Height.	Width at Top.	Front to Back.		
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	in.	ft. in.
8 0	2 2	1 6	2 3	1 6	6	1 3
8 6	2 6	1 9	2 9	1 6	6	1 3
4 0	2 10	1 9	3 3	1 6	6	1 3
4 6	3 3	2 0	3 9	1 9	9	1 6
5 0	3 7	2 0	4 3	1 9	9	1 6
5 6	3 11	2 3	4 9	1 9	9	1 9
6 0	4 4	2 3	5 3	1 9	9	1 9



Illustrations to Student's Column.

the side flues are stopped at the back end, and each of them has an opening into the hinder part of the bottom flue. The area of the side openings should not be more than one-third that of the main openings into the front end of the bottom flue.

The third method of fixing the type of boiler now under consideration does not require detailed description, as the combustion chamber behind and the chimney in front are supplied as parts of the boiler. Beyond the building of a fireclay lining in the combustion chamber, no brickwork is required.

Marine boilers of the return tube dry-back type are very much akin to boilers of the kind we have just dealt with, and when applied to land service they can be set in the same manner.

We now come to the externally-fired multitubular boiler (see Fig. 4, p. 18). This is a form of steam generator which affords wide scope for the ingenuity of the expert in brickwork.

When the boiler is supplied with a complete iron front, in which are fitted the smoke-box doors, the fire door, and the ashpit door, some limit is imposed on the proportions of the furnace and flues, but even then very considerable variations are possible in the design and construction of the brickwork.

Fig. 44 illustrates a method of setting which has been largely followed in this country and in the United States. The boiler is supported by lugs riveted to the shell, two lugs on each side, resting upon the walls. Care must be taken to build the lugs in so that they can move with the expansion and contraction of the boiler, and an inch or two of clearance must be allowed between the inner surface of the side walls and the periphery of the boiler. If these precautions be overlooked, the brickwork will certainly be cracked.

A good plan is to anchor the lugs at one side of the boiler, and to place steel rollers beneath the corresponding lugs at the other side, the rollers acting upon a steel plate built into the wall.

Sometimes the lugs are carried on cast-iron columns embedded in the walls, so that any of the brickwork above the fire-grates can be removed if occasion should demand. Another alternative mode of support is to suspend the boiler by tie-rods built into the upper part of the brickwork and passing around the lugs.

The boiler is completely enclosed by brickwork, which, as shown in the drawing, ought to be kept from actual contact with the plates, as far as possible. In building the arch over the top of the boiler, a good plan is to lay strips of wood of the required thickness upon the boiler and to remove them as the work proceeds.

The arch covering the back flue would be better if turned from side to side, as illustrated in Fig. 26, p. 211, or replaced by fireclay arch blocks, as in Figs. 27 to 29 on the same page.



The whole of the brickwork surrounding the boiler is usually stayed by cast-iron braces connected by tie-bars passing through the masonry from end to end and from side to side.

A preferable system of setting is represented in Fig. 45. In this, the boiler is supported on fireclay seating blocks carried by the side walls of the furnace. The hot gases pass beneath the boiler, through the fire tubes to the front smoke-box, and thence to the side flues, from which they are delivered into a main flue at the back. This method of setting is preferable for various reasons. Better use is made of the heat given out by the fuel, the boiler is free to expand without imposing strains upon the brickwork, and the top is left open save for the usual covering of non-conducting material.

One somewhat troublesome detail in connection with multitubular boilers, is the division between the furnace and the smoke-box. If formed by a steel plate, as is sometimes the case, it soon burns away, and if built in the form of an inverted arch, the bricks are apt to fall out, or to be damaged by the firing tools. Various types of cast-iron arches have been employed for the purpose of supporting the brickwork, but these are apt to bulge with the heat, and, in practice, satisfactory results will be given by using an inverted arch, forming the bottom of the smoke-box with an arch below forming the furnace entrance, as shown in Fig. 45.

The fire-bridge would be better if built as an inverted arch, serving to key the bricks in, and to render the bridge less liable to damage by the firing tools.

The combustion chamber behind the bridge is built in various ways. Some boiler setters leave it as a deep pit, others make it with a flat floor at about the same level as the fire-bars, and others, again, slope it downwards from the bridge to the back wall. In the ordinary way, however, nothing is to be gained by deviating from the form shown in Fig. 45.

Tables XII. and XIII. contain average dimensions of brick furnaces and flues for multitubular boilers, the measurements being, of course, subject to such modifications as may best suit the requirements of individual cases.

#### OBITUARY.

MR. WEIR.—Mr. James Weir, of No. 17, Victoria-street, W.S.W., died, aged sixty years, on August 27, at West Cross, Clapham Common. Mr. Weir was elected an Associate of the Royal Institute of British Architects in 1874, and a Fellow in 1882. He was the architect of Hindestreet Chapel, Marylebone, 1885-6; the new Surrey Chapel and schools in Blackfriars-road, built on the site of the Turkish baths and two houses, 1887-8; for the Primitive Methodist congregation of the old Surrey Chapel (Rowland Hall) close by, at a cost of nearly 12,000l., the freehold included; the Wesleyan Church, Hayward's Heath, and the chapel at Burgess Hill, Sussex, 1900; the alteration and enlargement of the premises, Nos. 202-6, Cambesall-road, of the Davis Gas Stove Company, at an outlay of nearly 4,000l.; and he re-built the Wesleyan church in Norman-road, St. Leonard's-on-Sea, at a cost for the fabric of over 4,500l., after its destruction by fire five years ago. He also prepared the plans and designs of a large two-storied building, adjoining the Wesleyan chapel at Leatherhead, containing classrooms, meeting-rooms, vestry, etc., on the lower floor, and the Wesley Hall on the floor above, with accommodation for 550 people in all; the Wesleyan church, on the summit of the Drive, Sevenoaks, cruciform on plan, with a tower and spire rising to a total height of 80 ft., after the Early English style freely treated, at a total cost of 7,000l., and having a capacity for nearly 600 persons. In January last Mr. Weir took into his practice as partners his then manager, Mr. Frederick Burrows, and his nephew, Mr. William May Weir, under the style of Messrs. Weir, Burrows, & Weir.

MR. MAWSON.—The death at Nasik is announced of Mr. Ernest Oscar Mawson, executive engineer in the Kathiawar Agency, where he constructed extensive irrigation and other preventive works at the time of the famine. Mr. Mawson invented an automatic gate for regulating the escape of stored water in the event of floods, and had published, in association with Mr. Calthrop, a text-book upon "Pioneer Irrigation and Light Railways." He proceeded from Cooper's Hill College in 1888 to India, and rendered distinguished service in the Western Provinces; when Under-Secretary to the Bombay Government he was selected, five years ago, to go to Kathiawar, whence he returned to England under two years' furlough, invalidated by hard work under severe climatic conditions.

#### GENERAL BUILDING NEWS.

ALL SAINTS', GREAT BERKHAMSTED.—The erection of the first portion of this church has now been commenced; it will consist of four bays of the nave, and two similar bays and apse forming the chancel—both nave and chancel being of the same width, viz., 33 ft. between the piers of arcades—with narrow north and south piers of arcades. It is proposed to build the church wholly of local bricks with a roof of Bedfordshire tiles. The building when completed will have a north transept containing vestries, an organ gallery, a chapel for daily services on the south side, and a western tower, with short, lead-covered spire. The whole of the congregation will be seated in the nave, the aisles being used as passages only. The church will be lighted by double lancet windows in each bay of the clerestory. The church is being built from the designs of Messrs. C. H. Rew and N. A. Rew, architects, of Great Berkhamsted, by the builders, Messrs. J. Honour & Son, of Tring.

ROMAN CATHOLIC CHURCH, ST. HELENS.—At Thatch Heath, St. Helens, on the 21st ult., the foundation-stone was laid of the new church of St. Augustine. The new church is 110 ft. long and 39 ft. wide, and will accommodate about 450 persons. It will be built in the Early English Gothic style, with east end sanctuary and with side chapels, and will be of red stone with extended porticoes. Messrs. Thomas Welsby & Sons are the builders, and Messrs. Curran, of Warrington, the architects. The total cost is estimated at about 2,600l.

CATHOLIC CHURCH, GARSTON.—A new Catholic church was opened on the 24th ult. in Garston by Dr. Whiteside. The building has been erected at a cost of a little over 8,000l., and it has been dedicated to St. Francis of Assisi. The church is situated on a south-west corner site, on the east side of East-street. It consists of a nave and chancel 102 ft. long and 27 ft. 3 in. wide, transepts 18 ft. across, aisles 11 ft. 6 in. wide, three chapels, priests' and boys' sacristies, confessionals, and an octagonal baptistry at the west end, the epistle aisle, and it accommodates 500 people. The style is Gothic, and it is built of red stone, with roofs covered with brindle tiles, and it is lighted by electricity. Mr. D. Powell, of Liverpool, was the architect.

SCALEBY CHURCH.—The Bishop of Carlisle recently re-opened Scaleby Church, the work of restoration which was begun some time ago having been completed. That work, for which Mr. Martindale was the architect and Mr. Sharp, Carlisle, was the contractor, included the re-roofing of the church, the restoration of the tower, the re-hanging of the bells, and the repainting of the woodwork of the interior and the re-colouring of the walls.

RE-OPENING OF LANDYD CHURCH, PEMBREY, CARMARTHENSHIRE.—Llandydy Chapel-of-Ease, in the parish of Pembrey, Carmarthenshire, has just been re-opened after restoration and extension. The old building has been restored, and the nave has been extended and a new vestry and organ-chamber built, so that now it has seating for 200 worshippers. The architect was Mr. W. Griffiths, of Llanelly, and the contractor Mr. Phil Phillips, of Trimsaran.

FIRE STATION, BRADFORD.—On the 22nd ult. the new Bradford branch fire station at Odsal was opened. The station is situated at the junction of roads leading to Bradford, Halifax, Cleckheaton, and Wibsey. It has been designed by Mr. F. E. Edwards (City Architect), and in the principal chamber is a steamer as well as a combined chemical engine, tender, and escape. Behind this apartment are the stables, and at the side a watch or duty-room and a recreation-room have been provided. On the second floor there is living accommodation for two officers, and at the rear of the building five cottages have been erected for the firemen, communication being established between these and the waterworks.

CHURCH REBUILDING, GLYNCEORRG.—St. John the Baptist Church, Glynceorrg, is to be taken down and a new edifice to seat 300 persons is to be erected on the site. The architect is Mr. E. M. Bruce Vaughan, of Cardiff, and the builder Mr. M. Jenkins, Port Talbot. The cost will be about 3,000l.

BAPTIST CHAPEL, MAESTEG.—The ceremony of laying the foundation-stones of the new Hope Baptist Chapel, Maesteg, took place on the 14th ult. The building is being erected with local stone; it is treated in the Renaissance style. Accommodation is provided for about 600 people, with a large schoolroom, vestries, etc., at the back. The cost will be about 1,700l. The building has been designed by Mr. Beddoe Rees, architect, Cardiff, and is being carried out by Mr. J. Davey, builder, Port Talbot.

SCHOOL OF ART, TAUNTON.—On the 24th ult. the foundation-stone was laid of the new Taunton School of Art. The contract for the work amounts to 4,500l., the architects being Messrs. Samson & Cottam, of Taunton and Bridgwater, and the builder Mr. T. H. Moggridge.

POST-OFFICE, NEWPORT, MON.—The new post-office at Newport is to be erected in the High-street, and the frontage, which will be largely in

the Renaissance style, will be about 100 ft. long as compared with about 35 ft. of the old building. There will be a frontage from the corner of Thomas-street back to the railway platform. The Thomas-street front will be set back a distance of 10 ft. from the rear of the old building, and the space will be occupied by a loading platform, so that vehicles may be taken up there and loaded without obstruction to traffic in the street. The main front in High-street will be built of Portland stone with brick panels. At the top there will be a projecting medallion cornice of over 3 ft. and above it a parapet with open balustrading. The windows of the second floor will have ornamental pediments. At the main entrance there will be double doors of oak, with panels and lion guards on either side. In the basement there will be accommodation for pneumatic power, power rooms, linenmen's-rooms, engineers' power, and accommodation for messenger copy. The ground floor will be devoted to the public use, (which will have a capacity of 1,500 to 1,600 sq. ft.), accounts, a waiting-room (34 ft. by 56 ft.), and store places. On the first floor there will be rooms for the postmaster, a chief clerk, the writing staff, engineer, draughtsman, and a waiting-room. On the second floor there will be the telephone-room and instrument-room. The third floor will be devoted to ladies' rooms and change-over switchrooms, with store and workrooms for the engineering staff. The work is being superintended by Mr. Rickard (chief of the works).

WORKHOUSE INFIRMARY, OTLEY.—The new Workhouse Infirmary at Otley, which is to be constructed of Gainsley stone, is to cost 8,500l., and is to give accommodation for seventy patients. The new building is to be in three sections or blocks, the two end ones being for men and women respectively, and the centre for the infirm and attendants. In each of the former there are to be two wards, each to contain sixteen beds, and there are separate wards for isolation, or special cases. On the men's side there are three of these private wards, two of which will hold two beds and the other one bed, while on the other there is to be one ward, a ward for men, and a labour-room. The nurses' quarters are conveniently placed. On the ground floor as to be rooms for the doctor and the head nurse, a large dining-room, scullery, etc., while upstairs are five bedrooms, bathroom, and linen closet. A glass corridor connects the three buildings, the site of which is to the west of the workhouse, in close proximity thereto. The western wing, the interior is to be of pitch pine. Mr. W. R. Herbert Marten, of Bradford and Messrs. the architect.

VICARAGE, OXFORD.—The foundation-stone of St. Paul's Vicarage, Oxford, was laid on the 14th ult. by the Bishop of Reading. The cost of the work, which will be carried out in red brick, is estimated at about 1,600l. Mr. Eden, of London, is the architect.

HOSPITAL, PENISTONE, YORKSHIRE.—A new hospital has just been begun in Penistone. The buildings comprise four blocks, built of Shapley and Thurlstone stone. The lighting is by incandescent gas, made in the system of the drainage system has been introduced. The work has been carried out under the superintendence of Mr. G. A. Wilde, Sheffield, by Messrs. Allen, Cook, & Heywood, contractors, Camberwell, with Messrs. John Holmes & Sons, Dandy Dale joiners; Mr. Fleming, Barnsley, slater; Mr. A. Tinker, Penistone, plumber, plaster, painter, and gasfitter. The wood-block flooring has been laid by Messrs. E. B. Burgess & Co., Liverpool.

WORKHOUSE INFIRMARY, WHARFEDALE.—On the 19th ult. the foundation-stone of the new Wharfedale Workhouse Infirmary was laid at Otley. The building, which is being erected by Mr. J. Hannan, contractor, from designs by Mr. W. H. Herbert Marten, architect, of Bradford, is estimated to cost about 8,000l.

SANATORIUM AT ALLYPIETH.—A meeting of the general committee of the West Wales Branch of the National Society for the Prevention of Consumption and Other Forms of Tuberculosis was held at the Guildhall, Carmarthen, when plans of a permanent sanatorium of concrete, to be erected at Allypieth, were presented by Mr. Ernest Atkin, architect, Carmarthen. The building is to accommodate twenty beds for poor patients and eight beds for paying patients. It was decided to refer the plans to the final adoption of the Building and Sites Committee, and to advertise for and accept tenders, and the view to an immediate expenditure of not less than 5,000l. Tenders will be asked for a main block and for the annexes for putting patients separately.

MEMORIAL LIBRARY, GLENALDON.—The library which has been erected a corner with Trinity College, Glenalton, as a memorial to those who fell in the South African war, is just been opened. The building consists of an entrance-hall and two classrooms on the ground



**ADVANCED INSTRUCTION FOR PLUMBERS.**—A part of the course of advanced instruction for plumbers given by the Plumbers' Company at King's College, London, includes visits to notable buildings where plumbing and sanitary work is in progress. A party of students attending this course recently visited the workmen's dwellings at Grove End-road, St. John's-wood, where the foreman in charge explained the character of the work, pointing out the various specialities in connexion with the same, notably the special stoneware interceptors with sweeping eyes, special expansion joints, locking apparatus, gullies, etc. In this work there are about 1,000 fittings, water closets, sinks, baths, and lavatories, and 200 cast-iron pipes. The soil and waste pipes are fitted with special inspection caps at each change of direction, and on each junction. The details of the drainage were explained to the students and a section of the drains tested by hydraulic pressure to prove their soundness.



The whole of the contract has been executed by Messrs. Davis & Bennett, of Westminster, and registered plumbers were employed throughout the work.

#### PATENTS OF THE WEEK.

##### APPLICATIONS PUBLISHED.\*

17,062 of 1904.—T. ARROWSMITH, T. H. ARROWSMITH, and J. ARROWSMITH: *Appliances for Use in Forming Undercut Recesses in Bricks, Quarries, Tiles, and other Articles.*

This relates to the fitting of suitably-shaped metallic die blocks, and consists in the combination of a die box, guides, lifting and depressing rods, transverse bars, springs, and a bearing block, with slidable push bars, and rods or levers for operating same, with presses or like machines for use in making "stacks," bricks, tiles, and other articles from semi-plastic clay, or like material, with undercut recesses in one side surface of same, and the use of a metallic or wood frame for lifting the formed article from off the serrated end of the matrix or lower portion of the die block.

18,928 of 1904.—THE KOMATA REEFS GOLD MINING COMPANY, LTD. (F. C. BROWN): *Apparatus for Mixing or Circulating Materials in a Liquid or Semi-Liquid State.*

An apparatus for circulating and mixing crushed ores in a liquid or semi-liquid state, consisting in the combination of a tank adapted to receive the material to be treated, a material-conducting pipe suspended therein, means for introducing liquid into the tank near the bottom thereof to bring the material to a fluid state, means for distributing and discharging the liquid, and means for supplying air to the lower portion of the tank for forcing the material up through and out of said pipe, causing thereby the circulation, agitation, and mixing of the material within the tank.

19,528 of 1904.—J. PETERS and A. RILEY: *Bond Iron or Tie for Walls.*

According to the invention the tie is formed in two parts, each part being capable of being built into the wall, and also of engaging with the other part by a suitable connecting device or connecting devices. A connecting device on one part of the bond iron is passed through the sheet of metal forming the vertical damp proof course, and the connecting device on the other part of the bond is caused to engage with the device on the first in such a manner that the two parts are firmly joined together, and the damp proof course material is firmly gripped and held between them in such a manner that damp or moisture cannot pass through the opening from one side of the damp proof course to the other.

20,041 of 1904.—R. T. HODGSON: *Fireplaces.*

This relates to a grate made of cast iron or other suitable material and provided at the rear with projections or studs which act as pivots for the grate to tilt on when placed in position. The front of the said grate is raised or curved, so as to be approximately semi-circular in section, and is provided with a series of slots or apertures, and co-acting therewith is a slide similarly slotted, and adapted to act either longitudinally or concentrically. These parts work on the hit and miss principle, and form a ventilator for the grate.

20,385 of 1904.—S. PHILLIPS: *Firegrates.*

This invention consists of a firegrate having a sliding removable bottom, to the under back end of which is connected, by means of suitable supports, a sweeping brush, which may be a revolving or a fixed brush. Suitable side plates and front bars are provided, constituting the main portion of the firegrate, such main portion being a fixture in the fireplace. One or more of the lower bars in the fixed part of the firegrate are dispensed with, and the removable sliding bottom is formed as a grid of any configuration suitable to permit of ashes falling through. At the front end of this grid, as part thereof, the front lower bar or several bars of the grate are provided, and at the rear end of the grate suitable supports are provided to which are connected the stationary or the revolving brush. The combined grid and its bar or bars and brush connexions are removable in one piece.

21,087 of 1904.—J. W. CROOK: *Fire Plugs and Stand Pipes.*

A stand pipe adapted to be fitted to fire plugs, and to occupy a lower level than that of the street, and constructed with a coupling-head, and provided with fittings, consisting of a flange at its bottom edge and union and an internal jointing ring.

25,437 of 1904.—R. EWING: *Joints of Stoneware and other Pipes.*

A pipe joint consisting in the combination of a bell-shaped socket with an inner wall about half the length of the outer wall, with a spigot having at its extremity—moulded on, if any

suitable composition—an overlapping collar or faucet or saddle, receiving the end of said inner wall of socket, and with the saddle at the mouth of socket attached to or forming a part of either spigot or socket.

29,221 of 1904.—G. W. LUPSON: *Building Blocks.*

A moulded block having cavities running through vertically, whereby, when the blocks are placed in position, the cavities coming exactly over each other, form vertical air shafts, which may be used for ventilating the structure or may be filled with concrete or other suitable material if a solid wall is desired.

2,560 of 1905.—J. SCHERRA: *Construction of Walls and Partitions for Fireproof Buildings.*

This relates to the construction of walls for fireproof buildings wherein recessed studding members are used, and are provided with sliding members adapted to be attached to the floors, and consists in adapting the sheet metal, forming the sliding member, to bridge the recessed portions of the studding member, and to be tightened thereon by bending inwardly.

3,084 of 1905.—J. B. MOYER and H. BOUVIER: *Portable Apparatus for Lifting, Lowering, and Shifting Loads.*

Apparatus for lifting, lowering, and shifting loads, consisting in the combination with an unequal-armed lever capable of turning in a horizontal plane and moving up and down in vertical planes, and provided on the larger arm with a counterweight adjustable along this arm by means of chain gear, of a standard having feet bearing on the ground when the apparatus is in use, wheels journaled eccentrically on a shaft carried by two of the said feet, a wheel at the end of the longer lever arm capable of being brought into contact with the ground when the said longer arm is tilted downwards, a rod for connecting the end of said longer arm to the shaft so that the shaft is thereby rotated to cause the wheels carried thereon to come into contact with the ground and to raise the feet of the standard from the ground, thereby enabling the apparatus to be wheeled from one place to another.

6,583 of 1905.—G. H. THIRSK: *Art of Constructing Chimneys or Stacks.*

This relates to the art of constructing chimneys or stacks of angular formation, and consists in using angular bricks of gradually decreasing size to form the corners and produce tapering thereof, and rectangular bricks to form the sides, such angular and rectangular bricks being arranged throughout the structure.

20,226 of 1904.—J. LOCKIE: *A Self-opening Lifting Device Adapted to Release Bags of Cement when placed in position for Pier Building, or like purposes.*

This invention relates to a self-opening lifting device adapted to release bags of cement when placed in position for pier building. According to the invention, a clutch is provided with hooks which are inserted into the bag of cement, the bag being lifted thereby. As soon as the weight is taken off the hooks by the bag of cement being at rest, the clutch is automatically released.

21,703 of 1904.—J. HALL and R. B. WRAGG: *Device for Feeding Clay to Sanitary Pipe Machines.*

According to the invention, a plate or the like is employed situated opposite the mouth of the machines, and connected at the ends to one or more sliding rods, preferably on two rods, one passing on either side of the machine. These rods are supported slidably in bearings attached, for example, to the body of the machines, or they may be supported by swinging links attached to any convenient part. They are caused to reciprocate together by means of cranks, cams, or the like, attached to a shaft which may be driven by belt or other gearing from the power shaft driving the machines.

6,668 of 1905.—C. JACKEL: *Drain Conduits.*

A drain conduit comprising an outer and an inner member, the outer member being open at its bottom and the inner member being open at its top, there also being a passage leading from the open bottom of the outer member to the open top of the inner member, and said inner member constituting a trough or gutter.

16,924 of 1904.—A. E. HUBERT and W. EDWARDS: *Automatic or Intermitting Flushing Tank for Drains, Sewers, and the like.*

This relates to flushing tanks for drains, and consists in the combination of a syphon pipe with trap below same, and a lifting dome acted upon by the pivoted levers and floats, by which action the air compressed in the pipe constantly expands to its normal state, allowing the different levels of water inside and outside the dome to assume the same level, whereby the pipe is filled with water which at once sets up syphonic action.

19,288 of 1904.—A. J. SMITH: *Street Gully Boxes, Sinks, or Traps.*

A gully trap wherein a flap or door is provided

adapted to tend to close the opening from the space beyond the water level in the flow chamber, whilst the said trap is open to the flow of water or escape of sewer gas through the trap when the flap is closed or is seated. The cover of the chamber which contains the pieces projecting from said cover and from rear of a grid, whilst said grid is locked by any means, such as a gravity catch.

19,489 of 1904.—H. WILHELM: *Covers for Manholes, Shafts, and the like.*

This relates to manhole, shaft, and cover covers, and consists in the combination of a cover-plate, a slot in said cover-plate, internal lateral and end faces for said slot, a pivoted closing member for said slot, and a handle connected to the lateral and end faces of said closing member, said handle being of segmental form, and a stop carried at the extremity of said handle for engagement with the under-  
side of the cover-plate.

5,323 of 1905.—H. ALEXANDER: *Outflow Connection for Cisterns.*

This relates to apparatus so arranged as to facilitate the cleansing of iron or other cisterns by the use of an outlet arranged for hand movement, and connected with the surface of such cistern. The action is as follows:

The upper end of the outlet—which, like the upper end of an ordinary fire outlet, is 2 or 3 more above the bottom—effectually prevents the ordinary deposits which accumulate in cisterns from passing down, and, when the surface, and when the removal of deposits and cleansing becomes necessary, the outlet which may be secured by a chain attached to an eye in a segment of a flange, can be taken out of its socketting, and the whole contents, deposits, and water, be swept away from the bottom of the cistern, without the necessity of the passages between the segment of the outlet and the bottom of the cistern.

20,911 of 1904.—R. DUNCAN: *Boiler Grates.*

The invention comprises a sitting-room boiler grate having an oven constructed some distance above the hobs and fire space which is heated by the fire beneath through a flue which passes under the hob, behind the side oven plate, beneath, above, and behind the oven, which unites with the chimney. Hobs are connected with the front parts of this oven for the purpose of attaching a screen of upholstery to hide the oven doors when cooking is not required.

#### Legal.

##### SOUTH NORWOOD NUISANCE CASE.

THE case of Saunders v. Lovell came before Mr. Justice A. J. Lawrence, sitting at the Central Criminal Court, on the 30th ult., on a motion by the plaintiff, the owner of three houses in Oakley road, South Norwood, for an interim injunction to restrain the defendant, an experimental engineer, who carried on his business in a shed adjoining the wall of No. 9, Oakley road, from the trial or further order from working an engine, drilling machines, and lathes so as to cause a nuisance by noise and vibration to the plaintiff's tenants. Affidavits sworn by the plaintiff and his tenants in support of the motion having been read.

Counsel for the defendant stated that he had a number of affidavits sworn by experts capable of contradicting the plaintiff's allegations. It was, he said, certainly some vibration from the engine, but it was not such that anybody could complain of.

In the result, the motion was ordered to stand till the trial of the action, the plaintiff's liberty to apply to expedite the trial. The defendant undertook not to work the engine on Sundays, or after 9 p.m. on week-days, or to run the engine so as to be a nuisance to the plaintiff's tenants.

##### SOME RECENT SALES OF PROPERTY.

###### ESTATE EXCHANGE REPORT.

August 9.—By HAMPTON & SONS (at Bideford).

Monkleigh, Devon.—Looseham and Upcott Farm, 173 a. 3 p. 1. 173 a. 3 p. 1. 173 a. 3 p. 1.

Knowle Farm, 87 a. 1 r. 14 p. 1. 87 a. 1 r. 14 p. 1. 87 a. 1 r. 14 p. 1.

Ley Farm, 135 a. 0 r. 4 p. 1. 135 a. 0 r. 4 p. 1. 135 a. 0 r. 4 p. 1.

The Bell Inn, 1, vt. 10, 100. 1, vt. 10, 100. 1, vt. 10, 100.

Post office, house, etc. 1, vt. 10, 100. 1, vt. 10, 100. 1, vt. 10, 100.

August 15.—By BAILEY & MARR (at Twickenham).

Twickenham.—"Devonshire House," 1710 Cross-st., n. s. 35 p. 1. 1710 Cross-st., n. s. 35 p. 1. 1710 Cross-st., n. s. 35 p. 1.

1 and 2, 5, County Villa, n. s. 64 p. 12. 1 and 2, 5, County Villa, n. s. 64 p. 12. 1 and 2, 5, County Villa, n. s. 64 p. 12.

August 16.—By MADDOX, MMS. & MADDOX (at Bideford).

Fressingfield, Suffolk.—Small holding 5 a. 0 r. 21 p. 1. 5 a. 0 r. 21 p. 1. 5 a. 0 r. 21 p. 1.

Church-st., four freehold cottages. 1, vt. 10, 100. 1, vt. 10, 100. 1, vt. 10, 100.

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.







## COMPETITION AND CONTRACTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.	Design to be Drawn
*SECONDARY SCHOOL FOR GIRLS .....	County Borough of Preston .....	50l., 30l., and 20l. ....	Oct. 18

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be closed
Steam Rolling and Scarifying .....	Southwam U.D.C. ....	R. W. Evans, Commercial Bank-chambers, Halifax .....	Sept. 3
Team Labour .....	do. ....	do. ....	do.
Shed at the Workhouse .....	Banbury Guardians .....	H. Hopkins, Surveyor, Banbury .....	do.
Hall & Classrooms at English Presby. Ch., Bridgeend .....	Welford Guardians .....	P. J. Thomas, Architect, Bridgend .....	do.
Tools and Stores .....	Bengal and N.W. Ry. Co. ....	A. East, 227, Gresham House, Old Broad-street, London, E.C. ....	do.
Bridge-work and Permanent way material .....	Caerphilly U.D.C. ....	H. W. Notman, 55, Gracechurch-street, London, E.C. ....	do.
Cemetery, Penryn, near Caerphilly .....	Caerphilly U.D.C. ....	A. O. Harpur, Surveyor, Council Offices, Caerphilly .....	do.
51 to 55 Houses at Capococh, near Aberdare .....	Caerphilly U.D.C. ....	G. F. James, 12, Hagley-street, Stourbridge .....	do.
Dog Spikes for Rails .....	Secretary of State for India .....	Director-General of Stores, India Office, Whitehall, S.W. ....	do.
Wheels and Axles for Carriages and Wagons .....	do. ....	do. ....	do.
English Presbyterian Church, Maesteg .....	Portsmouth Corporation .....	A. Lloyd Thomas, Esqr. and Arch., Church-st.-chmrs., Pontypridd .....	do.
Public Library, Fratton-road .....	Bookle Corporation .....	B. Hurst, Master of Workhouse .....	do.
140 yds. super. Concrete Layer & Wood Block Flooring .....	South Dublin Guardians .....	Borough Engineer's Office, Town Hall, Bookle .....	do.
Painting, etc., to Two Buildings at Workhouse .....	Stourbridge Guardians .....	J. P. Condon, Clerk, Board Room, James-street, Dublin .....	do.
Steam Pump .....	Cannock R.D.C. ....	W. H. Bevers, Architect, 26, Bond-street, Leeds .....	do.
Congregational Church, Shaftesbury-av., Roundhay .....	Hale U.D.C. ....	H. M. Whitehead, Engineer's Office, Penkridge, Stafford .....	do.
Painting Isolation Hospital, etc., at Cheslyn Hay .....	Nantwich R.D.C. ....	T. Blagburn, Surveyor, Council Offices, Ashley-rd., Hale, Cheshire .....	do.
Galvanised Eye-bolts and Strandwire for Fencing .....	East Indian Railway Co. ....	C. B. Speakman, 152, Hospital-street, Nantwich .....	do.
Infected Hospital near Rose Cottage, Marwood .....	do. ....	C. W. Young, Secretary, Nicholas-lane, E.C. ....	do.
Shop and House, Broughton-in-Furness .....	Barnard Castle R.D.C. ....	R. Brown, Inspector, Winslow .....	do.
Builder's Work to Schools .....	Mr. W. Redhead .....	J. Bell, Architect, Coniston, R.S.O. ....	do.
Flagging, Paving, etc., Passages .....	Bendishshire Education Authority .....	W. D. Wiles, County Architect, Buthin .....	do.
*NEW QUARTERS FOR NURSES, FEVER HOS. 2,700 yds. of 10-in. cast-iron pipes, etc., Newbigginghill .....	Birkenhead Corporation .....	C. Brownridge, Borough Engineer, Town Hall, Birkenhead .....	do.
Paving and flagging streets .....	Inweith Corporation .....	Borough Surveyor, Town Hall, Ipswich .....	do.
Scavenging .....	Midlothian & Peebles Lunacy Bd. ....	A. Carter, Engineer, 14, Queen-street, Edinburgh .....	Sept. 4
Two Cottages at Bodmin .....	Leeds Highway Department .....	City Engineer's Office, Municipal Buildings, Leeds .....	do.
Three Dwelling Houses, Eland-roa, Churwell .....	Blaydon U.D.C. ....	B. Biggins, Sanitary Inspector, Blaydon-on-Tyne .....	do.
Restoration of Wesleyan Methodist Ch., Mount Hawke .....	Mr. E. Stanhope .....	J. Sansom, Secretary, Town Hall, Ipswich .....	do.
Renovation of Wesleyan Chapel, Barnsley .....	Waterford Tech. Instruction Com. ....	T. A. Buttery & S. B. Birds, Architects, Queen-street, Mould .....	do.
Technical School .....	The Guardians .....	Sampson Hill, Architect, Green-lane, Bournemouth .....	do.
Boiler House, etc., Hereford .....	Glamorgan C.C. ....	G. Moxon, Architect, 24, Church-street, Barnsley .....	Sept. 5
*COASTGUARD BLDGS., NELLY'S POINT, BARRY .....	Buchan & Co. ....	W. W. Robinson, Architect, 10, King-street, Hereford .....	do.
Alterations, etc., at Penarth Police Station .....	Somerset County Education Com. ....	G. Martin, Chisleton .....	do.
Alterations, etc., Haydon Inn, Clydach .....	Warminster R.D.C. ....	Civil Engineer, H. M. Dockyard, Pembroke Dock .....	do.
Additions, etc., Llyn Connel School .....	Mr. E. Falloon .....	T. Boderick, Architect, Ashbrook House, Aberdare .....	Sept. 5
Waterworks, Upton, Scandamores .....	Wirral R.D.C. ....	Sampson & Cottam, Architects, 43 and 45, High-street, Bridgwater .....	do.
Two Dwelling Houses, Albion-place, Ulverston .....	N.E. Railway Co. ....	A. F. Long, Engineer, 13, Market-place, Warminster .....	do.
Cattle Market .....	Beaminstor R.D.C. ....	F. E. Priest, Engineer, 13, Harrington-street, Liverpool .....	do.
Painting on Malton and Thirsk Branch .....	Walsend, etc., Joint Hospital Bd. ....	Bessley, Son, & Nichols, Sing, 11, Victoria-street, Westminster, S.W. ....	do.
Sewers, etc., at Gayton and Willaston .....	Manchester Improvement Com. ....	F. Davidson, Architect, Central Buildings, Walsend .....	do.
Sinking, etc., Borehole .....	Alnwick R.D.C. ....	Mr. Price, London House, Church-street, Bargoed .....	do.
Taking Down and Re-erecting Iron Hospitals .....	Chepping Wycombe Town Council .....	City Architect, Town Hall, Manchester .....	do.
Cottage and Business Premises, Bargoed .....	Knottling U.D.C. ....	H. W. Walton, Clerk, Alnwick .....	do.
Painting 266 to 295, Rochdale-road .....	Crews Town Council .....	Borough Surveyor, Euston-street, High Wycombe .....	do.
Relay, Sewer, Dial-pl. to Tithe Barn-la, Warkworth .....	Secretary of State for India .....	Garvide & Pennington, Engineers, Pontefract .....	Sept. 11
*SECOND. SCH. FOR GIRLS, HIGH WYCOMBE .....	Leatherhead U.D.C. ....	G. Eaton-Shore, Borough Surveyor, Crews .....	do.
C-1 Settling Tank (80,000 gallons), Steel Girders, etc. Street Making .....	Heston and Isleworth U.D.C. ....	Director-General of Stores, India Office, Whitehall, S.W. ....	do.
Street Paving .....	do. ....	P. G. Parkman, Engineer, Town Hall, Hounslow, W. ....	do.
Carriage Iron Work and Fittings .....	Horsham U.D.C. ....	do. ....	do.
Materials .....	do. ....	S. Mitchell, Council Offices, Horsham .....	do.
Moveable Timber Floor at Baths, Isleworth .....	Keighley Corporation .....	Lunn & Kaye, Architects, 14, John William-street, Huddersfield .....	do.
Timber and Corrugated Iron Shed at Baths .....	Brentford Guardians .....	W. H. Hopkinson, Borough Engineer, Keighley .....	do.
Making-up Alexandria-road .....	Halfax Gas Works Committee .....	Clerk to the Guardians, Union Offices, Isleworth, Middlesex .....	do.
700 tons Hardstone .....	Soyland U.D.C. ....	J. Wilkinson, Gas Works Engineer, Mutton Hall, Halifax .....	Sept. 13
1,050 yds. of Broken Pit Filins .....	Tynemouth R.D.C. ....	R. Horsfall & Son, Engineers, Commercial-street, Halifax .....	do.
Additions to Clough Hse. Mills, Birkby, Huddersfield .....	do. ....	A. S. Dinning, 21, Allison-place, Newcastle-on-Tyne .....	do.
*ADDITIONS TO WORKHOUSE AT ISLEWORTH .....	Kingston-on-Thames Corporation .....	J. Coulton, Sandalside Kirkby-in-Furness .....	do.
*ROAD CONSTRUC. OWINGHAM, RE. BRIGHTN .....	Leeds Highway Department .....	Borough Surveyor, Clatteron House, Kingston-on-Thames .....	Sept. 14
Slates' Work, Roof of Col. Stoner Sch., Chelmsford .....	Ipswich Guardians .....	City Engineer's Office, Municipal Buildings, Leeds .....	do.
4,000 yds. super. of Concrete and Bitumen Sheeting .....	Governor .....	R. J. Bennett, Surveyor, Council Offices, Ipswich .....	do.
Road Works (5,500 yds. super.), Forest Hall .....	Lindsey C.C. Education Committee .....	C. W. H. Partees, Architects, Bank-chambers, Chislehurst .....	do.
Reclustering, etc., Parish Church, Kirkby-in-Furness .....	Victoria Building Club (No. 2) .....	Scorer & Gamble, Architects, Bank-street-chambers, Lincoln .....	Sept. 15
*ROADMAKING WORKS .....	Llandudno U.D.C. ....	J. Lowell, Smith, & Davies, Architects, Aberdare .....	do.
Automatic Flushing Apparatus to Public Urinals .....	Selby U.D.C. ....	E. P. Stephenson, Engineer, Town Hall, Llandudno .....	do.
Dynamo, Motor, etc., Additions, etc., to Swifts, Chelmsford .....	Kent County Lunatic Asy. Visitors .....	P. Griffith, Engineer, 54, Parliament-street, S.W. ....	do.
Classrooms, Edward VI. Grammar Sch., Chelmsford .....	Elham Guardians .....	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury .....	do.
Thirty-four Houses, Rows-square, Rhymer .....	Committee of Management .....	D. Conroy, Architect, 21, Shipway-street, London-derry .....	Sept. 19
Asphalt, Playgrounds, Cottage Homes, etc., Cheriton .....	Pembroke-shire Educa. Authority .....	D. E. Thomas, Architect, 17, Victoria-place, Haverfordwest .....	do.
*ENGINE AND BOILER HOUSE, COAL STORE .....	Stretford U.D.C. ....	E. Worral, Surveyor, Council Offices, Old Trafford .....	Sept. 19
*REPAIRS, ETC., TO CHARTHAM ASYLUM .....	Stockport Guardians .....	C. F. Johnson, Clerk, Union Offices, Stockport .....	do.
*ALTER. HEAD ATTEND. OFF. CHARTHAM ASY. .....	Working Education Committee .....	J. White, Architect, Elgin .....	do.
*ASPHALT PLAYGR. CHERTON COL. HOMES .....	do. ....	Education Offices, Working .....	do.
Catholic Temperance Hall, Llanvady, Ireland .....	do. ....	do. ....	do.
Alters, etc., Council Sch., St. Dogmael's, nr. Cardigan .....	do. ....	do. ....	do.
2,000 tons of Granite .....	do. ....	do. ....	do.
Main Roads Paving (30,000 yards Granite Setts) .....	do. ....	do. ....	do.
Union Offices, Shaw Heath .....	do. ....	do. ....	do.
Additions, etc., to Public School Buildings, Bothes .....	do. ....	do. ....	do.
*ERECTION OF INFANTS' SCHOOL .....	do. ....	do. ....	do.

### Tenders to be Delivered

*Public Appointments, —*

## METALS (continue)

LEAD, &c. Per ton

ENGLISH SHEET GLASS IN CRATES

OILS, &c.VARNISHES. &c

Haslemere :—	G. A. Franks,	
Chapman & Lowry £145 10	Guildford* ....	£252 0
Haslemere		



LONDON.—For additions and alterations to Shore-ditch County Court:—

	Allowance for old materials.	
J. Shelbourne & Co. ....	£1,500 0 0	27 11 6
Cons & Smith .....	1,399 0 0	—
J. Mowlem & Co., Ltd. ....	1,394 0 0	—
G. R. McKenzie & Co., Ltd. ....	1,338 11 0	4 10 0
Newell & Lusty .....	1,234 18 0	7 3 0
Martin, Wells, & Co., Ltd. ....	1,194 0 0	—
H. L. Holloway .....	1,180 0 0	8 0 0
C. Deering & Son .....	1,149 0 0	5 0 0
Staines & Son .....	1,130 0 0	5 0 0
W. Mills .....	1,059 0 0	—
B. E. Nightingale .....	1,054 0 0	21 0 0
F. & G. Foster, Clifford-road, Norwood Junction* ..	988 0 0	—

LONDON.—For taking down and rebuilding factory, Summer-road, Peckham, S.E., for Mr. Henry Pennack. Mr. A. Gernar architects, 66, Oakhurst-grove, East Dulwich, S.E.7.—

Laurence & Co., Peckham\* .....

LONDON.—For alterations and additions, St. Ann's School, Avenue-road, Tottenham. Messrs. Warren & Stupart, architects, Harringay, N.1.—

	Drainage	Extension of classroom
H. Rusham-Brown .....	£238 0 0	£243 0 0
J. Stewart .....	216 0 0	312 0 0
C. Hale & Co., Harringay ..	207 0 0	239 14 0
J. Groves & Son .....	198 10 0	234 0 0
A. Baker, Tottenham .....	147 0 0	359 10 0

LONDON.—For the erection of a new police section house at Islington. Mr. J. Dixon Butler, Architect and Surveyor to the Metropolitan Police, New Scotland Yard. Quantities by Messrs. Thurmond, Son, & Childrey, Charing Cross Chambers, Duke-street, Adelphi:—

Faris & W. drop £5,570 Prestige & Co. .... £5,270  
C. Ansell .....

LONDON.—For further alterations at 88, High-street, Peckham, S.E., for Mr. Henry Morse. Mr. Arthur Gernar, architect, 66, Oakhurst-grove, East Dulwich, S.E.7.—

W. Smith\* .....

MARCH (Camps).—For erecting farm buildings on land in Blunmoor. Mr. J. Collingwood, architect and surveyor:—

Parker .....	£190 0 0	Swann .....	£148 4 0
Shanks .....	175 0 0	Whitlesey .....	148 0 0
Dack .....	160 0 0	Papworth .....	148 0 0
White .....	154 10 6	Heath .....	143 0 0
Bedhead .....	148 5 0	Eggh, March* ..	132 0 0

NEWTOWN LINFORD.—For erecting a Council school, for the Leicestershire County Council Education Committee. Messrs. Barrowcliff & Alcock, Architects, Mill-street, Loughborough:—

Leicester Builders, Ltd. £1,260 0 0	A. J. Wileman £1,100 0 0
J. C. Kellett .....	T. Herbert .....
& Son .....	Son .....
E. Peach .....	W. Smith .....
Jeffs & Edwards .....	C. Wright .....
Haskard, Rud-kin, & Beck .....	F. Sleath .....
J. H. Clayton .....	W. Corah .....
H. Hammond .....	C. A. Dobson .....
W. F. Harding .....	W. Wesley .....
J. T. Ball .....	Woodhouse .....
G. Toone & Sons .....	Haves* .....
B. Shipman .....	999 0 0

NUNEATON.—For rebuilding the chapel of St. Mary's Abbey Church, for the Restoration Committee. Mr. Harold Brakspear, F.S.A., architect, High-street, Corsham, Wilts. Quantities by Mr. E. C. Plinks, Parliament-mansions, Victoria-street, S.W.1.—

Dallow & Sons .....	£5,950	G. F. Smith & Sons ..	£3,900
Hayward & Wooster .....	4,639	T. Smith .....	3,740
J. Hanterley .....	4,473	Collins & Godfrey ..	3,652
King & Bidley .....	4,127	H. Smith .....	3,589
Gowing & Ingram .....	4,138	Willcock & Co. ....	—
Bowman & Sons .....	3,910	Wolverhampton* ..	3,395

PONTSHONORTON.—For erecting a boys' school to accommodate 250 pupils, for the Education Committee. Mr. P. R. A. Willoughby, Surveyor, Education Offices, Pontypridd:—

E. R. Evans Bros., Cardiff .....

£3,598 12 4

QUORN.—For enlargement of the Grammar School, for Leicestershire County Council Education Committee. Messrs. Barrowcliff & Alcock, architects, Town Hall-chambers, Loughborough:—

A. & W. Cham-bers .....	£789 8 0	R. Peach .....	£682 11 0
C. Wright .....	776 0 0	T. Herbert .....	612 0 0
W. Haasman .....	695 0 0	W. F. Harding .....	601 10 0
J. T. Ball .....	683 0 0	T. Barker .....	639 0 0
A. Faulks .....	689 5 6	Son .....	649 10 0
H. Hammond .....	669 0 0	C. A. Dobson .....	647 11 6
Leicester Builders .....	669 0 0	C. A. Dobson .....	647 10 0
		A. J. Wileman .....	609 0 0

RATBY.—For enlarging the Ratby Council School, together with out-entrances, drainage, etc., for the Leicestershire County Council Education Committee. Messrs. Harding & Topott, architects, Hotel-street, Leicester:—

A. & W. Cham-bers .....	£1,964 13	Leicester Builders, Ltd. ....	£1,779 0
G. Toone & Sons .....	1,944 0	W. Moss .....	1,765 0
C. W. Micklethorp .....	1,919 0	E. Bax .....	1,765 0
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W. Smith .....	1,841 3	J. Cole .....	1,723 0
		W. Shipman .....	1,699 4

SOUTH TWENTON (Bath).—For the erection and entire completion of five additional classrooms, being an extension of the three departments of the South Twerton Council School, for the Somerset County Education Committee. Mr. W. F. Bird, Architect, Mid-somer Norton, Somerset. Quantities by Architect:—

Hayward & Wooster .....	£1,943 0	E. Chancellor & Sons .....	£1,750 0
R. Love .....	1,925 0	J. Long & Sons .....	1,727 0
E. Wood & Morris .....	1,893 0	A. J. Colborne .....	1,687 2
A. E. Denby & Co. ....	1,799 0	F. Amery .....	1,628 0
A. Willis & Sons .....	1,784 0	F. J. Blackmore .....	1,579 0
		W. Webb, Bath* ..	1,519 0

WELTON, MID-SOMER-NORTON (Somerset).—For the erection and entire completion of three additional classrooms, with teachers' retiring-room, and enlargement of offices being an extension of the Welton Council School, for the Somerset County Education Committee. Mr. William F. Bird, Architect, Mid-somer-Norton. Quantities by Architect:—

W. R. Moody .....	£1,956 8 8	W. Webb .....	£1,645 0 0
J. Child & Son .....	1,862 0 0	E. Wood & Morris ..	1,633 0 0
Hayward & Wooster ..	1,847 0 0	W. A. Catley .....	1,622 0 0
R. Love .....	1,799 0 0	A. Willis & Sons .....	1,546 0 0
A. E. Denby & Co. ....	1,700 0 0	F. J. Amery .....	1,546 0 0
A. J. Colborne .....	1,610 10 0	Grove-st., Bath* .....	1,520 0 0
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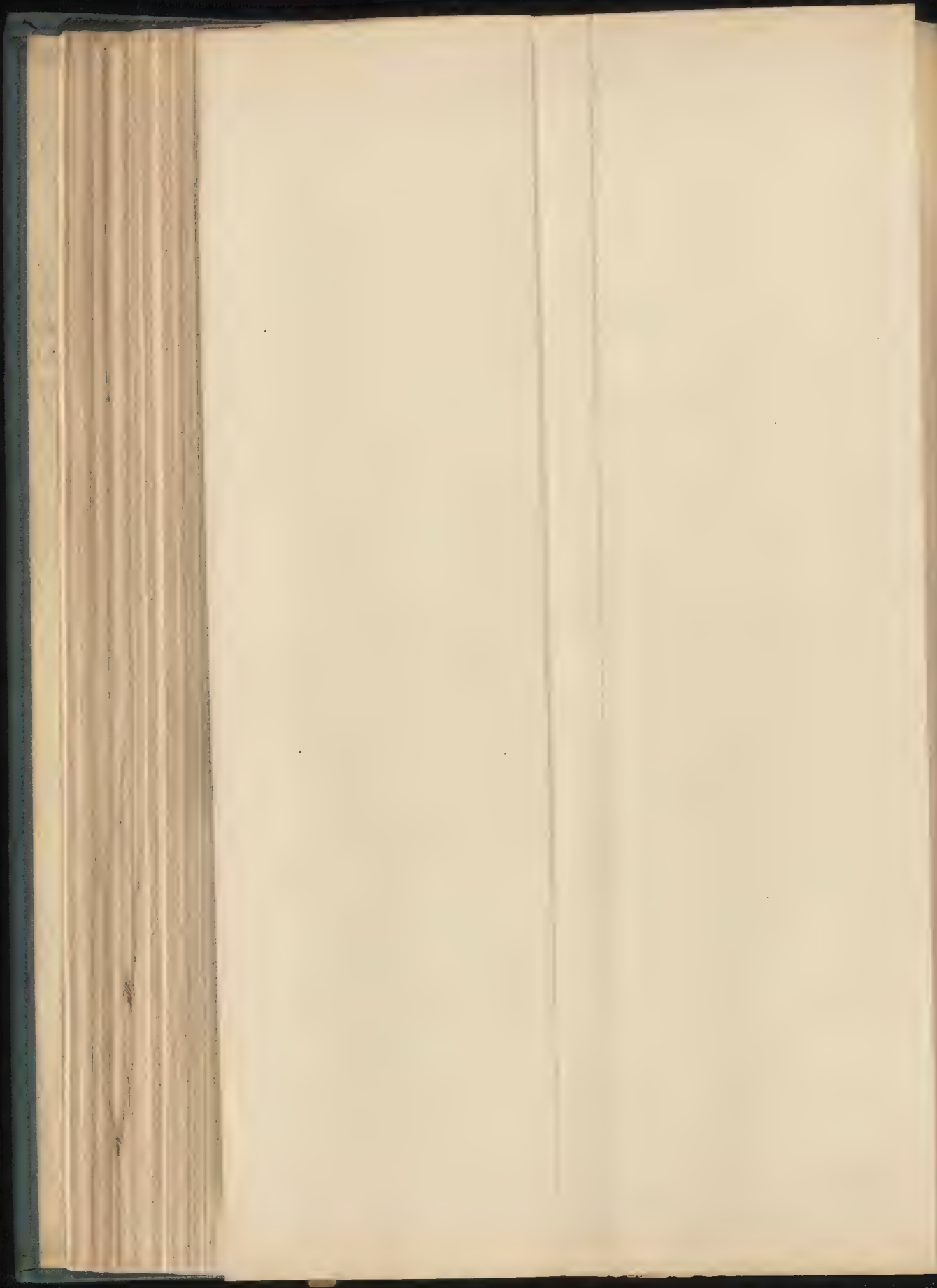
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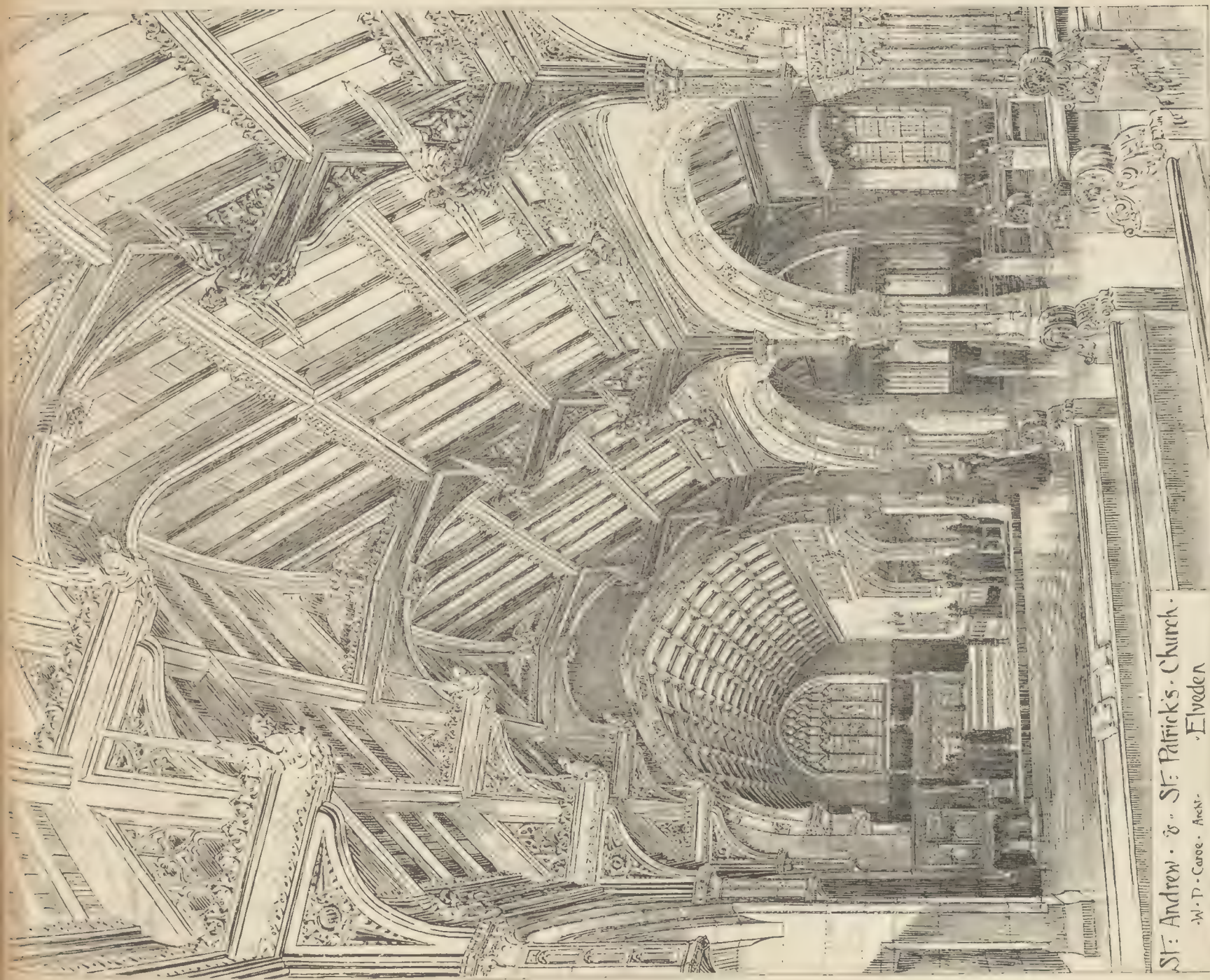
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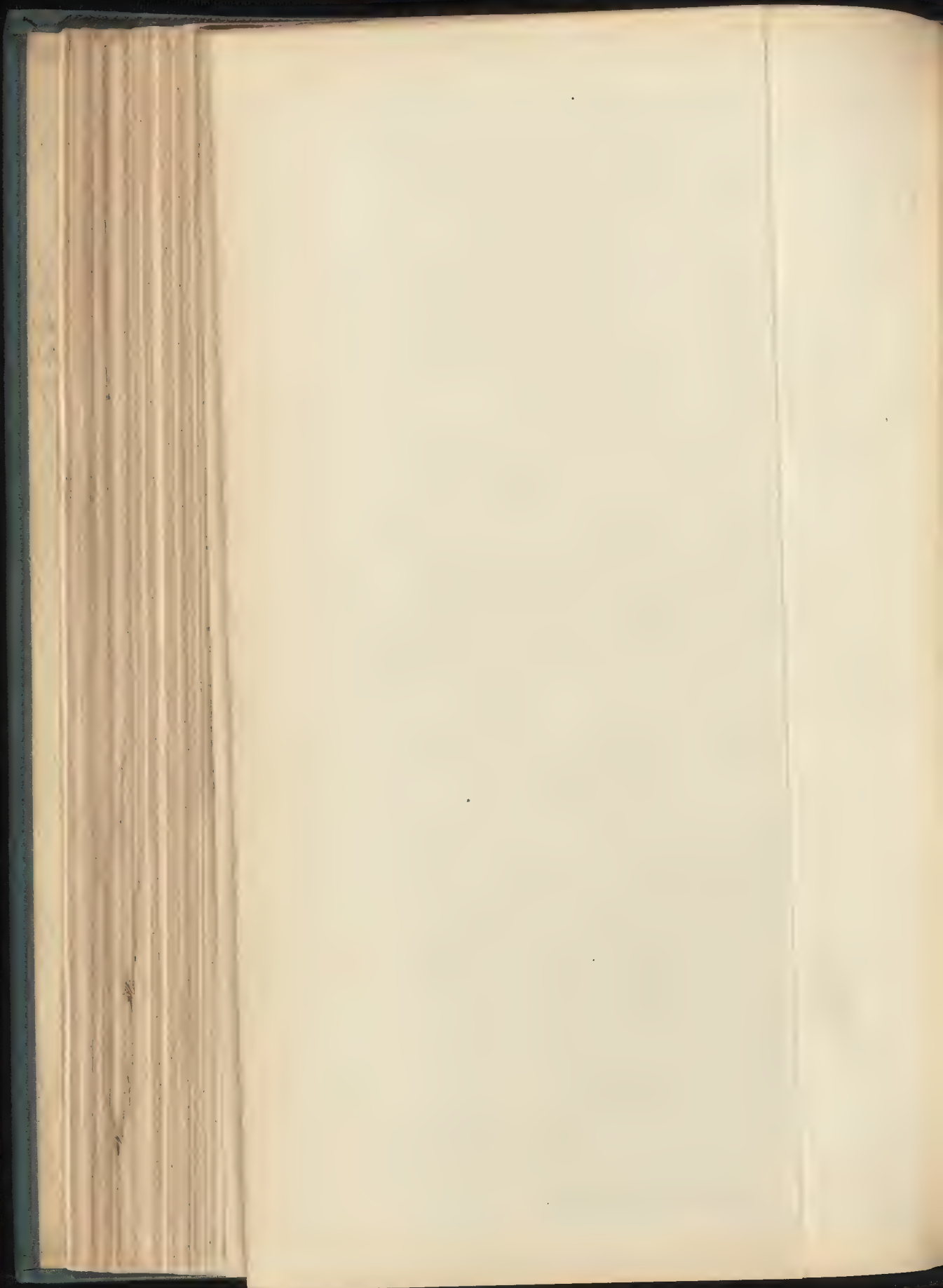


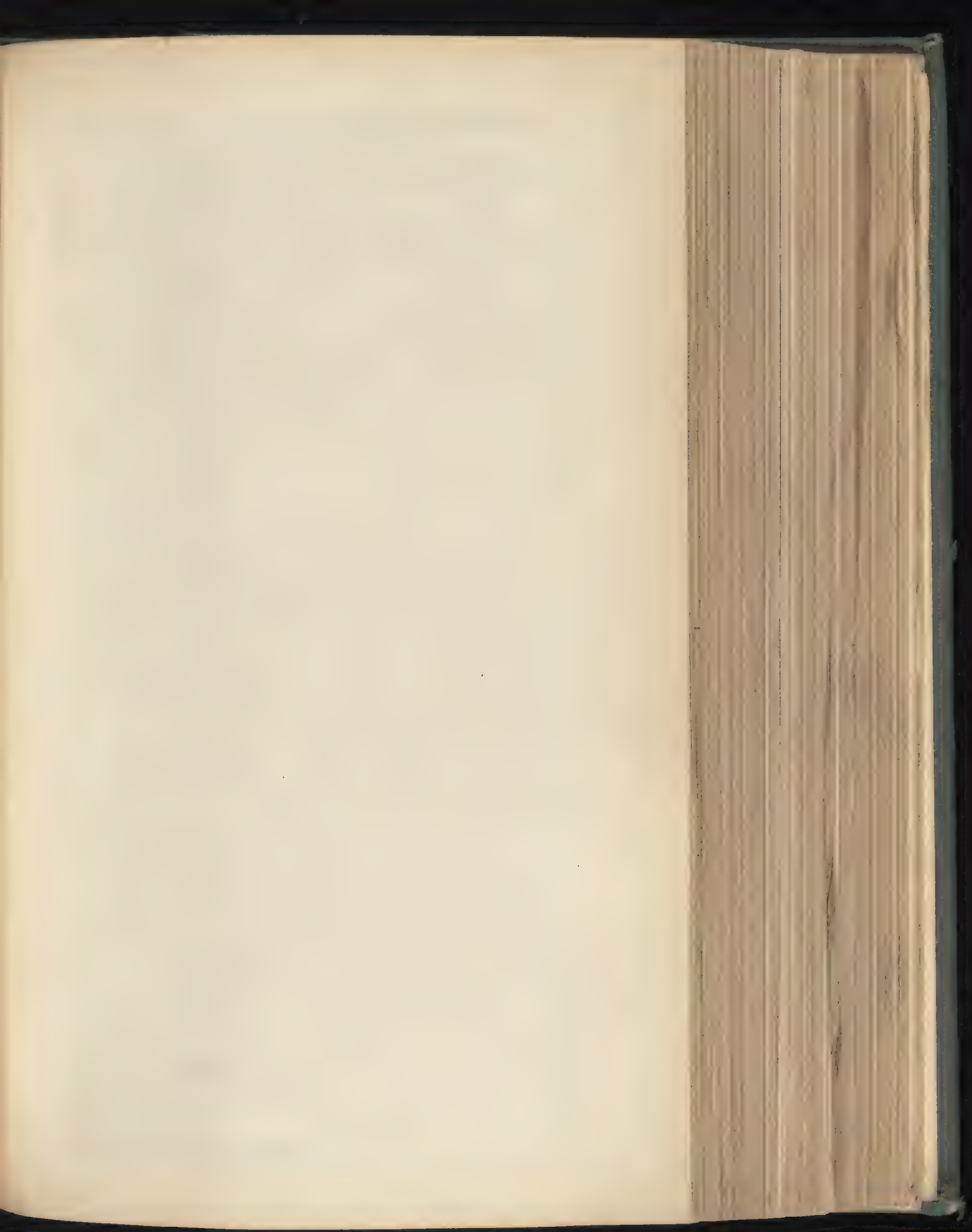
St. Andrew & St. Patrick's Church.

Elveden

W. D. Caroe. Archt.



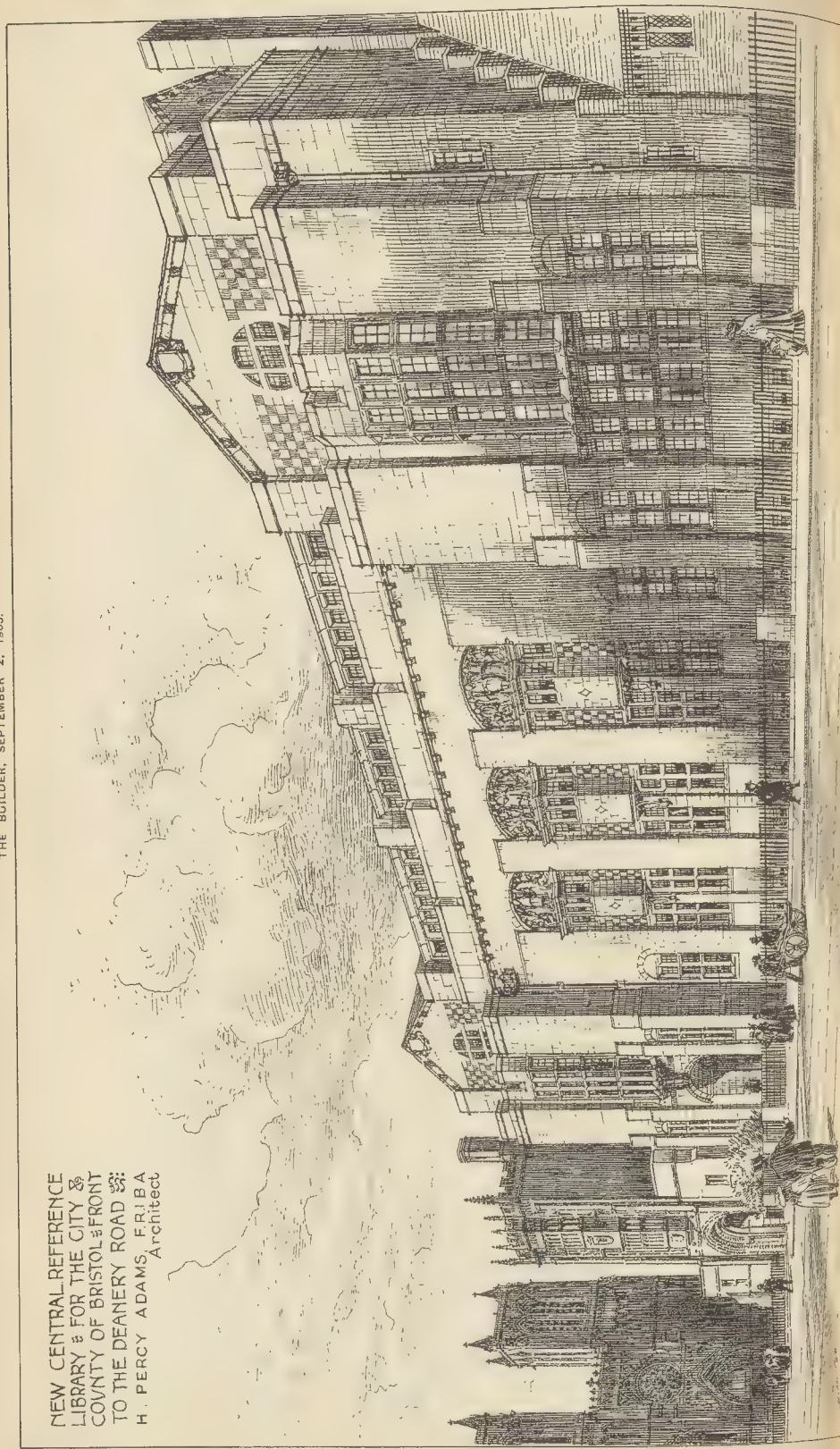






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H. PERCY ADAMS, F.R.I.B.A.  
Architect





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TO THE DEANERY.  
H. PERCY ADAMS, F.R.I.B.A.  
Architect

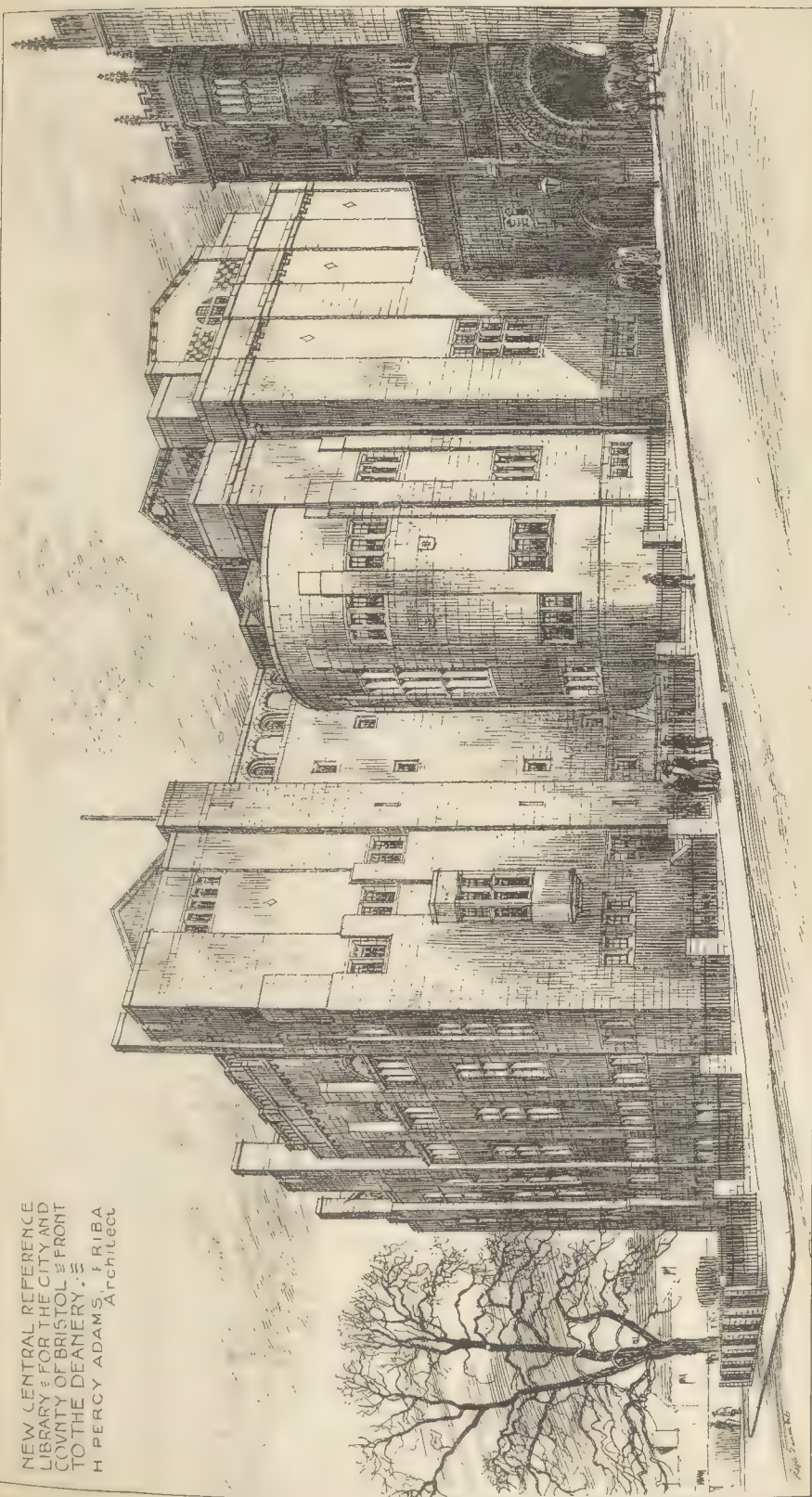
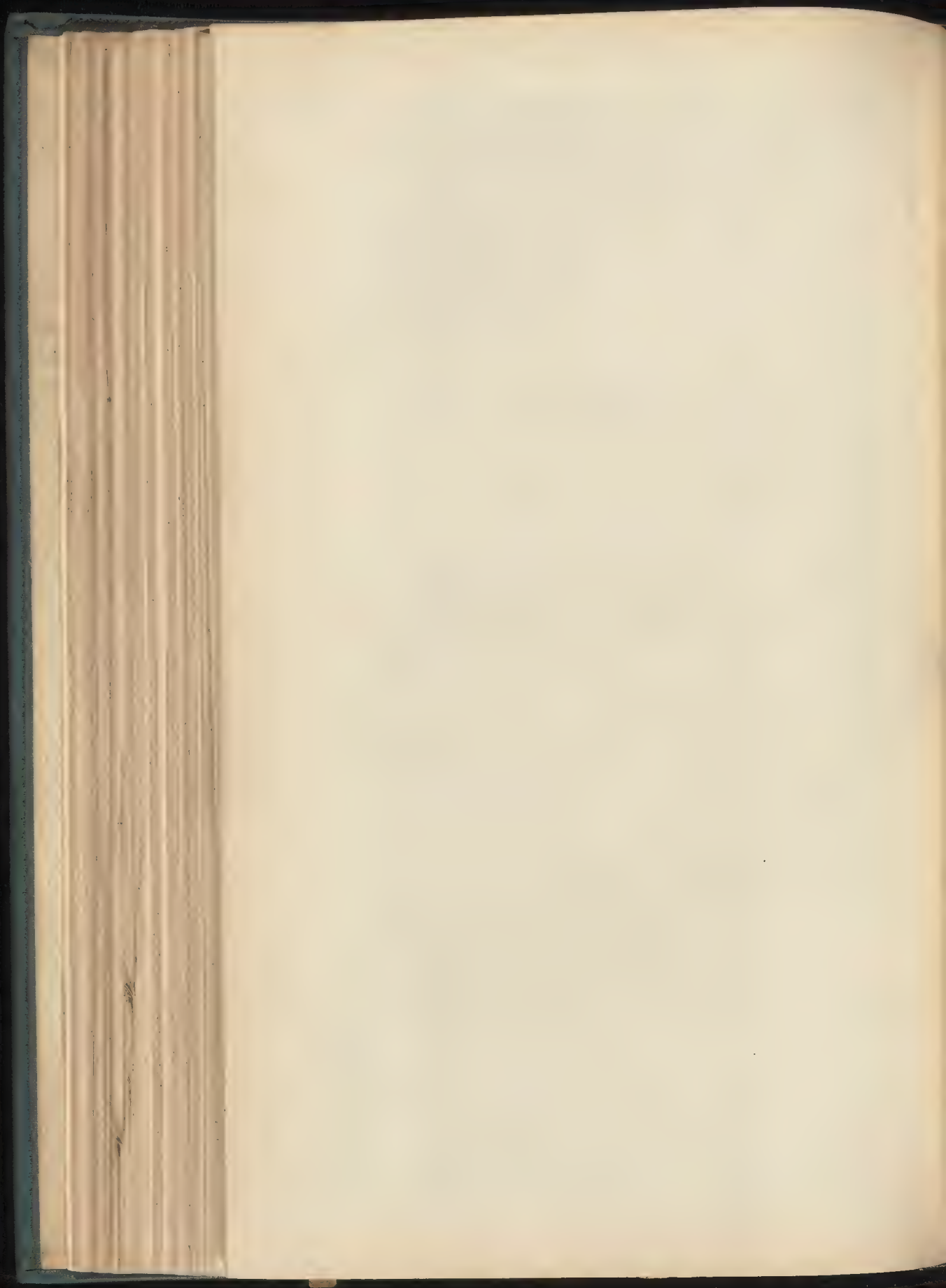


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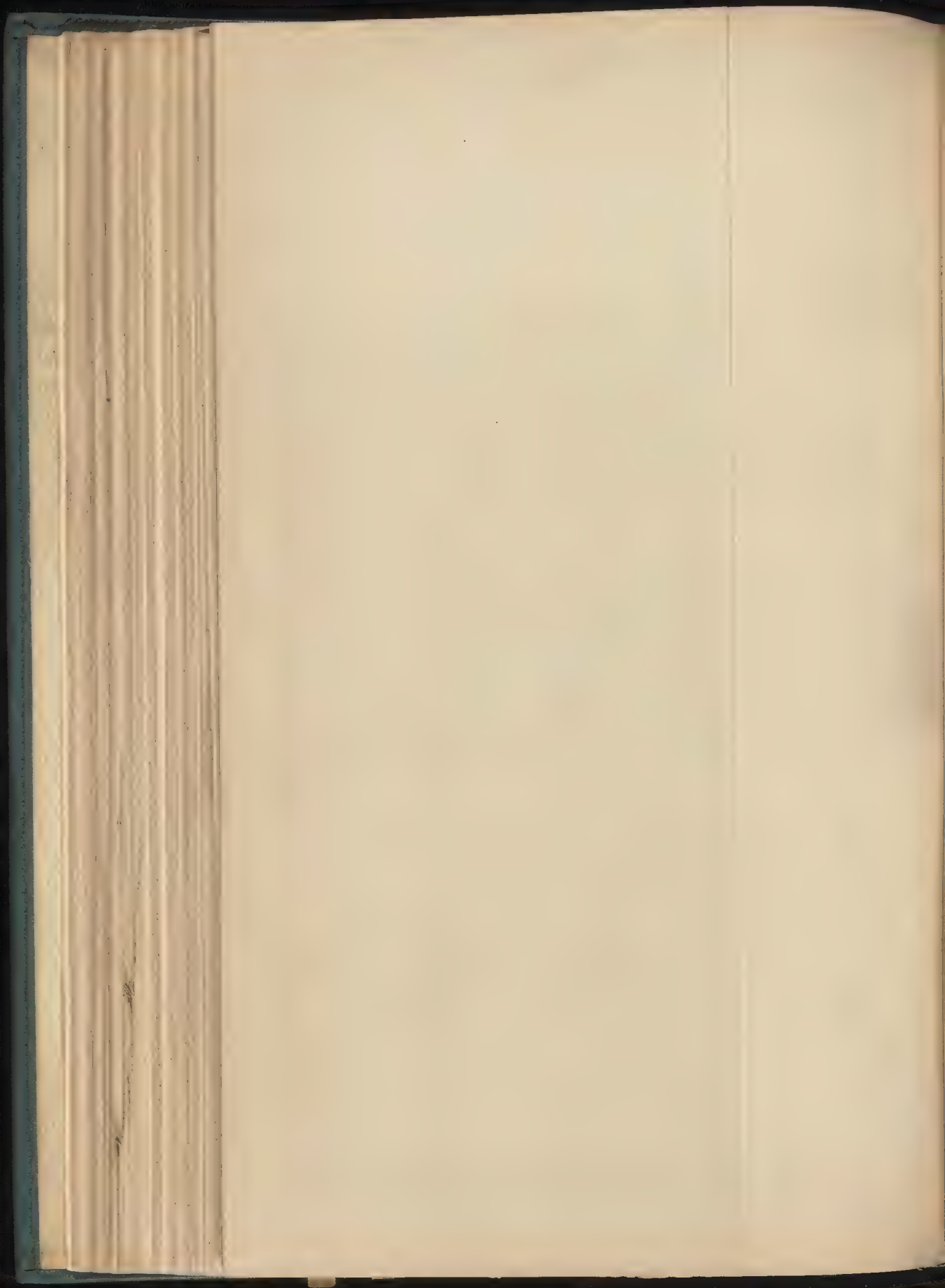






EAST WINDOW OF CHULMLEIGH CHURCH, DEVON —DESIGNED AND EXECUTED BY MISS CAROLINE C. TOWNSEND





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Roadway Alterations and New Guildhall Offices, Bargate, Southampton.....	Mr. R. M. Lucas, Architect.
Western Theological College, Bristol.....	Mr. H. Daro Bryan, F.R.I.B.A., Architect.
Principal's House, Western Theological College.....	

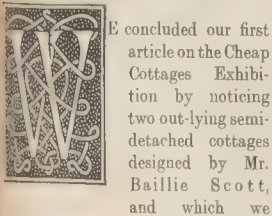
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## The Cheap Cottages Exhibition.—II.



E concluded our first article on the Cheap Cottages Exhibition by noticing two out-lying semi-detached cottages designed by Mr. Baillie Scott, and which we

presume are to form a portion of the permanent residences in the Garden City; at all events they are not of the class intended to illustrate the cheapest possible residence for the agricultural labourer. Continuing our way past these northwards, we come to one or two which are at a long distance from the main exhibition, which we shall find to contain some of the most interesting and promising of the houses on the ground.

Those which are numbered 66, 67, and on the plan of the estate form a group apart, and we surmise that these also are permanent Garden City cottages. Nos. 66 and 68, still unfinished, are brick buildings of rather ordinary type, and are not included in the catalogue. No. 67 is a picturesque pair of semi-detached cottages, one of them inhabited, erected by the "Co-partnership Tenants' Housing Council" (London), who are Garden City tenants. These are simply designed cottages with 9-in. brick walls white-washed, and external wood-work painted green on white seems to be the vogue of the day for the picturesque cottages, and red-tiled roofs. The claim

made for these is that they "combine pleasing appearance with cheapness, comfort, and light," a claim which seems fairly made out; their appearance is certainly pleasing, and they must be fairly cheap, though that they can be built under ordinary circumstances for 300*l.* the pair seems to us exceedingly problematical. Compared with some of the cheap cottages of the exhibition they are in fact somewhat palatial in their proportions, and are clean, light, and cheerful internally. The inner walls are finished with Duresco. The fire-places (as in some other instances) are unfortunately disfigured with poor and quite unnecessary "ornament." As a matter of taste, things of this kind, in what is meant as a humble dwelling, cannot be too simple.

Skirting the northern boundary of the estate, westwards, we come on another group of which the first two form a rather significant contrast. One of these, occupying the site marked "Clough" on the plan, is a single cottage exhibited under the name of Mr. A. H. Clough, of Castletop, Burley, Ringwood, Hants, who is also the exhibitor of blocks 70 and 71 further; whether the bearer of this pleasantly familiar name and initials is estate-owner, architect, or builder, does not appear. This single cottage, a very small one, is of wood-framed walls with roughcast below and overlapped planking above, and partitions of 1-in. boarding simply, left with unpainted surface. The cost of this is stated at 110*l.*, and it is quite possible that it may be built for this, but it is not an erection calculated

to promote the comfort of tenants or to form a very permanent property on an estate, and we should not advise any landlord to adopt such a construction; as a habitation, it is of altogether too bandbox a character; for a temporary shelter it would be well enough. Next to this is the concrete cottage designed and exhibited by Mr. Brodie, the City Engineer of Liverpool; as solid and durable as the other is the reverse, and which in a practical sense looks more like solving the problem of the 150*l.* cottage than most of them. The walls are made of concrete slabs of destructor clinker, slightly re-inforced with steel, 6 in. thick throughout; but the 6 in. in this jointless stuff should count more than 9 in. of brickwork. The experiment is so interesting that we may as well quote the considerations by which it is recommended in the catalogue:—

"The principle adopted in the construction of each room in the building has been that of a dovetailed box, in which each of the four sides, the floor, and ceiling of the rooms, is made of one concrete slab suitably reinforced with steel and made in a mould. After maturing, the slabs are conveyed to the site and erected in position.

Economy—due to utilisation of waste materials, small amount of labour throughout the various processes, rapidity of erection owing to the small number of pieces to be handled.

Advantageous arrangement of material in slabs—viz., rich proportion of cement in concrete, which is also compressed, used for outside skin where waterproof quality is desirable; poorer proportion of cement in concrete used for inside, which, being uncompressed and of a porous character, is suitable for taking a distemper wash or paper, without any further treatment.

Expense in woodwork reduced to a minimum, as, owing to the possibility of accurate moulding in concrete, the hinges of doors and windows can be screwed direct to the concrete. [They are not so, however, in this case.—Ed.]

Long life of building.

Small cost of upkeep and insurance.

This system of building construction was



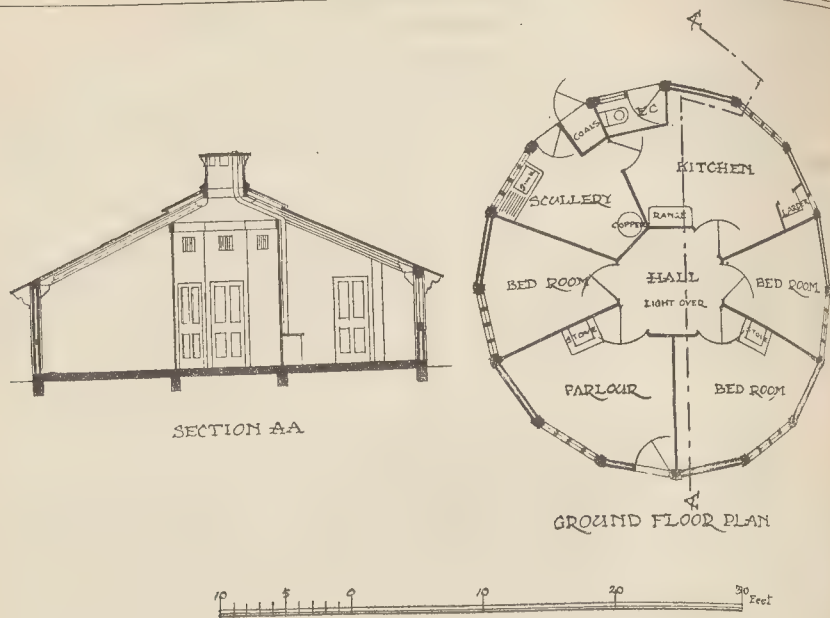


Fig. 1. Cottage by Messrs. Hesketh &amp; Stokes.

originally designed by Mr. Brodie with the special object of providing a thoroughly sanitary and economical building, suitable in every way for the housing of the poorest classes displaced owing to the demolition of insanitary areas in Liverpool. The benefits of the system can be most fully obtained where the work to be carried out is on a considerable scale, and where approximate repetition in size of slabs is possible."

The interior is comfortable and well-arranged; the drawback is the external appearance. It is at the best a kind of construction better suited in appearance to town than country; this colourless concrete always looks poor in the country, and the attempt here made to give a kind of exterior design to it is not happy. It may be possible to make something better-looking out of it than this, by a different treatment; we may think it worth while to make the attempt; as it now stands it would be a very foreign body in a rural landscape. But it does seem more like the provision of a cheap cottage which shall be comfortable, solid, and durable than most of the others. The interior of the finished room is disfigured by a perfectly abominable "ornamental" grate; is this the sort of thing the Liverpool Corporation put in the dwellings they provide for their evicted residents? If so, it is enough to lower their moral tone still further.

Beyond this Mr. Clough exhibits two blocks, a single and a double cottage, with 11-in. brick walls with a hollow space. The double cottage is very compactly planned; the entrance is into the scullery, from which a 12 ft. living-room with a range is entered, and through it a third smaller room which forms a ground-floor bedroom, the upper story being divided into two pretty large bedrooms. The author draws attention to this arrangement, expressing the opinion that it is "more economical of space and cost than any method of placing three rooms over two," and there is something in

this point. The appearance of these cottages is decidedly pleasing, but the erection of the whole block, with the outbuildings containing earth-closet and coal-store (the latter rather unnecessarily large) for 230*l.*, or 115*l.* for each dwelling, seems very doubtful. The remaining building of this group is a one-story cottage by the Darlington Construction Company. The walls are composed of 1-in. weather-boards, one layer of inodorous felt, and asbestos cement sheeting  $\frac{1}{4}$  in. thick. "The result of an experiment carried out recently by the College of Science at Newcastle indicated that the above combination was equivalent, when temperature conditions were steady, to 9 in. of brickwork." We are not told the nature and details of the experiment; the result may be correct in a sense, but we can hardly regard this as calculated for a permanent abode for all seasons and weathers. It is the kind of thing to be described as a "shanty" rather than a house, and in the way it is treated here it suggests a temporary building for a country railway station rather than anything else. It is possible (as we shall see) to treat a building of this kind of construction in a much more suitable and picturesque manner than this is treated. Internally it is roomy and convenient. The cost, "erected on purchaser's foundations," is given as 150*l.*; and under that limitation it could probably be carried out for that sum. An unnecessarily high roof leaves a good deal of waste space over the ceilings.

In the next and larger group a little further on we find in No. 73, by Messrs. Hesketh & Stokes, architects (London), an interesting and ingenious experiment of a novel kind. The architects observe that the chief feature in this design is the economical employment of reinforced concrete. We may quote their

description of the building, the plan and section of which are shown in Fig. 1—

"Economical considerations require that as far as possible there should be a repetition of parts, and that the wall surfaces should be diminished to a minimum consistent with sufficient coverings to meet any recognised standard of healthy conditions. These two considerations led to the following conclusions, viz. (1) That the nearer a building approaches a circle the larger is its contained area; and (2) a polygonal figure of sixteen sides gives the required repetition of parts.

All the living-rooms, both in winter and summer, get direct sunlight into them. The upward slope of the roof from the walls gives an opportunity of ventilation towards the centre where the chimneys are collected into one. The inner hall gives convenient access to all the rooms in the cottage.

The walls are formed of two 3-in. slabs of concrete separated by an air space. The roof is formed with concrete slabs covered with sawdust, and the floor and foundations consist of a bed of reinforced concrete not less than 6 in. thick in any part, with wood floors to living-rooms. The divisions between the rooms are formed of 4-in. concrete slabs. The stoves to parlour and large bedroom are warm air grates of special pattern giving warm fresh air to the adjoining bedrooms.

The architects deserve credit for their clever suggestion, and the system would certainly be economical of material and labour; but there is the obvious drawback that the plan produces rooms of a very inconvenient shape, and we do not think such a scheme is likely to be adopted, so that such a form of house would be as unpopular among those for whose benefit it is intended.

The pair of cottages, No. 73, by Mr. A. J. Bateman, of Romsey, does not represent the cheapest class of cottage, but it is a substantial and well-arranged building, with two wash-houses, one for each dwelling, placed one beyond the other in a block at right angles to the rear of the houses, the earth-closets being placed again beyond these as part of the same block, so as to get them as far as possible from the living portion. The cost of the pair is put down at 300*l.*, and the exhibitor candidly adds that their erection at that cost is due to the fact

that besides being a builder, he is also the manufacturer of the bricks, cement, hydraulic lime, roofing tiles, paving squares, etc., used on the building; and, of course, puts it in an exceptional category. Mr. E. Clarke's cottage (74) presents nothing for special comment, except that the walls are described as "four inches thick, built hollow"; but we are told how this is carried out. The exterior face is brick, so it is to be presumed this must be 4½-in. brick with a thinner concrete wall inside; but the narrow space cannot amount to very much in that case, and would probably be better filled up. Throughout a great part of the exhibition too much faith is reposed in hollow spaces, the drawbacks of which are greater than their advantages. The walls are finished inside with cement, which, as remarked, "is more durable than ordinary lime plastering"; and attention is drawn to the fact that the windows open so that they can be cleaned from the inside, a point which is overlooked in many of the cottages exhibited, in which the upstairs casement windows, at all events, would be difficult to clean. The next cottage, exhibited by the Wire-Wove Roofing Co. (though the wire-wove roofing is not employed in it) is an interesting and meritorious piece of work, though it belongs to what we call the "shanty" class of erection. It is very different, however, to the one to which we have already applied that term; it looks like a dwelling and not like a railway station office, and is a very workmanlike piece of timber construction. The walls are formed of over-lapping vertical 1½-in. planks 8 in. wide, every alternate one recessed and over-lapped by those on each side of it; they are interlarded with Fero's sheeting and lined with matchboards covered with canvas and Hall's distemper. This is typical of the class of cottage which Mr. Allport, the manager of the Company, has for some time past advocated for estate purposes. It is a one-story cottage, well planned, with a living-room, scullery, and three bedrooms; there is a brick fireplace and chimney in the centre, as in the American frame-houses, and the two bedrooms adjacent to the fireplace side of the living-room have each a stove on a stone hearth in the corner, discharging into the centre brick chimney stack. Very little space being taken up by walls, the rooms are large, and the interior is well and simply

treated. The cost is given as 150l.; we should doubt it being done elsewhere for that sum, but it is certainly not an expensive erection. We come round again however to the question, is this a kind of house for all seasons, and is it not likely to need a good deal of repairing? To answer the first question one must live in such a house through the winter, or take the evidence of those who have done so. If however, anyone wanted to build a sensible-looking summer bungalow as a holiday cottage, at a small cost, he could hardly do anything better than this; it is creditable in every way to the Company who exhibit it.

The case for the wooden cottage is put still more favourably in the one designed by Mr. F. W. Troup (No. 80). Mr. Troup is an artist, as many of our readers know, but he has also gone into this little problem in a thoroughly practical manner from his point of view. We give an illustration of his cottage (Fig. 2). It is supposed to be built on a concrete layer which, as the work is all light, would form a sufficient foundation. Everything is done to avoid little complications of construction; the roof in a single span running through, with no intersecting gable; the bedroom windows placed in the end gables, avoiding the expense of dormers. The walls are of 4-in. deal framing covered externally with weather-boarding and internally with lath and plaster. Is there a hollow space between the lathing and the weather-boarding, in the spaces between the framing? It is not apparent; but if so, that we think a weak point—much more so in a timber than in a brick building. Every inch of space is utilised inside, but without anything appearing cramped; indeed, the staircase is wider and more convenient than in many of the larger cottages. Two very nice bedrooms are obtained above, partly in the roof, and the architect points out that by the terms of many building by-laws these upper rooms must, under this roof, have been compressed to about 6 ft. wide, in order to obtain the orthodox height of wall at the springing of the sloping ceiling. The height is, it is true, only about 5 ft. on the side walls, but yet these are quite comfortable and habitable rooms. In the plan it will be observed that the bath, placed in the scullery, is arranged so that this corner could be temporarily shut off and produce a small

bath-room, though it would ordinarily form part of the scullery. Mr. Troup does not overlook the fact that such a building would need repairs, but he suggests that everything is kept so simple that the village carpenter can do all that is required. The interior has been tastefully fitted up with plain and suitable furniture. In short, the case for the timber-built cottage could not be better represented, and the architect has kept fully before his mind the precise problem which the Cottages Exhibition was intended to solve.

The cottage No. 79, by Mr. A. Randall Wells, of Hastings, has good points. This is a building of 9-in. brick walls white-washed, with a roof of hand-made pantiles. The plan includes a small parlour to keep books and to relieve the crowding of the living-room; and in regard to plastering external angles have been avoided, and also large sheets of plaster for ceilings, owing to their liability to crack with the spring of the joists; the joists show and are plastered between. The hanging of the eaves gutter on the end of the rafters in the naked way adopted, with no eaves board and widely projecting eaves, would lead to the blowing about of rain-water against walls and windows in stormy weather, and looks rather too crude. This, however, is in the main a good cottage, but any one concerned in the economic question should compare this with Mr. Troup's cottage just mentioned, and note that they are both put down at 150l. It is obvious at a glance that if Mr. Troup's cottage costs 150l. to build, this one must cost much more.

Messrs. Smith & Brewer's cottage (No. 81) is another wooden erection of the same class as Mr. Troup's, and with the same merits, though not quite so good. It is furnished by Messrs. Heal & Son with their "Cottage Set in Oak," than which nothing could be more pleasing or more suitable for its purpose and position. The architects have aimed at the provision of as much space as possible in the living-room, adding a small bay window "such as may be seen in the old cottages of the neighbourhood," to give a little incident and a little more appearance of space. Next to this we come on a curious contrast to most of the others, in the block of two cottages—"Single-story Agricultural Labourers' Cottages," as built on the

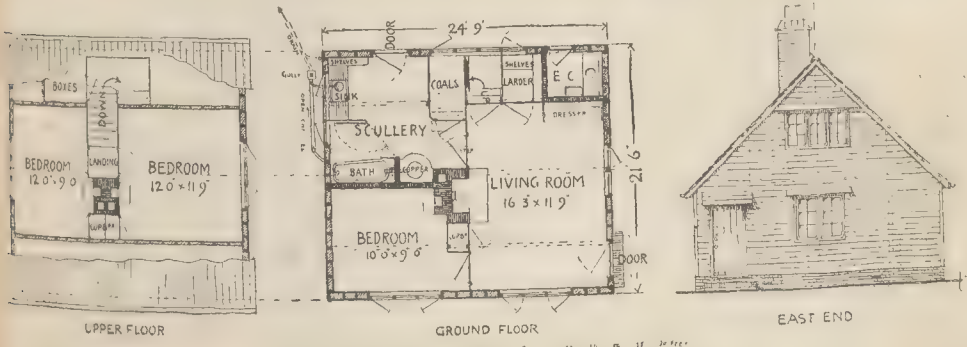


Fig. 2. Cottage by Mr. F. W. Troup.



Marquis of Salisbury's estate. Here we come for the first time on 14-in. brick external walls, the Marquis's architect clinging evidently to the old and perfectly sound opinion that this is the least thickness that ought to be admitted for an external brick wall of a dwelling-house. After all these thin walls the effect is almost monumental; but it is almost the only merit of this exhibit. The cottages are among the ugliest to be seen on the ground; in spite of the expenditure on walls, there is no place or provision for a bath, as will be found in many of the more slightly constructed cottages; and the sink is placed in the most awkward manner, thrust endways into a narrow space between the outer wall and projecting jamb of the main fireplace, so that only the end of it can be conveniently got at. These are stated to be 300% the pair; if they are really built on the estate at this cost the information is important, as in that case it would appear that the thin walls prevalent everywhere in this exhibition are not a necessary concomitant of the 150% cottage; but they do not show a satisfactory plan, as one of the three bedrooms can only be reached by passing through another. We question whether the one-story cottage is the best type; it is difficult to arrange the rooms satisfactorily without covering a good deal of ground. The cottage by the Society of Artists; the last of the row, is too pretentious for a labourer's cottage, and as to it being built for 150%, we cannot credit that. The walls are of timber post and pan work (the long uprights somewhat too skimpy in proportion) filled in with concrete; the whole 6 in. thick. The plan is well arranged, especially the kind of exterior lobby or porch to scullery, with the coals and water-closet on each side of it; but the whole is hardly the type for a labourer's cottage, and seems out of place in this exhibition.

Near the railway is a group of cottages, in occupation, designed by Mr. V. Dunkerley, with whitened walls and red tile roofs, and with those sloping buttresses at the angles which Mr. Voysey has done most to bring into vogue; these give a character to a cottage, and are not uncommon in old cottages in Dorsetshire; but in new buildings they have no structural significance; they are only a matter of sentiment, and it is possible to get tired of them.

If one were to admit that buildings in which the main structure is timber can be accepted as desirable permanent structures on an estate (which, as already remarked, we very much doubt), Mr. Troup has solved the problem best, and has produced a cottage which is really pleasing and well arranged, while perfectly simple and unpretending and with no elaborate effort to be picturesque, which is the weak point pervading a great part of the show. If we have to end in condemning buildings of comparatively perishable materials, and demand something solid and permanent, Mr. Brodie's concrete and steel cottage provides it, in a practical and economical sense, better than any other; and it is the single exhibit which recognises the fact that sloping roofs are no longer a necessity, and that a roof can be made flat just as easily as sloping. We have long been of opinion that

this facility afforded by concrete ought to be more taken into account in modern cottage building. Sloping roofs are picturesque and appeal to our associations, but they involve low walls to the upper rooms (in the case of more than one story), or loss of space and material in the roof. We admit that we think Mr. Brodie's cement cottage, as it stands at the exhibition, would be a most painful portent in a rural landscape; but the question is whether the material is not susceptible of a different treatment, without losing its practical value. Flat concrete roofing, moreover, may be applied to a brick-walled cottage; it does not necessarily imply concrete walls. One of the special problems in connexion with modern cottage building seems to be to design a concrete-roofed cottage that will not be ugly, even if the roof is flat. Can that be done?

### NOTES.

Art and  
General  
Education.

A CORRESPONDENT suggests to us that some general knowledge of the history and principles of architecture ought to form a part of general education in our schools. We agree with him; but we should go further, and suggest that some knowledge of sculpture, painting, and music should also form part of a general education. The English public, even the better educated section, are for the most part deplorably ignorant of the history and outlines of those arts. No doubt the answer, on the part of schoolmasters, would be that time is too short as it is for all that ought to be taught in a general school of liberal education, and that such an addition is impossible; but this ought not to be assumed too hastily, and without consideration as to whether there are not some studies which might be displaced to make room for a little general knowledge of the arts. We are not of those who advocate the displacement of Greek and Latin in our schools—in our opinion nothing can supply their place as the basis of a liberal education; but is the making of verses, which occupies so much time in many schools, a really necessary part of education in the classics? If one art only were to be made a part of a school curriculum, we agree that it should be architecture, not because it is the art we are specially concerned with, but because it is the one which is most universal and most interwoven with and illustrative of national history. But surely it should be possible to introduce into a school curriculum short and comprehensive primers of the three other great arts, so that a boy who has been through his school course should at least know something about them. It seems rather unsatisfactory that a youth should be supposed to have completed his education, and yet know nothing of the origin of music, nor who Josquin or Palestrina were and their place in the art, nor what a "symphony" is; nor anything about the characteristics of Greek and Renaissance sculpture; nor of the rise and development of the art of painting. As a nation we are artistically very ignorant and indifferent; some attention to these subjects in general school instruction might do much to remove this reproach.

The Panama  
Canal.

In their anxiety to push forward work on the Panama Canal the American Government made a serious mistake in commencing construction before the sanitary regeneration of the canal zone had been completely effected. The arrangements made with the Republic of Panama that new sewerage and water supply systems should be established, and measures adopted for exterminating the mosquitos which perpetuate malarial and yellow fevers. It is true that the sanitary works were by no means neglected, but until quite recently they had not received sufficient attention, and were progressing simultaneously with construction on certain parts of the new canal. The result was that hundreds of the workmen and many of the officials were attacked by fever, and demoralisation began to spread among all ranks of the staff. Fortunately, the new Governor of the canal territory has reversed the previous policy, and with the aid of Colonel Guevara, the health officer who took a leading part in the extirpation of yellow fever from Cuba, has concentrated attention upon the sanitary works. Operations on the canal itself are now stopped, and the whole of the men are engaged in making roads and footpaths, filling up swamps, cutting down thickets, and in completing the drainage and water systems. This new policy will not really have the effect of delaying the completion of the canal, for when the country is fit to live in work will be conducted on far more favourable terms, and in consequence with far greater rapidity.

Railways  
and  
Rates.

THE various reports of the railway companies and the statements made by the directors at the half-yearly meetings recently held, when they have had to meet the shareholders after a somewhat lean half-year, all testify to the steady increase in the burden the companies have to bear in rates and taxes, as well as to the fact that, in spite of adverse trade conditions, a continuous attempt is being made by the authorities to raise their valuations. Some of the companies have shown that the amount paid in rates and taxes now represents from 2 to 3 per cent. on their ordinary stocks. In times and very remote from the present these companies used to be regarded as powerful and dangerous monopolies, capable of crushing all opposition; yet now we find them brought into direct competition with the tramways, undertakings with running powers over the public roads, and which have not had to acquire the land for their lines at so much a yard as the railway companies had to do, and many of which are run by municipalities out of the rates. The depreciation in the ordinary stocks is hardly to be wondered at when it is a form of investment which makes the stockholder bear increased rates and taxes to the extent of 2 to 3 per cent. on his income, but it is remarkable that the companies and this large class of the general public have been unable to place any check on municipal extravagance, especially in view of the fact that the community at large is alive to the necessity of limiting municipal expenditure in the future.



UNTIL the results of the inquiries being made into the cause of this lamentable accident are made known, it would be appropriate to make any comment of an anticipatory nature. Serious railway accidents are comparatively rare in this country, but it is worthy of note that a considerable proportion of those which actually occur is due to derailment at curves. We all know that since the time of our leading railways were laid down considerable increase in the speed of trains has taken place, and it is only reasonable to argue that the curves which were suitable for former rates of speed are unsuitable for existing rates. It is probable, therefore, that the permanent ways of railways all over the country should form the subject of careful examination with the view of ascertaining whether the curves are such as afford reasonable security to the travelling public. Considerable improvement could doubtless be effected by remodelling sharp curves, so as to render them more suitable for the conditions obtaining in modern railway practice.

WHEN one speaks in general terms of the mineral matters of which the earth is made up—at least to such depths as have at present been attained—it is permissible to speak of them as “rock.” But when one speaks of a particular variety of mineral is in question, it is more correct to use the proper name for the substance in question. Thus, an engineer or an architect may refer to material which has to be excavated as rock, but in referring to granite and limestone on one hand, or to clay and sand on the other, the individual names are far more appropriate. The same applies still more forcibly to manufactured products such as iron and steel. Hence in describing steel as an “igneous rock” in his lecture before the British Association, Professor Arnold imposed a somewhat severe strain on modern terminology. The lecture itself, however, contained much instructive matter. Steel is probably one of the most complex substances extant, and the causes which lead to its unexpected failure, in perhaps one case out of ten thousand, still baffle metallurgists. As various failures show, the product sometimes behaves more like glass than as a ductile metal. The lecturer stated that researches made at Sheffield University proved that steel has a high elastic limit was as a general rule more liable to rupture than low-limit steel. In concluding, he urged that if Great Britain was to maintain her supremacy in the production of armour plate and projectiles, the scientific study of steel ought to receive far greater national recognition than had been accorded in the past. The same may be said of many other branches of investigation, and notably of those which are being undertaken in a small way by the National Physical Laboratory.

ONE of the most practical papers contained in recent volumes of the Proceedings of the Institution of Civil Engineers concerns the investigation made by Mr. C. W. L. Alexander at the University of Birmingham as to the resistance

offered by pipe bends and elbows to the flow of water. For the purpose of these experiments, the bends and elbows were made of pine, carefully varnished with shellac, and rubbed down very smooth with glass paper. A length of straight pipe was also prepared for the comparison of results. The object of the experiments being to determine the loss of head for different degrees of curvature at different velocities, the curve of loss for a straight pipe was first ascertained per unit length. Then a table was prepared showing the loss of head at various velocities for a length of straight pipe equal to the length of the centre line of the different bends and elbows tested. When the losses for these had been obtained and plotted, the exact effect of each was clearly seen. It appears that the loss of head at a bend follows the same laws as those governing the loss in a straight pipe, and the obstruction does not cause anything in the nature of a shock until the bend assumes the form of a sharp elbow. For the formulæ derived by the author we must refer our readers to the paper itself, but may mention two interesting practical points. The first is that the curve offering the least resistance is one with a radius of  $2\frac{1}{2}$  diameters, and the second that the resistance of such a bend is 3.38 times the resistance of an equal length of straight pipe.

Electric Fuses.

THE paper on “Low Tension Thermal Cut-outs,” by A. Schwartz and W. James, recently published in the *Journal* of the Institution of Electrical Engineers, will be useful to electricians. The “thermal cut-out” or fuse is a very simple device to protect electric circuits and apparatus from damage by large currents. It consists simply of a piece of thin wire placed in the circuit. This melts when the current attains a definite value depending on the gauge and material of the wire, and so ruptures the current. The simplicity of the device has probably prevented it from receiving the study which it deserves. Formerly tin and lead wires were almost universally used, but the introduction of higher pressures brought into prominence several defects of these metals. It was found that an arc was frequently established between the terminals when the fuse wire melted, and before the arc went out the fuse block was destroyed. In addition they were frequently found to be untrustworthy. The authors have found that one reason for this is the excessive oxidation of the surface of the metal, due to the use of very thin wire, which heats considerably at the normal current. They recommend that the fuse should be rated so that the normal current is only half the current at which the fuse melts. The present rating makes the normal current two-thirds of the fusing current, and hence the wire heats excessively and oxidises rapidly. This entails frequent inspection and replacement of fuses. We agree with the authors in considering that for the ordinary pressures used in practice the best open fuse is a piece of tinned copper wire of a suitable gauge, about  $2\frac{1}{2}$  in. long, held in a porcelain clipholder. With copper the arc is much less persistent than with tin or lead. From the point of view of the risk of fire it is essen-

tial that small fuses should not be interchangeable. In practice this is easily secured by the use of cartridge or plug fuses, but clip fuses can also be arranged so that a large fuse cannot be placed accidentally or otherwise in a circuit consisting of only a few lamps. The authors have found that when a fuse is placed horizontally it requires a larger current to melt it than when it is placed vertically, and that the larger the terminals to which the fuse wire is attached the greater will be the current it can carry. They have also made tests on silver and aluminium fuse wires, which are rapidly coming into favour on the Continent.

Victoria Falls and Electricity.

AN important discussion at the British Association meeting was elicited last week by the lecture of Professor Ayrton and the paper of Mr. Hammond, both dealing with the possibilities of the Victoria Falls as a source of electric power. No doubt these falls will some day furnish power for mines and cities scattered over an immense area, and a project is already on foot for utilising some portion of the power now running to waste. As Mr. Hammond remarked, there are no engineering difficulties in the way of supplying all the mines on the Rand with electrical energy, the main point for consideration being the cost of production and transmission. Until the demand has very largely increased in comparatively distant areas, it will probably be far more economical to establish central stations in the proximity of the places where energy is required, and where coal is both plentiful and cheap.

A Literary Museum for Edinburgh.

PROPOSALS are made for the establishment of a literary museum for the deposit of exemplars associated with the literary history of Scotland and the capital city. It is suggested that the old house, known as Lady Stair's, on the north side of the Lawn Market, might be appropriately acquired for the purpose. The house, bearing an inscription with date “1622,” and standing between Lady Stair's and Gladstone's closes, had a garden reaching by a steep incline to the North Loch and at one time commanded a view of the Firth of Forth and the hills of Fife. It was the home of Eleanor, Viscountess Primrose, who married for her second husband John, second Earl of Stair, and having formerly played a notable part in the story of fashionable life in Edinburgh, is the scene of Scott's tale—“My Aunt Margaret's Mirror.” Nine years ago Lord Rosebery purchased the house in honour of his ancestral relative, and employed Mr. G. S. Aitken, of Edinburgh, to restore the fabric to its pristine condition. The south and north wings, both being later extensions, had been pulled down some months previously, and two flats, of two panelled rooms a-piece, had been added at the building, in the XVIIIth century, of the adjoining James's-court. The extension of the north side contained in its lower basement a wine-cellar having bins formed of small Dutch bricks. In the course of reparation Mr. Aitken found that a floor had been inserted in the hall, originally two stories high; the



turnpike-stair from the door in the south-east angle, giving access to the vaulted basement and to the hall, was intact; on the north side of the hall were two rooms of which the upper one was entered from a gallery around two sides of the hall at the second-floor level; the hall retained fragments of a large stone fire-place, similar to that in Craigmillar Castle. Lady Stair's house was recently occupied, for temporary purposes, by the United Free Church of Scotland.

Two years ago a project was opened for the encouragement of art in South Africa by way of founding an academy to provide a comprehensive education in the arts and crafts. The scheme had the support of many leading artists in this country, and is now assuming a more definite shape under the presidency of Sir William B. Richmond, with Mr. Whale, of Cape Town, as vice-President. It is proposed to seek for affiliation to the Royal Academy, London, and for a Royal charter; and to constitute a Royal Academy for South Africa, to consist of twenty-four Academicians and eighteen Associates, to be elected in the first instance by the projectors and the Committee of the South African Society of Artists conjointly.

#### STEPS AND THEIR TREATMENT.\*

The subject for discussion embraces a wide area, and, if considered fully, would occupy more space than can be afforded in this paper. Stairs do not come within the scope of this paper, nor shall I deal with methods of construction. A consideration of the broad aspect of the architectural treatment of steps will, I think, provide sufficient matter, and within these limits I propose to confine myself. There are so many points to be considered, if the subject is discussed in detail, that it is impossible to deal effectively with more than general principles in a short paper such as this.

The variety of treatment to which simple steps lend themselves is as amazing as the endless melody to be obtained within the limits of a two-octave board. The scales upon which both are based are in a way parallel. The incidents and adaptations which produce the variety, however, are in the former cribbed within comparatively narrow limits.

The stepped pyramid at once lays down a fundamental scale upon which to fashion our compositions. The broad and simple conception forms a grammar of expression, beyond which we must not trespass too freely.

If we can fancy a monument at the apex of the pyramid, the steps or terraces assume a different meaning. Some Persian monuments are of this type, notably the tomb of Cyrus, which is raised upon the platform of a truncated pyramid.

In Central America the Teocallis, or houses of God, were built in a like manner, as were also many palaces. The palace at Palenque is an interesting example of a variation upon this treatment. The building is a simple parallelogram on plan, and is raised on a platform, which, instead of being stepped, is sloped inwards. Access is obtained by a huge flight of steps cut into the slope extending almost the whole length of the longer side. The Teocalli of Tusapan shows an attempt to add greater prominence to the steps as a feature in the design.

The Persians raised their palaces upon a base of great stone terraces, and each terrace was provided with two flights, the steps being set at right angles and housed into the wall at one end. The plan of the Palace of Persepolis shows this arrangement.

The use of steps in this way is always

splendid, and their sober simplicity commends itself to the cultured and uncultured alike. The monument on a tumulus, or the city on a Del, are each inspired by the same feeling. The conception being primitive is therefore reasonable. This layer-like arrangement of the base commended itself to the Greeks, and their appreciation of its value is shown in their use of the stepped stylobate to their temples. In this treatment is the use of steps made perfect as an integral part of the design. They are the plinth to the building. There is no other arrangement which could possibly be so satisfying, and it is impossible to imagine anything more reasonable.

Of course, the proportion of these steps was relative to the column of the order, and their convenience as footways was a secondary consideration. In the Temple of Zeus at Olympus, as in other examples, the large proportions of the steps forced the introduction of a minor flight leading to the central intercolumniation. In adapting Greek work to modern uses the difficulty must be got over in some such way. The portico of St. George's Hall, Liverpool, illustrates an effort—unsuccessful, I think—to solve the problem. Here there are three minor flights introduced, with the result that the breadth of line, which is the whole charm, is entirely lost. In the Olympus example the flight occupies only a very small part of the whole, and the dignity and rest of the base is not seriously affected.

Precedent in all things dies hard, and none more so than in architecture. The fragmentary retention of a feature which is beautiful because of its entirety is unwise. It becomes a makeshift, and is an unwarrantable mutilation of a beautiful thing.

This broad understanding gave way—by reason of demand—to a littleness of conception much in the same way as the beautiful serenity of Greek sculpture gave way to the pretty prettinesses of the sculptor's imagination.

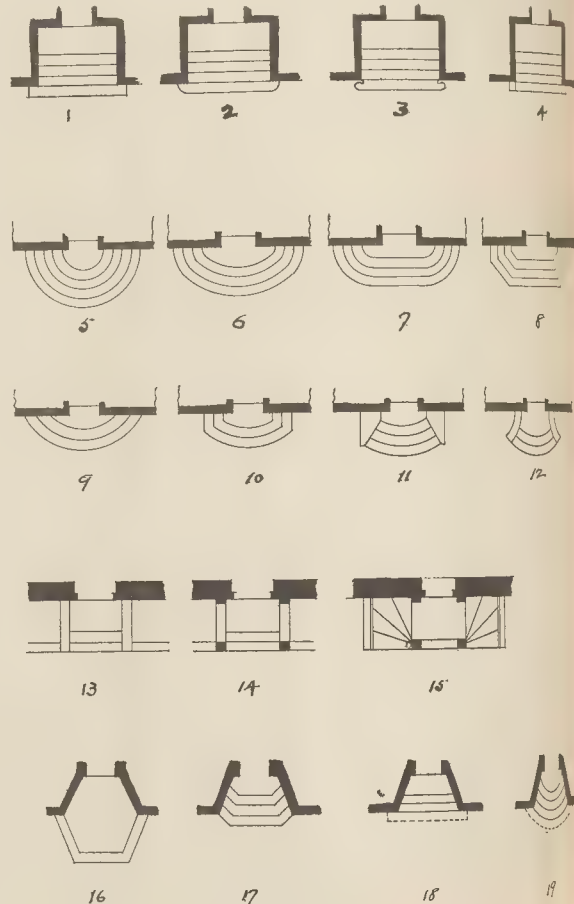
The Romans saw the difficulty not as the problem by simply redoubling the proportion of the steps. In the styles we have followed the increased variety of building caused a still further breaking away. The broad feeling has never again been so much except, perhaps, in those great buildings of medieval times which were floored at the ground level, thus enjoying even greater inheritance. Steps became catalogued as a separate item in the minds of architects and were treated as such.

The stepped stylobate becomes more rare. There are a few later examples, however, notably the cathedral at Orvieto, which stands on a projecting platform surrounded by continuous steps.

Except in minor features, such as porticoes, returning steps were abandoned. Indeed they departed with the peristyle which served. Flights in one great hall, such as the whole width of the facade, were protected at the ends, were staircases, as in the Temple of the Sun at Baalbek, and Madeleine (Paris), and the British Museum are some of many examples of this type.

A modification of this often comes by breaking the flight into intercolumnar flights starting the first step in line with the last plinth, as at St. Sulpice, Paris.

The great flights to the west portico of St. Paul's are a most satisfying treatment. The two great flights are treated differently: the lower flight returns on itself, and the upper flight is protected at the ends. The same



\* A paper by Mr. A. C. Dickie, read before the Architectural Association Discussion Section on February 1 last.

or lar steps to the north portico are equally exciting. Here the effect of the unbroken ramp is charming. It is much more effective than the south portico on account of there being eleven risers, instead of five, thus emphasising the feature more strongly against the intercolumnar steps.

The portico of London University, Gower-street, is a beautiful example of returning steps around the three sides.

In St. George's, Bloomsbury, the flight is contracted, and embraces only four of the columns of the portico. The result is unhappy, and its meagreness detracts considerably from the general effect. The "New Church," Berlin, illustrates the same accuracy.

The theatre at Malta shows an unusual arrangement. A parapet is carried across the top of the platform, and the traffic is divided by the returning flights at the angles, which are themselves sub-divided by the introduction of angle piers. From the landing reached by these flights the portico is approached by a broad flight passing through the intercolumniations.

The broad use of steps as a great street approach to a building is shown in the Piazza di Spagna, at Rome, which leads up a continuous flight to a landing, from which minor ways sweep to the right and left round to the entrance.

Stepped streets have a peculiar fascination, and there are no more splendid examples than these in the streets of Malta. They are arranged in simple flights, which vary in length as necessity demands. Seen from below the vista and the ascending figures on the great ribbed incline is an imposing and picturesque sight. Clovelly furnishes another example much nearer home. The way to the Colonna Romana at Brindisi is an example of the same without intermediate landings.

There are many examples of what may be called the "public way" use of steps. The stepped way from the Temple area to the Pool of Siloam, at Jerusalem, is of more than usual interest. The steps near the Pool were originally cut in the rock, and are arranged in narrow and wide treads alternately. They are not at right angles to the rock scarp upon which they butt, and this peculiarity has been explained by Mr. Crace as a method to drag the traffic away from the unprotected edge of the Pool scarp. This would not, however, apply to ascending traffic.

The great flight of steps descending through the piers of the north aisle of a later church built over the street is an interesting and unique arrangement.

The Renaissance gives unlimited variations of the use of steps; some of them grandiose to the most extravagance and many of other modesty.

In France the greatest freedom of line in planning is observed. Double O.G. flights occur in the court of the Louvre, and many more unreasonable forms are to be found elsewhere. The varying radii make it extremely difficult to preserve the balance of the body, and the effect is not sufficient reward for the inconvenience. The great double flight to the entrance of Fontainebleau is another specimen of this class. It has nothing to recommend it. Of itself it is a shapeless, ill-conceived mass, bearing no relation to the facade it so sadly mars. From the top landing you descend in devious ways, first round a semi-circle, then across a square landing, and finally you are screwed round a sharp O.G. almost into the opposite flight, where you scarcely know whether to stop or go up again.

Compare this with the steps to the Caprara, which so admirably fit the building.

In the directness and simplicity of the plan lies its propriety. A more elaborate use of the same is seen in the facade of the Palais du Sénateur. It will be difficult to find a more perfect adaptation of steps to a building fulfilling in every respect the demands of the mind and the eye. It is a rare and parcel of the base story, and carries the harmony of the design through the whole width of the facade.

In an example at Monte Caprino the flights are arranged at either side of the facade, and the plain, raking sides of the step walls are so arranged as architectural features flanking the main. The crude effect of this raking line against the perpendicular is cleverly got over

by the batter in the wall from the junction of the step wall, and the perpendicular of the angle turrets. There is no over-straining, it is simply reasonable; the only effect required to bring the two into harmony being the introduction of the batter to the side walls.

The Giant's Staircase in the Court of the Doge's Palace is a beautiful and simple arrangement of two direct flights with intermediate landings. Personally, I confess inability to raise much enthusiasm for it as appropriate to the building. In spite of the most respectful consideration of it from all points of view, I cannot help doubting its propriety, and wishing it was elsewhere. It has the appearance of an afterthought. It lies awkwardly in the angle of the building, and the manner in which the steps are cut into the upper landing seem to indicate considerable scheming on the part of its designer to get over the want of space.

Michael Angelo's famous steps to the Biblioteca Medici, at Florence, are the most strikingly original of all the endless varieties. The three flights side by side are fashioned by some uncanny skill and artistic power into a thing so fascinating that one scarcely cares whether it is of use or not. As a treatment in harmony with the facade, it is altogether satisfying. As a problem, it is most difficult of treatment.

At Siena is a staircase with two flights, the lower one returning round an octagonal column up to the landing from which the upper flight rises. Whether there is any practical reason for subdividing the traffic in the lower flight I do not know.

In a palace at Genoa is a flight of steps broken into three by the columns supporting the roof. The use of sculpture to get over the unhappy attenuation of the pedestal at the first step is the principal lesson to be learned here.

English domestic work provides many examples, especially in houses of the palace type. The artistic value of steps to houses and to terraces around these houses, as well as their uses in formal gardening, has been realised to the utmost. Flights are usually direct, and the segment is more common than the ellipse. The loose lines of the French examples are seldom seen, and I think we can lay claim to the fullest appreciation of the limits within which step design must be confined.

It is difficult to imagine anything more serenely beautiful than the steps to the garden front of Prior Park, Bath. The flights are divided at fitting stages, and the great sweeping flights to the first landing are used as a screen of the greatest value, both practically and artistically. The arrangement is altogether simple, and the effect of the great stepped height is retained, while its practical inconvenience is minimised.

Another well-known example is Lord Burlington's house at Chiswick. Here the problem and its solution are altogether different. The flanking zig-zag flights are very beautiful of themselves, but it is questionable whether they add to the beauty of the facade. The moving lines rob the base of its rest, the double bottom flights seem unnecessary, and it is worthy of discussion whether it is anything more than an interesting failure.

The steps to the orangery at Bowood House are dainty and beautiful. The straight flight is housed at the ends excepting the lower steps, which project from, and are turned back on to, the flanking pedestals.

I have sandwiched the Chiswick example between this and the Prior Park one to illustrate more clearly the dignity and restraint of both. They are entirely different problems handled by artists of entirely different architectural feeling. Both are evolved from identical reasoning. The Chiswick example differs from each of them as much as it differs from the facade which it serves.

The steps to Seaton Delaval are very ungraceful; they fit the portico badly, and look particularly dull and uninteresting.

The garden entrance to Highhead Castle, Carlisle, is a treatment perhaps more often used in smaller houses. It is less pretentious, and not so monumental as the others, but its quiet homeliness is charming.

The mural fountain at Bowood is an example of double segmental flights happily arranged.

In the smaller and more modern class of

domestic steps the variety is proportionately great. I have drawn rough diagrams of some arrangements which are common. Figs. 13 and 14 are the usual London house steps; one is uncovered, and the other is covered by the usual portico. Both are equally appropriate. Fig. 15 is slightly more elaborate, and shows a double flight of wheel steps. This is from a house in Oxford-street, where a limited projection is allowed. I pass the house every day, and am always struck by the delightful privacy given to the entrance.

Let us suppose a doorway in a deeply splayed ingoing such as that shown. The first plan (16) shows the steps projecting from the opening and forming the other three sides of the hexagon. As the completion of the figure is not conveyed in actual execution, it becomes merely paper architecture, and falls with the rest of its class. Another method which is to be seen in old work is that shown in Fig. 17. The practical effect of this is to make it impossible for two to walk abreast, the mitres are awkward, and the uncertainty of the choice between the different faces is annoying. The next figure (18), which shows the straight filling of the space, is the most satisfactory arrangement, the nearest approach to which is the segmental form (19) shown next to it.

If steps are enclosed between two walls it is always awkward to have the bottom steps projecting beyond the face of the wall. A few of the commonest ways of making the best of it are shown (Figs. 1, 2, 3, 4), none of which look well. Semi-circular steps (5) always look well if they are not too numerous. When they exceed four or five in number they become obtrusive. Segmental steps to a large radius are objectionable on account of the unhappy line at their junction with the wall (9). This is sometimes got over by cutting the ends back on to the wall (10). An elliptical form (6) is more satisfactory than any of these when the number is considerable. In many of the Venetian examples this form has been adopted.

The proportion of tread to riser is given by Tredgold as 2 risers+1 tread=24 in., and I fancy some compromise of this is a safe standard. It is unnecessary to give figures and instances. Personally I believe that, if the tread is never less than 12 in., an inch out or in in the riser is not of serious consequence. Whatever they are they must be all alike in each flight. The astonishing readiness with which one instinctively adapts one's step to any particular proportion is reflected in the suddenness with which a change in that proportion is felt.

Steps should not only be safe, but they should also appear safe. It must be remembered that we not only go up, but we also come down. It is the descent which shows the defects. Even the most nervous can ascend without fear. To descend, however, where there is any degree of incident occurring causes concern in spite of the most intimate acquaintance. This uneasiness exists until the incident is past. The ideal descent is that which can confidently be made without thought or consideration of your footing. To do so the flights must be straight and the steps of equal number and proportion, and the landings of equal width.

A number of flights in one straight line, although architecturally imposing, have the disadvantage of appearing too formidable. In dealing with a problem such as this we must pay careful attention to staging. The more interest that can be added to each stage the less is the ascent felt. At the same time the effect of the great steep must be preserved as much as possible. Prior Park may again be instanced as a happy compromise of these two claims.

Zig-zag steps to a great height are altogether convenient, but never imposing. The man with a "heart" would much rather face the series of returning flights which decoy him to the top than he would a long straight ascent. The momentary rest which pivots him round the newel is a distinct relief.

The object of steps is to give access with the least exertion, and to provide egress with the greatest safety. This object must always govern architectural treatment; at the same time it must make terms with the broad laws which govern architectural expression.





the Kettering Urban Council promoted a Bill in Parliament to obtain power to purchase the waterworks' under-lying from the company then owning them, and it was very evident that it would be necessary before long to obtain an additional supply; estimates showing that at the present rate of increase in the water consumption the available surplus water would be taken up in four years.

The works purchased comprised a storage reservoir of 160,000 gals. capacity, near the village of Cransley, with a gathering ground of 1,805 acres. The average rainfall in this area, as determined by the late Professor Symons for the arbitration, amounted to 21.2 in., and the average of three consecutive years 21.2 in., leaving, after deducting 4.8 in. for evaporation, 5.2 in. available for collection, equal to a daily supply from the source of 581,932 gals. From this 210,000 gals. per day had to be deducted for transference water, leaving 346,795 gals. per day available for supply to Kettering. There were also two well-pumping stations, together equal to 100,000 gals. daily, making a total available supply of 656,795 gals. per day. The population of Kettering was then about 22,000, and the number of water consumers, situated at 53 per house taking water, was 1,206; the daily consumption was 485,820 gals., leaving a surplus of 170,975 gals., which with an annual increase in the daily consumption of 40,000 gals., would evidently last not more than four years.

The Council thus had early to consider the necessity of additional works, and in 1899 they asked the late Mr. James Mansergh, M.Inst.C.E., to advise them as to what works should be undertaken, and to assist them in obtaining the necessary Parliamentary

Mr. Mansergh's then partner, Mr. Geo. R. Norton, M.Inst.C.E., soon after made a careful examination of the country in the neighbourhood of the Cransley reservoir, and from there as far as Naseby, where the River Nidd flows, with the hope of finding a source which would allow of a gravitation scheme to meet all the requirements of Kettering for the next twenty or thirty years. No position for a reservoir could, however, be found, and the configuration of the country was offering very small collecting areas for a reservoir at a sufficient elevation for a gravitation scheme. Mr. Mansergh, therefore, recommended in his report that reservoirs should be constructed in two valleys immediately adjoining the present gathering ground at Cransley, the sites selected being at levels that the water would gravitate to the Cransley works where the filtration and pumping would be done, the existing works being enlarged from time to time as consumption increased.

The two collecting areas were almost equal, the Thorpe Malsor area being 1,330 acres, and the Orton area 1,360 acres. The estimated quantity of water available for the Thorpe Malsor area was 399,000 gals. per day, and for the Orton area 397,500 gals. The average dry-weather rainfall for these calculations was 20.8 in., which, after deducting 4.8 in. for evaporation, leaves 4.8 in. available for collection. This was a smaller basis than previous calculations, as it was computed on recent dry years had lowered the

The compensation water to be given to the Orton reservoir, put at 115,340 gals. per day from the Cransley reservoir, and 116,025 gals. per day from the Orton reservoir, these quantities being about midway between one-fourth and one-third of the total quantity available, and the Thorpe Malsor for consumption in Kettering 283,660 gals. per day from Thorpe, and 281,475 gals. per day from Orton, or a total of 565,135 gals. per day from the proposed new works. The total available water supply for Kettering according to these calculations was 1,177,166 gals. per day.

The Council went again to Parliament to obtain the necessary powers to construct the works advised by Mr. Mansergh, and the two reservoirs referred to in the Orton reservoir to have an embankment 7 ft. high, a capacity of 90,000,000 gals., and a top-water level of 350 ft. above O.D., and a main delivering the water at the Thorpe reservoir to have an embankment 46 ft. high, a capacity of 100,000,000 gals., and a top-water level of

335 ft. above O.D., the delivery main from this to convey the water from both reservoirs to the Cransley reservoir. The Cransley reservoir has an embankment 32 ft. high, a capacity of 160,000,000 gals., and a top level of 298.5 ft. above O.D. At these works there were three filter beds, each of 500 sq. yds. area, and a pair of Worthington pumping-engines, each of a capacity of 500 gals. per minute, or 720,000 gals. per day for twenty-four hours continuous pumping, delivering water to the town through a 12-in. main, 4,400 yds. in length, the working head against the pumps being about 70 ft. Mr. Mansergh's scheme further provided for two additional filters, a filtered water tank of 100,000 gals. capacity, and additional pumps at Cransley; a high-pressure tower with tank of 100,000 gals. capacity in the town at Clover Hill to improve the pressure at the higher parts, with pumps for supplying the same for the present service reservoirs, and new trunk mains arranged to serve the town in three separate districts, one high level and two low level. The estimate for the whole was 126,500l.

The Bill, which cost the Council 3,291l., received the Royal assent in July, 1901.

The award of the umpire in the arbitration for the price to be paid by the Council for the purchase of the works was 127,880l., and when to this were added the company mortgage debt, expenses of the Act, arbitration, winding-up of the company, compensation to company's officers, and legal expenses, the total cost to the Council became 148,111l., for works on which the total capital outlay by the company only amounted to 72,025l. This heavy expenditure, much in excess of the highest estimates that had been formed, together with a further expenditure of 40,000l., to which the Council were committed for electricity works in order to avoid the loss of their provisional order, and the formation of a monopolist company, made the Council anxious to delay these new works of water supply as long as possible. But the exceptionally dry year of 1902 made it evident that more water must be provided, and in November of that year they decided to undertake the construction of the Thorpe Malsor reservoir, that being the nearer of the two reservoirs to their existing works at Cransley, and appointed the author their engineer to design and carry out the works.

These works comprised an embankment, with culvert under, valve tower, overflow weir, and waste-water channel, and a culvert bridge at the upper end of the reservoir with raising the road crossing the stream there to keep it well above the top-water level of the reservoir which would back up to this point. Arrangements had also to be made to supply the village of Thorpe Malsor with filtered water as compensation for the loss of their existing supply of spring water by a ram working in the valley on the site for the new reservoir, and which would be drowned when impounding the water by the new works; also for the diversion of the drainage of the village of Loddington, situated a mile above the new reservoir embankment; and a caretaker's cottage was to be built at the entrance to the site.

The site of the works was three miles out of Kettering, in the valley adjoining the south side of the main road to Market Harborough and Leicester. The strata of the neighbourhood, and generally round Kettering and over a large portion of Northamptonshire and parts of adjoining counties, consisted of a series of beds of sands, sandstones, limestones, and ironstones, known as the Northampton sands; they formed part of the inferior oolite, and rest on the blue clay of the upper lias. The latter was locally a very thick bed of clay, much worked for brick-making, and had been worked on the reservoir site for clay for the puddle wall of the embankment.

The embankment would be 840 ft. long at the top, and 46 ft. high at the centre; the width at the top would be 12 ft., the inner slope 1 in 3, and the outer slope 1 in 2 1/2 for the upper half, and 1 in 2 1/2 for the lower half, with a level benching, or beam, 4 ft. wide, at the junction of the two slopes. A wall of puddled clay was formed along the centre line of the embankment, and would be carried up to within 2 ft. of the finished level. It was 6 ft. wide at the top, and had

a batter of 1/2 in. to 1 ft., or 1 in 24, on each side to ground level, so that the thickness at ground level at the lowest part of the valley was 9 ft. 9 in. This was continued in the ground below, a trench being cut through the surface strata and sufficiently into the blue clay beneath to form a sound junction with it, the minimum depth in this clay bed being 5 ft. in the lower parts of the valley, and 3 ft. at the upper ends of the embankment.

The culvert for the draw-off pipes was placed in a trench under the embankment, out in the ground part way up the north side of the valley so that it was completely enclosed in the solid ground and protected from stresses arising from settlement of the bank. It was of horseshoe section, 6 ft. diameter, constructed of two rings of brickwork in cement-mortar—one part cement to two parts sand—with a rendering of cement mortar 1/2 in. thick between the two rings; the inner ring was of Hamblet's blue wire-cuts made with radial sides to suit the curves. The brickwork was placed on a foundation bed of cement-concrete, and surrounded with the same material.

The inner end of the culvert terminated at a valve tower situated just inside the toe of the inner slope of the embankment. The position was determined by the draw-off valves for the main to Cransley, which were placed at 12 ft., 24 ft., and 36 ft. below top-water level, the arrangement being that the bottom draw-off, together with the compensation draw-off, which was 3 ft. lower, was placed in the fore-bay channel at the foot of the tower, and the next draw-off in the side 12 ft. higher, was just above the pitching on the slope on the embankment.

The construction of the Thorpe reservoir was commenced in September, 1903, and should have been completed by the end of March, 1905; but the work was much delayed by the wet season following commencement. It would have been completed early in August, but for a subsidence of a part of the embankment between the valve tower and the south end, which occurred at the end of May last. The embankment was then within about 7 ft. of its finished height; the lower portion of the outer slope had been roughly soiled, and on the inside slope some 1,500 yds. of stone pitching had been placed on the lower portion of the south end.

The first thing noticed was a local settlement of the puddle wall, which began to attract attention about the beginning of the last week in May, and, at the same time, the pitching began, apparently, to travel down the slope of the embankment and crumple at the foot. This continued during the week, and by the end of the surface of the puddle wall had sunk about 5 ft., the inner slope had bulged outwards considerably, and several cracks appeared parallel to the line of the embankment for the length of the subsidence, but considerably transverse to this line towards the ends, and on the Saturday it was also evident that the ground immediately at the foot of the embankment on the inside was moving and crumpling up under the pressure of the weight of the embankment. As these movements continued to increase, the Water Committee, at a special meeting on the site the following Monday, considered it would only be wise to take further advice, and instructed the author to consult with Mr. Geo. R. Strachan, M.Inst.C.E., as to the best course to pursue.

The portion of the embankment affected by the subsidence was a length of 250 ft. between points 250 ft. and 500 ft. from the south end. In order to determine the nature of the movement at the foot of the inner slope, four lines of pegs, 4 ft. long, were driven into the ground, the first row near the foot of the slope, the second 10 ft. away from the first, the third 30 ft., and the fourth 60 ft., the rows being set out parallel to the centre line of the embankment. Observations had already been taken of the movement of the puddle wall, but a centre line of pegs was now put in and another line at the foot of the outer slope, as this side had bulged slightly, though no movement had been noticed at the foot. The pegs were accurately lined and levelled, and observations were taken on May 31, and June 1, 3, and 5. By this time the puddle wall had sunk another foot at the central part of the subsidence, making a total of 6 ft., and had



moved inwards 5½ in., making a total movement inwards of about 18 in. At the foot of the inner slope the pegs in the first line were opposite the central portion, and the subsidence had travelled from 8 in. to 11 in. up stream, in the second line from 5 in. to 6 in., and in the third and fourth lines from ½ in. to 1 in.; the general line of movement being not square to the embankment, but somewhat on the skew, away from the steep side of the valley at the south end, and towards the centre line of the reservoir. There was also some alteration in the level of the pegs.

It appeared from these observations that the ground was giving way under the pressure of the embankment, and moving bodily up-stream, and to stop the movement and secure the embankment Mr. Strachan advised that a line of piles be driven for a length of about 200 ft. parallel to the foot of the slope, and about 20 ft. away from it, and that a heavy toe be formed over the ground extending about 25 ft. beyond the piles, and about 15 ft. thick, and that from this platform a new inner slope be formed against the original bank with a slope of 1 in 4.

No movement was observed for some time on the outer portion of the embankment, and it was therefore only proposed to add weight to it by flattening the slope below the 4-ft. beam 1 in 3½. Later there was a slight movement opposite the central portion of the subsidence, and it was decided to drive a row of close piling for a length of about 180 ft. on this side, also to ensure the safety of the bank. The whole of the piles had since been driven, and the alteration to this part of the embankment was now well in hand.

Mr. G. W. Lacey (Oswestry), in moving a vote of thanks to the author of the paper, referred to the heavy Parliamentary costs in connexion with the waterworks undertaking. The sum of 3,291l. seemed a lot of money to waste in obtaining powers to fulfil the duties imposed upon the local authority by the public health of the district. As to the subsidence of the embankment, he wished to ask Mr. Smith if he had discovered any cause for this which was not discernable by any bore-holes in the strata. It seemed peculiar that it should go at one point when the strata appeared to be the same throughout the valley. He took it that the piling had stopped any further subsidence.

Mr. J. P. Norrington (London), who seconded, remarked that the whole of the trouble at the reservoir must have arisen from some defect under the embankment. The question was largely a geological one.

Mr. Jenkins (Finchley) asked whether any borings were taken under the site of the reservoir, and, if so, what strata was found; evidently the strata was not stable.

Mr. W. L. Thorp (Malvern) said they were spending 23,000l. on new waterworks, and had to spend 2,000l. to 3,000l. in getting powers. When there was so much talk about municipal extravagance, he thought it time that Parliament took steps to lessen the burden of obtaining powers to do necessary work.

The Chairman said it was a crying shame that the cost of obtaining powers for constructing necessary sanitary works was so very heavy. He was concerned in a sewerage Bill which passed Parliament two or three years ago, and the Parliamentary expenditure in that case was 19,900l. That was a Bill which was opposed in both Houses.

The vote of thanks having been passed.

Mr. Smith replied to the questions which had been asked as to the subsidence of the embankment. He explained that the valley was flat-sided. They saw what was underneath in taking down their puddle trench, which was 20 ft. deep. It looked good enough to carry the weight, and that was proved by the down face of the embankment, which had not given. He could not say more about it than this—that the natural drainage having been cut off, the land became waterlogged, and had not proved equal to carrying the weight. The expense they were now being put to was pretty much the same as if they had had to form concrete walls at the start. Mr. Strachan was there the other day, and he said it was in much better condition than he expected to find it. However, they were not satisfied with that; they were going to put a shaft down to test the embankment. They would start with the lowest point of the subsidence, and put the

shaft down to the original ground below, so they would be able to see what had happened to the puddle wall.

#### Electricity Works and Refuse Destructor.

Mr. F. J. Bakewell, A.M.Inst.E.E., presented a paper on the Kettering combined electricity works and refuse destructor. He said the undertaking had so far proved very successful, in spite of the great depression in trade and the very keen competition which had been met with from the gas company. This success was partly due to the low charges for energy—namely, 4½d. per unit for lighting, and 2d. and 1½d. per unit for power—and partly to the Council's scheme of wiring consumers' premises, and supplying motors for a small rental, or on hire-purchase; the charges being 6 per cent. and 8 per cent. per annum for the wiring of houses and the supply of motors respectively, and 12½ per cent. per annum for either on a ten years' hire-purchase, these percentages being reckoned on the actual cost of the installations to the Council.

One of the chief advantages of this system of assisted wiring was that the Council's engineer could insist on the installations being wired to his own specifications, and thereby obtain a much better class of work throughout the town than he would of work having power to enforce. As a comparison between the relative cost of electric light and gas very satisfactory testimonials had been received from numerous consumers, pointing out that their bills for electric energy, both for lighting and power, had either come out less or very slightly more than their previous corresponding gas bills, although they had a much better light, with its numerous advantages.

The working costs of the station had been very satisfactorily brought down during the ten months ending March 31, 1905, and have been reduced from 4½d. per unit sold in June, 1904, to 1½4d. per unit sold in March, 1905, averaging 1·76d. per unit sold for the whole ten months. Although the combination of the destructor with the electricity works was a decided saving to the Council as a whole, the working costs were not in any way reduced as far as the electricity works were concerned, but were, if anything, slightly increased, as the whole of the steam used from the destructor boiler was paid for to the public health department; and an extra amount of coal was used owing to one of the station boilers having to be always kept banked in case of the failure of steam from the destructor, although this extra was, as far as possible, taken into account in estimating the coal equivalent of the destructor. In order to obtain this coal equivalent very careful readings had been taken each month of the evaporation and coal consumption per unit generated of the station boilers, the amount of coal used per hour for banking, etc., and the evaporation per unit generated of the destructor boiler, whenever either had been used separately. From these results average figures had been obtained for the number of pounds of coal used per unit generated by the station boilers, after eliminating the coal used for banking and for the initial raising of the boilers to working pressure, and the number of pounds of water evaporated per unit generated by the destructor boiler. From the results obtained, 8 lb. of coal per unit generated, and 70 lb. of water evaporated per unit generated by the destructor boiler, had been decided on; so that, by dividing the total water evaporated by the destructor boiler during each month by seventy, the number of units generated by destructor steam only were obtained, and, on multiplying this amount by eight, the nearest coal equivalent of the destructor steam for the month was obtained.

The total amount of coal saved by the use of destructor steam during the ten months ending March 31, 1905, worked out by the above method to 389 tons, at 11s. 10d. per ton, including cartage, which was equal to 230l. payable by the electricity department to the public health department, from which an amount, reckoned at 50l. per annum, was deducted for management and wages of men employed by the electricity works for attendance to the pumps, boiler cleaning, and other incidental work done on the destructor, etc. The results obtained by the destructor itself had been very satisfactory, about 14 or

15 tons being destroyed per day by one shift of three men working ten hours per day in the summer months, and about 20 to 22 tons being destroyed in the winter months by one shift of two men working eight hours per shift. In order to obtain these results, the destructor had to be shut down for two or a half days once in every four weeks in summer, and once in every four weeks in winter, for cleaning out the combustion chamber and flues. An interesting result of the high temperatures normally obtained in the combustion chamber was that the fine dust deposited there was solidified into a very hard mass, which had to be broken out with wedges and sledge hammer. It was very satisfactory to notice that the usual dirt and unpleasantness of the destructor, which was one of the chief objections of electrical station engineers to combined works, had been very efficiently kept out of the engine-room and station house by the general arrangements of the works, and by having the whole of the destructor department thoroughly swept and washed down every day.

Mr. T. R. Smith also contributed a paper on the electric light and power station and refuse destructor at Kettering.

On the proposition of Mr. G. W. Lacey (Oswestry), seconded by Mr. H. Richardson (Handsworth), a vote of thanks was accorded to the authors of the papers.

The members had luncheon together at the Royal Hotel, and the afternoon was devoted to inspections of the electricity station and the new reservoir.

#### ARCHAEOLOGICAL RESEARCH IN EGYPT.

We have received the following circular from the "Egyptian Research Account," which we reprint in hopes that the subject may thus be brought to the knowledge of some of our readers who may not otherwise see this circular. We are entirely in sympathy with the objects of the "Egyptian Research Account." The need for something like a British Archaeological school in Egypt is even greater perhaps than in Greece, as the field is wider, and is at present less occupied.

"The Egyptian Research Account and British School of Archaeology in Egypt." The Egyptian Research Account was started several years ago in connexion with the Chair of Egyptology at University College, which had been established by the late Miss Amelia Edwards. The purpose is to give the assistance of students who offered to work in Egypt, and it has been the means of helping many of the students who have worked there with Flinders Petrie. Of these students a dozen are now in various official and other positions, to what has work has led them.

It has sometimes been remarked that there is no British School of Archaeology in Cairo, as there is in Athens and Rome. Such a school has, however, existed for many years past in fact, though not in name, and has succeeded in giving its students the practical experience which has enabled some to become successful workers.

The actual results justify the committee in considering that the time has now come to define the work as the British School of Archaeology in Egypt. There is not the same need for establishing a school in Cairo, and locating the second seat of the school in Athens and Rome. The seat of the school has always been on the actual scene of work, its centre in England will be University College, London.

In view of recent changes it is now intended that the Research Account should not only assist students, but should step into the shoes of the providing, also for the extension of Flinders Petrie. The means of support for his studies in Egypt during the last few years have lately been diverted to other work, the outcome of his researches will now depend entirely upon the contributions to the Research Account. His excavations have led to the discovery of the historic age of Egypt, and the present knowledge of its development, the history and the position of the early dynasties; the scientific accuracy of the great pyramids; the Senusert name of the Sinaï; the earliest monumental name of the Israelites, and their later connection with the Israelites in the Fayum and Oxyrhynchus, and the Greek and Roman portraits. The rise of civilization in the Mediterranean has also been traced.

In advance of the results of exploration in the Fayum and Oxyrhynchus, the discovery of the Naucratis and Daphnia, the Mycenaean art of the 14th century, the Kamara pottery of the 15th century, the earliest painted Greek pottery of the 7th century, and the western pottery of the 8th century, the earliest scheme of European history before the classical times. To carry on this work, the possible scheme of European history before the classical times, which have become the basis of our present view of early history, and to continue to train students in such historical research, is the purpose of the present movement.

This work will form a branch of the development of research work in the Egyptian at the University of London, and, as it is entirely



dependent upon personal contributions, the com-  
missioners appeal for assistance to all who care for  
the glory of Egypt and for the sources of our  
civilisation—to all who realise the con-  
tinuity of history, and who wish to maintain the  
glory of English discovery and scholarship in  
the East.  
The annual volume, describing the results of  
excavations, fully illustrated, is given to each sub-  
scriber at a guinea and upward. The whole of the  
illustrations found, that are not retained by the  
Egyptian Government, are presented to public  
libraries. No expense is incurred for manage-  
ment or for office.  
Subscriptions or donations for the excavations  
may be sent to the Secretary, Egyptian Research Account,  
University College, Gower-street, London, W.C.

PEDIMENT" AS AN ARCHI-  
TECTURAL TERM.

The seventh volume of the Oxford English  
Dictionary contains an interesting article upon  
the origin and history of this word. It has  
assumed many forms, from peremint, perim-  
ent, periment, pedament, pediment, to  
pediment, all of them being, it seems, cor-  
ruptions of pyramid, and not derivatives  
from the Latin *pes, pedis*. The Latin *peda-*  
*mentum* was a vine-stake or prop; the  
Latin *pedamento* signifies any foundation,  
groundwork, base, or footing (Florio), senses  
in which, Dr. Murray observes, the modern  
pediment has no connexion. An early user  
of the term is given from the English version  
of the "Hypnerotomachia" (by Poliphilus,

"The Corones . . . were correspondent and  
with the falling out of the whole works,  
a second or Perimert (marginal note, a peri-  
ment a corrupt English) or upper part of the upper  
Coronee only excepted."

John Willis and Clark's "Cambridge" are  
given:—"A periment in the midst of the  
ancient wanscott" over the high table in the  
Sage Hall; "a phaine for the periment of  
the Conduite," 1601-2; and (1605-4) "a Perri-  
ent on the topp of the organs with the  
crownes and seven bowles for the same."

Freym in his "Account of Architects,"  
1661 writes

"These Boofs which exalted themselves above the  
fences had usually in face a Triangular plane  
or fabel (that when our workmen make not so  
care and polished they call a Pedament), which  
is meant to be a Tympanum."

Dr. Murray's note appended to the quota-  
tions contains the following remarks:—

Evelyn's word was evidently an  
improvement upon the workmen's peri-  
ment, which the translator of *Hypnerotomachia*  
considered to be corrupt English for peri-  
ment. But the corruption of *perimert* to *periment*  
is difficult to imagine, and the connexion of sense  
with *Archit. Nomencl. Midd. Ages, 37* note  
is not obvious; and it seems more likely that peri-  
ment was a workman's corruption of pyramid, which  
in a triangular gable sometimes resembles in section,  
and is actually pronounced *periment* or *perriment*  
in some districts (e.g. in  
Somerset) at the present day. This would also  
explain the "periment of the Conduite" in  
above, since the Fountain in question had  
a curved roof in form of a  
pediment.

If this is the derivation, we have the  
perimant, periment pedament.

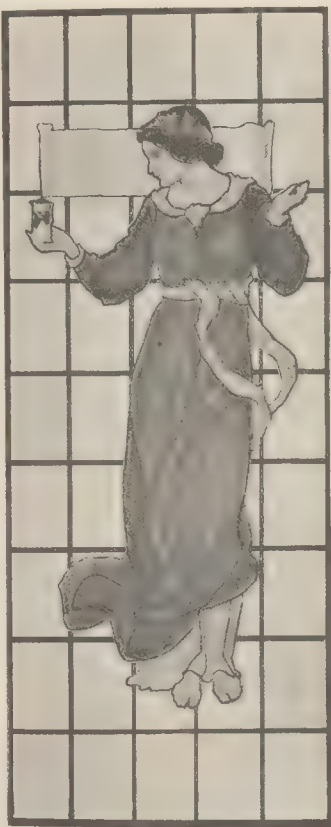
Professor Skeat ("Etymological Dictionary  
of the English Language," 1898) points out  
that *pedamentum* is not a Latin word, and he  
conjectures that the original word is *peda-*  
*mentum*, a stake or prop for vines and trees,  
or *pedare* to prop, from the *ped* stem of  
to walk, whilst the spelling of *pediment* for  
*pedament* would naturally follow from con-  
fusion with the word *impediment*. He sur-  
mises that *pedamentum* was used as an equi-  
valent of *datura*, a prop, and in Low Latin  
signifying a space of a certain number of  
feet, a site, or plot; but more likely, he  
thinks, is desired as to the word's history.  
We may observe that in his "Glossary of  
Lims" etc., fourth edition, 1845, Parker  
uses the *trapezupis* as the Italian equivalent  
of *pediment*, relating always to work in an  
angled position, over porticoes, windows,  
etc., and so on. Moreover, the synony-  
mous terms *pedis*, *pedica*, *pedica*, *pedica*, *pedica*,  
*pedum* (used by Vitruvius); *giebel*; and  
the French and Spanish, support the great  
probability that our word *pediment* is not  
derived from the Latin *pes, pedis*.

CEMENT AND LIMES BRICKS.—Some  
made at Purdue University, U.S.A., of bricks  
consisting of sand, cement, and lime, showed an  
compressive strength of more than  
100 lb. per sq. in. against 1,500 lb. for clay  
of average quality, and 3,000 lb. for  
best quality bricks. The transverse strength  
of the cement and lime bricks was found to be

DESIGN FOR STAINED GLASS.

This design, by Mr. Alexander Gascoyne,  
was exhibited at the Royal Academy this  
year.

Mr. Gascoyne writes:  
"The figure window of which you are  
reproducing the design is on Norman slab  
background, which gives a brilliancy and



Design for Stained Glass. By Mr. Alexander  
Gascoyne.

depth to the plain squares without inter-  
fering with the figure. The drapery is out  
of selected antiques, and painted lightly on  
the coloured portions, so as not to interfere  
with the natural quality of the glass."

THE ARCHITECTURAL ASSOCIATION.

The following is the list of fortnightly  
meetings of the Architectural Association for  
session 1905-6:—

- Oct. 6.—Annual General Meeting. Address and  
Distribution of Prizes, by the President, Mr.  
E. Guy Dawber.
- Oct. 20.—"London City Churches" (illustrated  
with lantern views), by Mr. Andrew Oliver.
- Nov. 17.—"Old Manor Houses," by Mr. J. A.  
Gatch.
- Dec. 1.—"Turkish Architecture" (illustrated with  
lantern views), by Mr. E. F. Reynolds.
- Dec. 15.—"Church Towers and Spires" (illus-  
trated with lantern views), by Mr. W. H.  
Bidlake.
- Jan. 19.—"The Consideration of Sculpture by  
Architects," by Mr. F. Lynn Jenkins.
- Feb. 9.—"Differences between English and French  
Gothic Art," by the Rev. G. H. West, D.D.,  
A.R.L.S.A.
- Feb. 23.—"Porches and Approaches," by Mr. F. T.  
Baggallay.
- March 9.—"French Modern Architecture," by Mr.  
A. Vye Parmenter.
- March 23.—"The London Club House of Last  
Century," by Mr. A. W. Soames, M.P.
- April 6.—"Valuations, Compensations, and Light  
and Air," by Mr. B. Grenop.
- April 27.—"Penetration," by Mr. Walter Cave.

AN OLD BOW CHURCH ACCOUNT.

The following account of the cost of  
chimes and clock, and some other additions  
to Bow Church, is taken from the Harleian  
MSS. in the British Museum (4941: fol. 153).  
It is sent to us by Mr. Andrew Oliver. It  
is apparently undated:—

An account from severall Workmen of ye  
charge to make chimes in Bow Steeple a dyall into  
the Street and a Cypriote to the Vestry of the sayd  
Church.  
To make Chimes compleat will require 24  
Bells which to doo wd require 16 new  
Bells which will way 61cw. At 6 li per  
cw. comes to . . . 366 00 00  
To hang the sd bells without clappers will  
coste . . . 70 00 00  
To make chimes on these Bells will re-  
quire a Brass Ranch 4 foot 6 inches  
long 4 foot diameter and half an inch  
thicke will way allowing for waste 17  
hundredweight with all other neces-  
sarys and workmanship . . . 400 00 00  
The handle into the Street will cost . . . 120 00 00  
And the prynting . . . 60 00 00  
A cypriote to the Vestry will cost . . . 50 00 00  
A Quatern clock to repeat only the  
Quarters . . . 60 00 00  
The Summ Total . . . 1,116 00 00  
To new Case the 3rd 4th and 6th Bells  
to make them tunable and fit for chim-  
ing and for mending the mettles will  
coste . . . 72 00 00  
1,188 00 00

Illustrations.

CHRIST CHURCH, NORTH  
BRIXTON.

THESE illustrations are copies of the  
working drawings of this church.  
Photographs of the completed  
buildings were published in the  
*Builder* of December 5, 1903, with par-  
ticulars of its erection.

The drawings were exhibited at the St.  
Louis Exhibition, and at the Royal Academy  
this year.

ROADWAY ALTERATIONS AND NEW  
GUILDHALL OFFICES, BAR-GATE,  
SOUTHAMPTON.

The work now nearing completion on the  
western side of the Bar-Gate comprises part of  
a roadway improvement scheme (illustrated in  
the *Builder* of October 12, 1901), which the  
architect (Mr. R. M. Lucas) put forward  
some years ago when the old gateway was  
in danger of being destroyed to make way  
for the electric trams. The arch between  
it and the new offices is as yet only face-  
work, for the brick wall under it cannot be  
removed until certain matters have been  
settled, so that the open way shown will not  
be made immediately. The upper part of the  
Bar-Gate has long been used as the town's  
Guildhall.

The drawing that we published in 1901  
showed a simple widening of the two present  
side passages under the flanking towers;  
but, in a Note on the work then proposed, we  
explained that Mr. Lucas would prefer, if  
possible, to close these passages (made about  
1770) and to form the new roads and path-  
ways outside the towers, which would then  
stand solidly on the ground. Fortunately,  
through the opportune tottering of a public-  
house that till lately hid most of the north-  
west tower, it became possible so to deal with  
the site as to permit of adopting the pre-  
ferred arrangement.

The new building makes no pretence of  
being mediæval in detail, but has been  
designed broadly on Gothic lines with par-  
ticular regard to the ultimate composition of  
the extensive array of buildings which will  
eventually be opened up, with the unaltered  
Bar-Gate as their central feature. For this  
reason the walls towards the main street  
have been kept as plain and as free from  
openings as could be managed in order to  
allow the plain expanse of rough stone (Pur-  
beck Roach) to have an unobscured and  
reposeful effect. The skyline has been  
arranged to lead the eye to the magnificent  
overhanging battlements which are such a  
noble feature of the Bar-Gate; and imitative  
outlines have been carefully avoided.

The half-timbering is of framed Baltic oak,  
and the internal fittings are mostly of the  
same rugged material. The work is being  
carried out by Mr. F. Osman, contractor, of  
Southampton, under the joint supervision of  
the architect and the assistant borough  
engineer, Mr. W. H. Killick.



WESTERN THEOLOGICAL COLLEGE,  
BRISTOL.

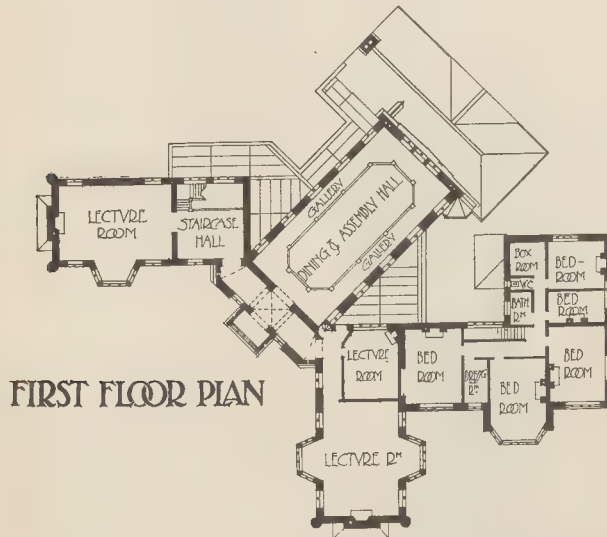
THESE buildings are now in course of erection, and will be used for training students for the Congregational body; the college is a non-residential one, but the students and professors will dine together daily in the hall. The buildings are faced

externally with Bath stone, with stone mullioned windows, and lead latticed glazing, and much of the interior finishings will be in oak. The roof is of specially-burnt tiles, the colour grading from buff at the eaves to reddish-brown at the ridge.

The heating is on the low-pressure hot-water system, installed by Messrs. Haden &

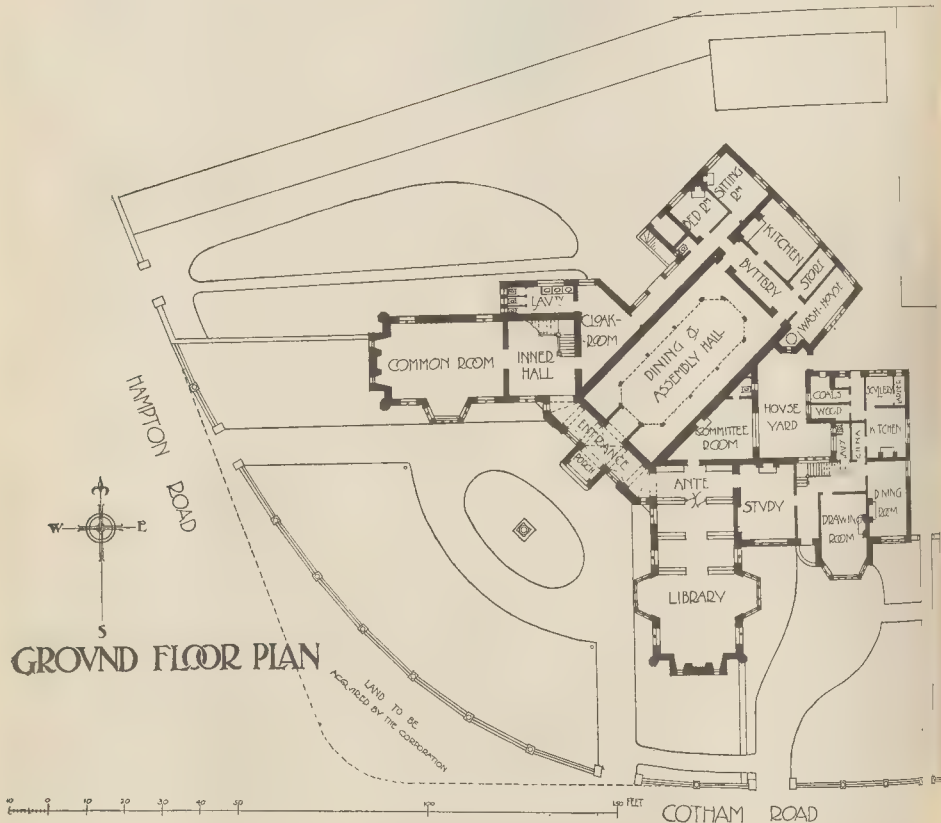
Son, of Trowbridge; Messrs. Jacob Long & Sons, of Bath, being the general contractors, and Mr. W. H. Lewis the clerk of works. Since the drawing (which was hung in this year's exhibition of the Royal Academy, was executed it is proposed to carry up the porch and to substitute a lead flat and parapet for the sloping roof, showing between the two octagonal towers, so that the flat roof may be used, affording, as it does, a magnificent view.

H. DARE DELS.



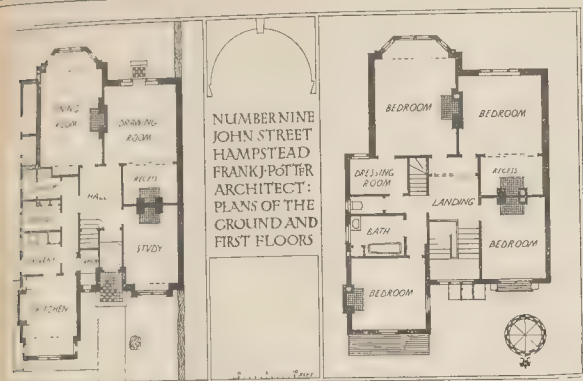
FIRST FLOOR PLAN

CALGARY CEMENT WORKS.—Canadian newspapers report that the Portland Cement Company has been organized and the charter capital is \$1,000,000 with a capital of 400,000 dollars divided into 100 dollar shares. A large number of the local men of Calgary have associated themselves with the company, as well as some practical men from Ontario experienced in cement manufacture. The location of this industry in Calgary in the North-West Territories, means an extra cost to the population of about 300, and involves a monthly pay roll of about 6,000 dollars, as most of the employees are mechanics and receive a high rate of pay. It also means a cheap source for construction of houses, sidewalks, and street pavements, reducing the cost of the above by fully 25 per cent. Building operations are expected to commence early this autumn, so as to enable the cement to be placed on the streets next spring. The building will be absolutely fire-proof, the walls being constructed of concrete with steel roofs. For motive power the company propose using electricity, thereby doing away with shafting, belting, etc., which have always been the source of great loss and annoyance in the operating of cement plants. The cement plant will be on the dry process, with an initial installation of three rotary kilns giving a daily capacity of about 700 barrels. A rotary kiln operating on the dry system with rock and coal will turn out from 125 to 150 barrels of cement per day more than can be turned out from wet and clay, which the Ontario Cement Company are using, with the same consumption of fuel, because of the excessive moisture to be evaporated from the latter. In other words, this one advantage over the Eastern cement means a direct saving of about 25,000 dollars.



GROUND FLOOR PLAN

Western Theological College, Bristol. Plans.



# HOUSE, JOHN-STREET, HAMPSTEAD.

This house takes the place of an old, badly-built stucco house, and, as most of the existing houses in this road are finished in the material, it was decided to use rough-cast for the exterior of the new house. The gable and chimney stacks are in red brick, and the roof is tiled. The leading considerations borne in mind in planning the house were that the aspect to the road was westerly and that no lights were possible on the west side. The house was originally intended to be used as a private residence, but is now used as a private school. Mr. Wm. Vent, of Hendon, was the builder, and Mr. Frank J. Potter the architect.

## THE HOUSING QUESTION IN GERMANY.

In his voluminous report on the trade and commerce of Germany for the year 1904, Mr. Consul-General Francis Oppenheimer, the British representative at Frankfurt-on-Main, devotes considerable space to the important question of small lodgings and housing accommodation generally. He observes, *inter alia*, that the housing question, one of the many social problems of the present day, may be said to have originated with changes dating back to the seventies, when on the one hand industry began to preponderate over agriculture and on the other hand the small industrial concerns of old developed into modern firms on a larger scale. The result of both these changes was a tremendous increase in the population of the towns (more especially of the towns with more than 100,000 inhabitants); like gigantic suction machines they depopulated the country. Considerable numbers of people were suddenly and permanently massed together in a comparatively limited space, and in consequence rents increased in spite of the limited means of the majority. While everywhere else an increased demand produces an increased supply, the very existence of the housing question proves that the demand for small lodgings and for cheap lodgings has by no

means been satisfied. Thus during April, 1905, there were in Frankfurt 133 single-room lodgings available for 554 applications, so that not even one-fourth of the demand could be satisfied. The disproportion between demand and supply of apartments with two rooms was even greater; only one-sixth of the demand could be met. In the case of three-room apartments, half the number of applicants only found what they sought. The supply of apartments of four rooms and above, however, was plentiful.

The annual increase in the population of Germany numbers 800,000; these, as well as those already in existence, must be housed properly, and most of them must be housed cheaply. The rapid increase of the population, and the facilities of modern traffic, have caused a rise of rents generally, so that the poorer classes of the population are spending a constantly increasing percentage of their income in the payment of rent. If the increase in the rents that has taken place during recent years were to continue without check, the calculation of what would be the price in 1925 for even so limited an accommodation as an apartment consisting of two rooms would yield alarming figures. The Imperial Minister of the Interior has frankly admitted that he regarded the housing question as one of the most important problems, possibly the most important, to be solved by the German social policy of to-day; for the benefit of the tremendous machinery put into motion to combat such evils as the various contagious and other diseases, the abuse of alcohol and immorality, must remain problematical if a clean and healthy home, the starting point of all social life, cannot be provided. Space is limited, and, to replace once opportunities have been missed. What were suitable sites only a few years ago have in many German towns been bought up by speculative builders, who have produced luxurious apartments along luxurious streets. Besides this increase in the value of sites, the prices of building materials have been more expensive, wages have risen, and lighter ways of building have been ousted by heavier, and certain luxuries have become part and parcel of modern apartments of which they have again increased the price.

The Imperial Treasury has since 1901 spent 15,000,000 marks for the purpose of providing housing accommodation, but these sums were practically limited to cheap apartments supplied for Imperial officials with small salaries. The Home Office has in some instances encouraged the building of small apartments by letting sites

\*CHURCH, SHARROW-LANE, SHEFFIELD.—A new church is being erected in Sharrow-lane by the Methodist New Connexion. The building will be of brick, with stone facings. Accommodation is to be provided for about 500 persons, at a cost of £2,500. Mr. J. C. Brameld is the architect, and Messrs. W. & A. Forsdike are the contractors.



House, John-street, Hampstead. Mr. Frank J. Potter, Architect.



on prolonged leases (Erbbaurecht) at reduced rental, under the condition that artisans' dwellings be erected. Yet in only too many instances as, e.g., in the case of Schönholzer Haide, in the north of Berlin, has the Treasury disposed of Treasury lands to builders and others at the best possible price, though suitable for cheap lodgings, and has thus missed rare opportunities. The *lessee*, with its limited application to Frankfurt, was prompted by similar considerations. Many of the large factories have spent great sums in supplying their workmen with lodgings, often model dwellings; in some instances the area covered by such workmen's houses practically equals that of large villages, namely, in the case of the chemical works near Höchst and others. The disadvantage of this system, however, lies in the fact that the tenancy ends with the contract of labour, and the workmen are thus easily robbed of the possibility of an independent attitude in questions arising between employer and employee. In some parts of Germany building societies of a charitable nature were started with a purpose of building cheap dwellings for the workmen. Thus in Rhenish-Prussia there exist 117 such building societies. The number of houses supplied by the societies amounted, up to April, 1904, to 4,242, containing 9,020 lodgings; 62.5 per cent. were built for sale, the others for letting; both kinds were chiefly built on the plan of admitting two families. The rents are on an average 20 per cent. cheaper than the ordinary local rents; in the houses for sale the workmen live more cheaply, too, after deduction of the payments made to capital account. Yet the financial position of the building societies is in most cases entirely satisfactory—seventy-one of them paid the average dividend of 3.2 per cent. If the 9,000 families thus housed are on the average calculated to consist of five persons, 45,000 to 46,000 persons in Rhenish-Prussia approximately owe to these building societies healthy and clean homes, from which there is small danger of ejection and where there is no fear of increased rents. Insurance companies and savings banks have from time to time invested money in similar building enterprises, yet the initiative of this charitable work is purely a question of chance.

All these attempted remedies, however, have at best bestowed local benefit only. The evil as such had not been attacked on a broader basis until a Bill was put on the table of the present Diet, which for the first time attempted to provide a uniform remedy for the whole kingdom. As the want of small lodgings remains dependent upon the speculative activity of the professional builder, the Bill in one of its parts devises means to remove the causes which have so far deterred the builder from erecting small lodgings. The unwholesome speculation in sites, which is the chief reason of the present high rents, is removed by provisions concerning the planning of the streets, the building plans, the frontage line, etc. Whereas the present building plans generally favour deep sites, very wide streets, and consequently buildings with an endless number of apartments and courtyards (resulting in a considerable rise in the value of the sites), the new building plans are to be devoted on a footing corresponding to the requirements of the districts so that quarters that are suitable for small lodgings shall be mapped out in shallow sites and streets of lesser width. As an inducement for the building of small lodgings, the contributions towards the road making are to be considerably reduced in all cases in which healthy and appropriate lodgings are contemplated for the housing of families of small means. This concession is extended to building and other societies if by their by-laws their shareholders are limited to a maximum dividend of 14 per cent., and which societies, when wound up, distribute only the nominal share value and make over the possible surplus to charitable and similar institutions. The benefit of this provision is also extended to workmen and people in a similar position if the buildings to be erected by them are intended for their sole occupation or the occupation of themselves together with, at the utmost, two families in similar circumstances.

The second part of the Bill regulates the police intervention in the case of bad and crowded apartments. It is thereby enacted that for communities of 10,000 inhabitants and more the police shall be compelled to frame lodging by-laws; that they may frame such by-laws for communities with less than 10,000 inhabitants. These by-laws must regulate the questions concerning sufficient air space, the separation of the sexes, the sleeping accommodation of employees and servants, etc. Provisions are also made for the inspection of lodgings by special officials, the communities with more than 100,000 inhabitants being forced to appoint a lodging board consisting of competent persons to carry out such inspection. Thus the Bill tackles the housing questions from three different points: (1) By means of the building plans and building regulations; (2) by means of reduced taxation; (3) by the introduction and supervision of minimum demands concerning hygiene and morality.

Yet the Bill has not escaped severe criticism. It was felt that the introduction of the Prussian Bill has rendered very precarious the chances of an Imperial Bill dealing with the same subject, which would have been preferable. The innovations in the Bill are said not to go sufficiently far, as some of its regulations do not even provide as much as has been at times locally supplied. The provisions for the cheapening of lodgings are said to be insufficient, as the reduction in the contribution towards road making is said to be too small a temptation. It is furthermore demanded that the lodging by-laws should be made compulsory in those communities also of less than 10,000 inhabitants, for there is no real connexion between the quality of the lodgings and the number of the population. The agricultural labourer, who certainly has the benefit of light and air during the summer months, will, as a rule, derive no benefit from this law when the winter months keep him indoors. The question of windows has been entirely ignored, yet light in lodgings is as important as air; the importance of this question of light may be gathered from the fact that in 1900 Berlin counted 24,000 so-called "cellar lodgings," so that 5 per cent. of its inhabitants were then lodged in cellars.

In the Grand Duchy of Hesse there exists since 1903 a law whereby any community can be compelled to participate financially, together with the Hessian Treasury, in the construction of cheap lodgings. It is claimed that financially this law has in no way resulted in losses to the communities; in many cases, on the contrary, their poor law expenditure has been reduced. At moreover, the town of Mayence has already started its own official Housing Board, the Grand Duchy of Hesse at present takes the lead in any official attempts towards the solution of the housing problem.

The general interest taken in the housing question may be gleaned also from the fact that during the month of October the first General German Housing Congress was held in Frankfurt, and was attended by approximately 1,000 members from all parts of Germany, among them representatives from various Government offices. This congress was the first national congress of its kind, for although the housing question has been touched upon on other occasions, only one other meeting has been held which had limited its debates to this subject, namely, the International Congress, which had met at Düsseldorf two years before. The Frankfurt Congress, however, discussed the question purely from a German point of view, hence its importance, for among all the social-political questions, the housing question has probably the least chance of being solved internationally. The Prussian Bill was on that occasion subjected to a very minute criticism, and many improvements introduced into the Bill during the committee stage will, to a great extent, be due to the deliberations of the Congress.

## Books.

*Stanford's New Map of the County of London, on the Scale of 4 in. to one mile.* (London: E. Stanford. 1905.)

THIS is a new edition of Mr. Stanford's 4-in. scale map of the County of London, which first appeared eleven years ago, and to which much information has been added since. It is comprised in twenty sheets enclosed in a neat portfolio, and with an index map on a smaller scale. We may take from the prospectus the following statement of matter included in the map:—"The map extends to Barking and Cross Ness on the east, and includes the whole of the extra-metropolitan Borough of West Ham; on the west it embraces part of the Borough of Ealing, the whole of the Borough of Richmond, and the greater part of the Borough of Kingston; on the north part of the Borough of Hornsey; and on the south the Borough of Wimbledon and the Hamlet of Penge, with the northern verge of Croydon. The schools of the London County Council Education Committee, the hospitals of the Metropolitan Asylums Board, the Fire Brigade stations, and the large open spaces now under the control of the London County Council, are accurately engraved. The railways and railway stations, above and below ground, the docks, steamboat piers, public markets, museums, churches and chapels, hospitals and institutes, theatres, music-halls, and other public places, are duly shown. Altitudes in feet are given at frequent intervals all over the map, enabling the resident to determine the height of his residence above the level of the sea, or, by deducting 12 ft. 6 in. from the engraved figures, the height above the level of the Thames." We may add that

for clearness and precision of printing and colouring the map is all that such a map ought to be. The form in which it is published is very convenient for keeping in a library, and the index map does away with any difficulty from the unavoidable division into separate sheets.

*Picturesque Essex.* By R. H. E. Hux. A.R.I.B.A. Illustrated by Duncan Mead. London: F. E. Robinson & Co. 1905.

THIS book is in most respects similar to the work on "Middlesex," by the same author, which was noticed in these columns a short time ago. It serves to draw attention to a very large number of interesting buildings, both ecclesiastical and domestic, scattered over a considerable area where stone was difficult to obtain or non-existent, and where wood, brick, and flint are the chief materials used. Of the larger examples may be mentioned Layer Marney Towers and Paulburne Hall, both fine examples of brickwork, especially the first-named, with its terra-cotta ornamental detail; while in every town and village in the county are numerous examples of less pretentious exterior but charming in grouping and proportion. The Mostell, at Thaxted, is a building of the type of those found at Ledbury, Hereford, and Lymington. Although not resembling either in actual design, charmingly grouped houses are to be met with in Saffron Walden and Castle Hedingham, and the churches are also rich in timber detail of a very interesting kind. The letterpress is very largely given up to a description of the various buildings, and useful information is given about their history as well as their architectural details.

The illustrations, on the whole, are good, but many suffer from over-elaboration and a certain scratchiness in the draughtsmanship which is not altogether pleasing. Among the best are three small illustrations of the old gate at Barking and the church at Stock and at Greenstead. There is also a picturesque drawing of that well-known object, the ruined church at Chipping. The book will doubtless draw attention to a very interesting county, not so well known as it might be.

*A Manual of the Law of Flats.* By G. S. LUGAN DANIELS, Barrister. London: "Econo Gazette," Ltd. 1905.

THE "Law of Flats" is technically not a very correct term; since it consists, in fact, chiefly of parts of the law of landlord and tenant and part of the law of easements, and of other substantial parts of English law. Thus the question whether the landlord of a ground floor is liable to his tenant, the former also being landlord of the upper part of the building, for damage caused by a leaky cistern, depends on general principle. The case in question, though applicable to flats, arose out of the tenancy of a warehouse, and it was held that unless there was negligence on the part of the landlord he was not liable. Still, this being a handy little volume, it will have abundant practical uses for those who have to do with flats.

## BOOK RECEIVED.

SMOKE ABATEMENT. By W. NICHOLSON. (Chas. Griffin & Co. 6s.)

## TRADE CATALOGUES.

WE have received from the General Electric Company, of Queen Victoria-street, the 12th edition of their catalogue of "Wires and Cables." The list of cables is very complete, and the specifications, tests, and guarantees given are quite satisfactory. Useful wire tables are quoted, and the data given will be of the greatest use to electricians. We have also received the section of their catalogue describing the single and polyphase induction motors which they have for sale. We have noticed that all the parts of their machines are interchangeable, and so a new part can be sent at any moment to replace any one which has been damaged or become worn. The machines are wound either for single-phase or polyphase circuits, and for a frequency of 50. The illustrations and diagrams are all excellent. They also send a paper model of a battery wall telephone which they list at 15s., and a leaflet describing new and very cheap types of electric hand-lamps. The



low price at which telephones and self-con-  
tained hand-lamps are now sold will make  
them popular.

The Columbian Fireproofing Company send  
their catalogue of armoured cement pipes,  
made in accordance with the "Bonna"  
process. For many years pipes of similar  
construction have been largely used on the  
continent, and especially in France, for the  
conveyance of water and sewage, and, after  
an investigation extending over some three  
years, the Columbian Fireproofing Company  
have purchased the rights of the "Bonna"  
process for Great Britain. It is claimed for  
pipes of this description that the first cost  
is very much less than for cast-iron or mild  
steel pipes, and that the cost of upkeep is  
practically nothing, owing to the absence of  
corrosion and leakage. In the case of pipes  
designed to resist pressure, an inner tube of  
steel is first built up of sheet steel, this tube  
preventing the penetration of moisture as  
well as serving the purpose of reinforcement.  
A collar welded to each end of the tube  
forms the flange of the completed pipe, and  
guarantees the process of jointing. Spiral coils  
of wire-bars are then wound around the steel  
tube both internally and externally, and  
connected by longitudinal bars of the same  
material. The armoured skeleton is placed in  
a vertical position, and after suitable moulds  
have been applied, cement-mortar, mixed to  
the consistency of grout, is poured in. A  
great convenience is that the pipes can be  
manufactured on the site of the works to be  
erected, the mixing plant being moved from  
point to point as work progresses. The cata-  
logue contains views illustrating the con-  
struction and laying of these pipes, which  
can be made to any required size or shape,  
and fitted with junctions, tees, and bends as  
may be necessary.

Messrs. R. Waygood & Co. send an illus-  
trated prospectus describing their lifts for  
private residences. A point emphasised in  
the little book is the convenience of the  
automatic push-bottom system, as applied to  
electric and hydraulic passenger lifts. Re-  
ference is also made to the adaptation of  
automatic control to electric service lifts, and  
to a special type of dinner lift designed to  
reduce noise to a minimum. This prospectus  
is of little use to architects, being evidently  
intended for private purchasers.

Correspondence.

"DECAY AND PRESERVATION OF  
STONEMASONRY."

Sir.—In reply to Mr. Sturge Cottrell's letter  
in your issue of July 8, re a statement I made  
regarding to "Box Ground" stone, that "this  
quarry appears to be nearly if not quite  
exhausted." I have, through the courtesy of  
the Stone Firm, visited the Bath stone quarries,  
and find my statement to be incorrect.  
This particular quarry of "Box Ground"  
stone (now called "St. Aldhelm's Box Ground")  
is fully at work and turning out immense quan-  
tities of splendid stone as heretofore, and the  
supply seems inexhaustible. W. R. PURCHASE.

COST OF WIDENING ROAD.

Sir.—The case mentioned by "Enquirer"  
on page 235 (note) is one of great interest to  
subscribers, and is a question that is constantly  
arising wherever land is being developed for  
building.  
I have had to deal with several similar cases,  
and find that the usual custom is for the free-  
holder to give the necessary land for widening,  
for the District Council to bear the cost of  
erecting and making good the road.  
The arrangement, of course, varies according  
to the value of the land and the cost of the road  
making; and it seems to me impossible for  
any test case to hold good in a matter of this  
kind, as the conditions necessarily vary in each  
instance.  
DOUGLAS WOOD, A.R.I.B.A.

CALCAREOUS CEMENTS.

Sir.—In thanking you for the complimentary  
reference to our work with the above title, will you  
allow me to point out that all the recent  
articles on kilns used in this country are  
mostly based on American models, and for  
reasons we selected examples from the United  
States. We have not failed to point out that  
the invention belongs to our own country-  
men, the earlier kilns proved without exception  
to be failures, and had to be abandoned.  
May I also state that though the name of my  
colleague, Mr. Charles Spackman, is the same as  
that of the eminent American cement expert in

Philadelphia, these gentlemen are in no way  
related to one another, and have no business  
connexion of any kind. The choice of Messrs.  
Lathbury & Spackman's kiln was chiefly in-  
fluenced by their excellent book on this subject.  
GILBERT R. REDGRAVE.

The Student's Column.

STEAM BOILERS AND PIPES.—X.  
BOILER SETTING (concluded).

**W**ATERTUBE boilers furnish the sub-  
ject for the concluding instalment  
of our notes upon boiler setting.  
Steam generators of this family  
exhibit great variety of design, and we can-  
not possibly deal with more than one or two  
typical forms.

Perhaps the most familiar type of water-  
tube boiler is that comprising front and  
back headers, connected by straight tubes  
placed in an inclined position, and sur-  
mounted by either one or two steam and  
water drums. One of the best-known  
generators complying with this brief outline  
is the Babcock & Wilcox boiler, but as  
others are very similar in appearance, the  
following remarks may be taken as being  
generally applicable.

Fig. 46 illustrates the ordinary method of  
setting a watertube boiler with two drums.  
The concrete foundation, as usual, should  
extend over the site upon which the boiler is  
to be erected. The side walls are of 18-in.  
brickwork, including a fire-brick lining, well  
keyed in from bottom to top. The front  
wall largely consists of the various doors and  
framing, with brickwork of suitable thick-  
ness, generally 18 in. thick up to the upper  
header, and 9 in. thick above. The back  
wall is 18 in. thick. By reference to Fig. 46  
it will be seen that stanchions are built into  
the front and back walls for the purpose of  
supporting the cross-girders from which the  
steam and water drums are suspended. The  
fire-bridge wall is 2 ft. 3 in. thick at the  
bottom, and the two other division walls, one  
at the top and the other at the bottom, are  
9 in. thick. The outlet leading to the main  
flue may be as drawn in Fig. 46, or can be  
carried underground if more convenient.

As the positions of the openings in the  
furnace front supplied with the boiler and  
the positions of the various mechanical  
details govern the arrangement and con-  
struction of the brickwork to a very large  
extent, it might be thought that the design  
of the furnace and combustion chamber in-  
volves very little consideration on the part  
of the architect. This is not quite the case,  
as we shall now show.

In the first place, the construction of brick  
corbelling between the side walls and the  
steam and water drums, as shown in Fig. 46,  
is not the best practice. Next, the employ-  
ment of ordinary fire-bricks in the top courses  
of the bridge and the upper division wall  
has the disadvantage of covering unneces-  
sarily large areas of the tubes and drums,  
and the lower division wall, when built as in  
Fig. 46, is by no means desirable or con-  
venient. Finally, the furnace section of the  
customary type, as represented in Fig. 46, is  
about as bad as can be, for complete combus-  
tion cannot be expected in a furnace where  
the gases proceed vertically from the grate  
and immediately pass among the water-cooled  
tubes above.

All these details are capable of improve-  
ment, and the architect who makes use of  
watertube boilers of the general class now  
under consideration should make a point of  
insisting upon such modifications as are likely  
to facilitate inspection and to keep down the  
cost bill.

Fig. 47 illustrates an improved method of set-  
ting a watertube boiler. In the cross-section  
it will be observed that fire-clay arch blocks,  
which can easily be lifted out for purposes  
of inspection, take the place of brick  
corbelling.

In the longitudinal section it will be seen  
that bricks of semi-circular form are used  
for reducing the bearing surface of the drums  
on the front, back, and upper division walls,  
and of the tubes on the top of the bridge.  
The lower division wall is set further away  
from the mud drum, and the space is covered  
by fire-clay arch blocks, thus leaving reason-  
able space for examination and the handling  
of tools for disconnecting pipes and fittings.

An important improvement in the furnace for  
a watertube boiler is illustrated in Fig. 48,  
which represents the arrangement adopted at  
the Kensington and Notting Hill Electric  
Light Works. This form of furnace has  
two arches of refractory material serving to  
deflect the hot gases and lead them in the  
right direction. Being provided with an  
auxiliary air supply by way of the bridge, all  
the conditions necessary for perfect and  
smokeless combustion are secured.

A furnace designed in this manner permits  
the use of bituminous coal without the pro-  
duction of black smoke, and is in every way  
worthy of adoption.

We ought to mention here that Messrs.  
Babcock & Wilcox have already introduced a  
somewhat similar furnace in connexion with  
their watertube boilers (see Fig. 49). In  
this, described as the Scotch furnace, and  
specially intended for bituminous coals, the  
products of combustion pass under a fire-  
brick roof formed over the front portion of  
the lowest row of tubes to a secondary com-  
bustion chamber, into which slightly heated  
air can be admitted, the supply being regu-  
lated by the stoker.

Among other forms of watertube boiler  
we select the Stirling type for the purpose  
of illustrating a rational system of furnace  
construction.

Fig. 50 is a cross-section of this boiler, in  
the setting of which provision is made for  
insuring the contact of the heated gases with  
the several clusters of tubes in regular suc-  
cession.

A still better arrangement is shown in  
Fig. 51, where cross and longitudinal sections  
are given of another pattern of the Stirling  
boiler. The furnace here shown is divided  
into two compartments, each being arched  
over to deflect the flame so that it comes into  
contact with the lower portion of the tubes,  
being guided upwards by a fire-block parti-  
tion, over which it passes and enters a second  
combustion chamber, where a fire-block baffle  
directs the gases to the second series of tubes.  
In like manner the gases are directed to and  
in the third chamber, whence they pass  
through the fourth group of tubes to the  
main flue. The various fire-clay blocks  
shown in these drawings are of the Poulton  
type, and the wall and floor linings are  
formed with serrated bricks of the kind  
illustrated in Fig. 32 ante. The employment  
of means for reducing the radiation of heat  
from watertube boilers of all kinds is parti-  
cularly desirable as the walls of the setting  
are subject to much higher temperatures than  
Cornish, Lancashire, and other internally-  
fired boilers.

An illustration of the manner in which  
heat is absorbed and stored in the brickwork  
of watertube boilers is given by Mr. Stroh-  
meyer in a report to the Manchester Steam  
Users' Association.

In this case a watertube boiler had been in  
operation at full power for several hours.  
The demand for steam then ceased, and firing  
was stopped suddenly, but the supply of feed  
water had to be maintained for five hours  
more because the boiler continued to blow off  
steam all this time. The reason was that,  
while raising steam, and during the quantity of  
hours of working, an enormous quantity of  
heat was absorbed by the brickwork; then,  
when the demand for steam suddenly ceased,  
the reserve heat reappeared, with the results  
stated. Had the steam demand been limited  
and steady this feature of the boiler would  
have been less noticeable. It would have  
been necessary to force the fires to their  
utmost extent during the first four hours,  
not only for steam production, but also for  
heating the brickwork. A time would have  
come later when the firing would have had to  
be reduced to its normal condition, and at  
the end of the day the heat of the fire would  
have been supplemented by that previously  
stored in the brickwork, and no serious incon-  
venience would have taken place after work-  
ing hours.

Under the conditions actually prevailing,  
however, the heat stored in the brickwork  
caused waste of fuel as well as inconvenience.

*General Note on Flues Around Boilers.*—  
In the foregoing articles we have given ap-  
proximate dimensions for the flues of the  
most commonly-used types of steam boilers.  
If such flues could be designed in strict con-  
formity with theoretical requirements to pro-  
vide for a predetermined uniform velocity of



the gases on the basis of a given coal consumption per hour, the results would not be satisfactory. The area of each flue would then be proportioned to suit the assumed volume of the gases in each part of the system. But as the temperature of the flame in a boiler furnace is at about 2,500 deg. F., and the temperature of the gases ranges from, say, 1,700 deg. at the fire-bridge to some 650 deg. at the dampers, the flues would have to be tapered in accordance with the diminishing volume of the gases. This would be impracticable, and, further, the furnace tube and some of the flues would be undesirably large, or some other flues so small as to prohibit access for cleaning purposes. Again, the presence of soot and flue dust, and the variable space occupied in the flues by soot deposits, would upset any calculations made with mathematical precision.

Donkin's work on "The Heat Efficiency of Steam Boilers," gives some idea of the disorganisation likely to be caused by foreign substances in boiler flues; and is sufficient to show that the velocity of the gases would be very different in the case of clean and foul flues.

Of course, in actual practice, no specified velocity can be maintained, owing to fluctuations in the steam demand involving variations in fuel consumption and consequently in the volume of gases to be conveyed. Still, although we have seen that relative uniformity of velocity is not practicable in the different flues of a boiler, it is desirable to approach as nearly as possible to uniformity as may be possible. Above all, it is important to avoid sharp bends and narrow necks causing excessive friction, and sudden enlargements causing eddies in the current of gases.

All sharp projecting corners should be rounded off, all entering angles filled, and an easy sweep given to all surfaces which are intended to change the direction of the draught. Further, the interior surfaces of all brickwork should be as smooth as possible with the object of reducing friction.

For the purpose of facilitating the process of proportioning the flues for any boiler we give, in Table XIV., the volume of the products of combustion at different temperatures for various weights of air supply per pound of coal.

This table has been calculated by the formula:—

$$q = Q \times \frac{461 + t}{461 + T} \dots\dots (1)$$

where  $Q$ =volume of gases at the temperature  $T=32$  deg. F.,  $=1.000$ ,  $q$ =volume of air at the temperature  $t$ ; and  $461$ =degrees from

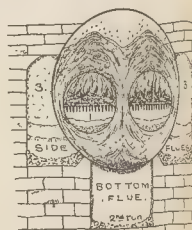
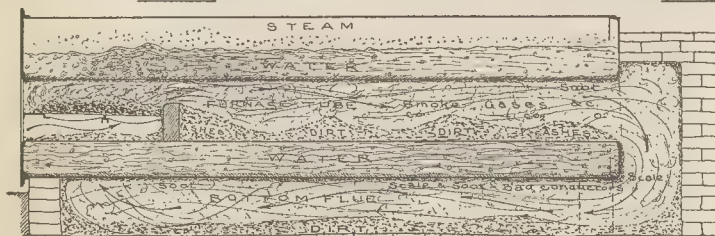
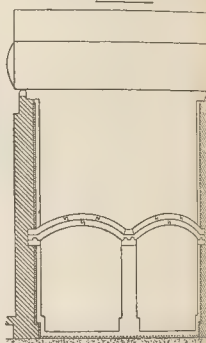
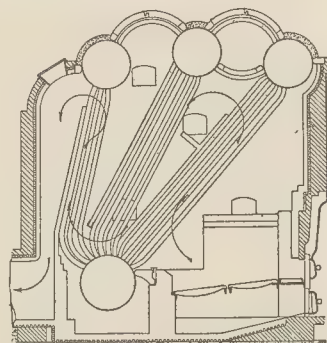
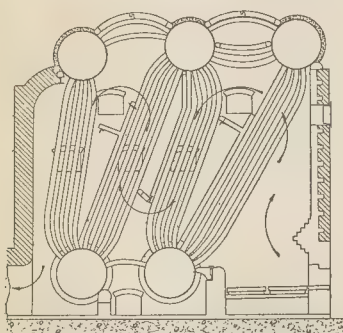
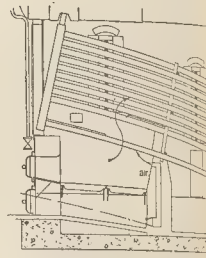
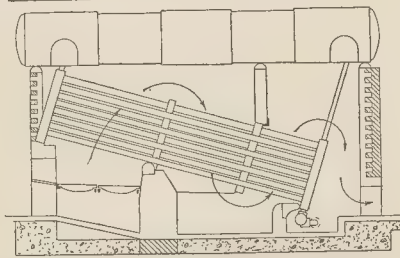
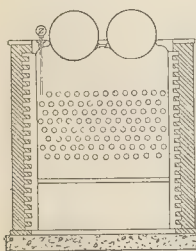
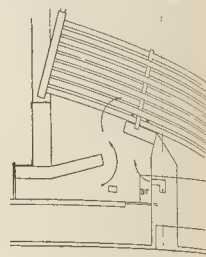
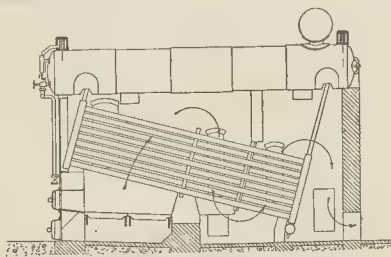
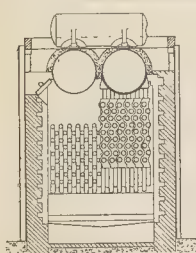


FIG. 52

*Illustrations to Student's Column.*



TABLE XIV.—VOLUME OF PRODUCTS OF COMBUSTION FOR VARIOUS WEIGHTS OF AIR SUPPLY PER POUND OF FUEL.

	14 lb.	16 lb.	18 lb.	20 lb.	22 lb.	24 lb.	26 lb.	28 lb.	30 lb.
cu. ft.	173.4	198.3	223.0	247.9	272.8	297.7	322.6	347.5	372.4
cu. ft.	164.1	189.0	213.9	238.8	263.7	288.6	313.5	338.4	363.3
cu. ft.	154.8	179.7	204.6	229.5	254.4	279.3	304.2	329.1	354.0
cu. ft.	145.5	170.4	195.3	220.2	245.1	270.0	294.9	319.8	344.7
cu. ft.	136.2	161.1	186.0	210.9	235.8	260.7	285.6	310.5	335.4
cu. ft.	126.9	151.8	176.7	201.6	226.5	251.4	276.3	301.2	326.1
cu. ft.	117.6	142.5	167.4	192.3	217.2	242.1	267.0	291.9	316.8
cu. ft.	108.3	133.2	158.1	183.0	207.9	232.8	257.7	282.6	307.5
cu. ft.	99.0	123.9	148.8	173.7	198.6	223.5	248.4	273.3	298.2
cu. ft.	89.7	114.6	139.5	164.4	189.3	214.2	239.1	264.0	288.9
cu. ft.	80.4	105.3	130.2	155.1	180.0	204.9	229.8	254.7	279.6
cu. ft.	71.1	96.0	120.9	145.8	170.7	195.6	220.5	245.4	270.3
cu. ft.	61.8	86.7	111.6	136.5	161.4	186.3	211.2	236.1	261.0
cu. ft.	52.5	77.4	102.3	127.2	152.1	177.0	201.9	226.8	251.7
cu. ft.	43.2	68.1	93.0	117.9	142.8	167.5	192.2	216.9	241.6
cu. ft.	33.9	58.8	83.5	108.6	133.3	158.0	182.7	207.4	232.1
cu. ft.	24.6	49.5	74.2	99.3	124.0	148.7	173.4	198.1	222.8
cu. ft.	15.3	40.2	64.9	89.6	114.3	139.0	163.7	188.4	213.1
cu. ft.	6.0	30.9	55.6	80.3	105.0	129.7	154.4	179.1	203.8

absolute zero to 32 deg. F. As a matter of fact, the gases contain carbon dioxide, nitrogen, unconsumed oxygen, water vapour, and other substances, but no appreciable error is caused by taking the volume of the mixture at that of an equal volume of air at the same temperatures.

Assuming the motive force of the chimney to be sufficient to cause the passage of a certain weight of gases per hour, it is clear that the relative velocities of the gases in the furnace tube and flues of the boiler must depend upon the respective areas and shapes of these parts, and the character of their interior surfaces.

The diameter of the furnace tube must not exceed a certain proportion to the diameter of the boiler shell, and in practice its area is already fixed by the boiler maker. Similarly, the width of the side flues is fixed beforehand, this dimension being governed by the necessity for providing ample space for access. Hence, as a general rule, the collective area of the side flues is about 50 per cent greater than the area of the furnace tube, and the excess is more marked in the smaller-sized boilers. For this reason, uniform velocity is out of the question, and the chief thing in settling the sizes of the flues is to see that the dimensions are such as to secure progressive decrease of the velocity from the one end of the system to the other.

By taking suitable values for the mean temperatures, which should be in accordance with the extent of the exposed heating surfaces, it should be easy to arrive at correct proportions for the various flues of any boiler.

OBITUARY.

MR. JAMES K. COLLING.—We have to record the death of Mr. J. K. Colling, one of the founders of the Architectural Association, who passed away, after a brief illness, on September 1, at the advanced age of eighty-nine. With the exception of hearing, which was somewhat impaired, he retained all his faculties and pursued his lifelong hobby of drawing in water-colours till a few weeks of his death. His published works on Gothic Art and Medieval Foliage continue to occupy a prominent position among the interesting records of the Gothic revival; and his love of flowers and foliage and his persistent habit of drawing from nature everything which interested him led to the production of "Art Foliage" in 1885, and a second edition in 1892. The beautiful original drawings, from which the plates for these books were produced, were presented to the library of the Royal Institute of British Architects in February, 1902; and in the Royal Institute of British Architects' "Journal" No. 8, of Vol. IX., third series, a brief account of Mr. Colling's career is given, with a list of some of the buildings erected from his designs. Among the most important of these were a large block of offices in Liverpool, decorated with some fine ornamentation found on floral forms, and the church on Mr. Naylor's estate at Eton, Cheshire.

MR. MAYNARD.—The death on August 26, at the residence of Mr. Charles Grason, architect, of No. 34, King-street, Chesham, Bucks., Surrey, architect and surveyor, in his sixtieth year. Mr. Maynard was elected an associate of the Royal Institute of British Architects in 1874. He was architect of St. Mark's Church, Wimbledon, completed in 1888, and of a house with shops in Queen's-road, Bays-

GENERAL BUILDING NEWS.

CATHOLIC CHURCH, BARMOUTH.—The new Catholic church at Barmouth, dedicated to the memory of St. Tudwal, is divided into a nave to accommodate 200 people, with gallery at the end and a chancel and the usual sacristies. The upper part of the tower will be used for a belfry and the lower part for an organ. There will be a total accommodation for 250 people. The design of the edifice was adapted to suit local material, the treatment being of early English Gothic, and the material used has been Minford stone, with Celtic stone dressings. The roof is of timber, and the flooring consists of wood blocks. The tower is finished in an apex with a statue of the Blessed Virgin, a carved canopy and niche. Mr. A. Gilbertson, Liverpool, was the architect, and Mr. Shanley, Liverpool, the clerk of works. The principal part of the contract was carried out by Messrs. Lloyd, Williams, & Jones, and the sub-contractors were Messrs. Evans & William carpenters; Messrs. Minshull & Co., plumbing; Mr. John Morgan, plastering; and Mr. John Roberts, painting. The total cost is estimated at about £5,000.

MISSION CHURCH, DINNINGTON COLLIERY.—The foundation-stone of the new mission church at Dinnington Colliery was laid on the 4th inst. The new building will seat 200 persons, and the estimated cost is about £600. The architect is Mr. C. S. Errington.

MISSION CHURCH, MERRINGTON-LANE, NEAR SPENNYMOOR.—The foundation-stone of a new mission church at Merrington-lane has just been laid. The church, which will be known as Ven. Bede's, provides sitting accommodation for 200 persons, and the site is in a central situation, between Merrington-lane and Low Spenny Moor. The structure will be of pressed brick, built with stone dressings. The building will consist of nave and sanctuary, and provision is also made for a clergy vestry, and also for a bell gable, to be surmounted by a stone cross. The contractor is Mr. H. C. Howe, of West Hartlepool, and the work is being executed from designs by Mr. Stephen Wilkinson, architect, of Newcastle-on-Tyne.

MISSION CHURCH AT NORTH SHIELDS.—The Lord Bishop of Newcastle (Dr. Lloyd) dedicated recently St. Faith's new church, in Hudson-street, North Shields. The new church was designed by Mr. W. Hope, architect, and the contractor was Mr. Joseph Felton, of North Shields.

METHODIST CHURCH, HOVE.—The new Bible Christian Methodist Church, which for the past twelve months has been in course of erection at the corner of Old Shoreham-road and Montefiore-road, Hove, is now practically completed. Externally the walls are faced with rubble flint-work with dressings of Bath stone, and the roof is of coloured bricks, and the roofs are covered with Broseley tiles. The main entrance is in Montefiore-road, where there are three doorways, a large central one, flanked by two smaller ones but there is another entrance in Old Shoreham-road with an oak porch, which also forms the main entrance to the lecture hall and classrooms immediately adjoining the church on the western side. The site measures 160 ft. by 68 ft., and the total cost of the whole building, including the site, is nearly 7,000. The church is seated for 412 persons, including a choir of forty-two, all the seats being on the ground floor. Provision has been made for the ready addition of a gallery at the east end to accommodate about thirty more. At present the site of the staircases for the gallery is utilised for ante-rooms. The church comprises a nave, two shallow transepts, a chancel, and an organ chamber. The seats are of pitch pine, varnished, and the pulpit, which is at the south-west end, is of American wainscot oak. The chancel contains the communion table, which stands behind a low panelled pitch-pine screen, the frieze of which is decorated with carved

panels representing corn and grapes. In the rear of the communion table are the seats for the minister and elders, behind which are the seats for the choir, the whole being arranged in semi-circular form. Behind these, on the wall of the chancel, there is a wooden screen with panels, surmounted with a carved canopy, enriched with cherubs' heads. Above the screen is a stained glass three-light window, the centre panel of which contains an emblematic figure of Faith, while the side lights are treated with conventional representations of the date palm. The walls are plastered with floated stucco of a warm buff tint, at the foot being a wooden dado. The church and lecture hall have open timber roofs of pitch pine slightly stained and left unvarnished. The heating is by low pressure hot-water system.

There is a ventilating turret at the crossing of the roof containing an exhaust ventilator, into which the vitiated air is sucked by an electric fan. The windows are glazed with tinted glass in lead quarries. The floor of the church slopes upwards to the extent of about 18 in. from the pulpit to the back of the church. The lecture hall, which seats some 250 people, is approached by a short staircase, it being above the ground level. Underneath the hall, on the ground floor, there is an infants' class-room, and seven other class-rooms, three of which are divided off by roller shutters and can be converted into one large room. A second staircase provides an emergency exit from the hall and also an approach to the minister's vestry, a kitchen, and a ladies' cloak-room. The staircases are composed of teak, and all external doors open outwards. The building is lighted throughout by electricity, the electrolights being of wrought iron. The organ is by Messrs. Morgan & Smith, and cost between 300 and 400. The architect is Mr. Edwin J. Hamilton, of Brighton, and the builders, Messrs. Hockley & Co., of Grantham and Brighton.

BOYS' SCHOOL, TONYPREAFALL.—A new school for boys was recently opened at Tonympreafall. The work has been carried out from plans prepared by Mr. Jacob Rees, architect, by Messrs. Lewis & Davies, builders, Tonympreafall.

SCHOOLS, WOMBWELL.—New non-provided schools were opened at Wombwell, near Barnsley, on the 31st ult. The new premises occupy two acres of ground, and provide accommodation for 660 children, 420 in the mixed department and 240 in the infants. The cost of the work is 10,087. 1s. Mr. John Robinson, architect, prepared the designs.

MONASTERY, LODDISWELL.—On the 30th ult. part of the monastery built at Wood Barton, near Loddswell, by the Cistercian Trappist monks, was opened. Erected from the plans of Canon Scoles, the building is dedicated to Our Lady of Compassion. When fully completed the monastery will be of quadrangular shape. At present only one side is finished. It is of three stories, built of local stone, with granite main coigns and sills, and white brick window dressings. In the basement are cellars, ware-houses, laundry, drying apparatus, sculleries, kitchen, bakehouses, etc. The living-rooms and dormitories are on the ground floor. The next floor will be used by the Chapter, and the space above will provide additional dormitory accommodation if required, and storage for grain. A part of the ground floor is now used as a chapel, but when the other wings are built the present building will be the public part, for the guests, and will include a library. In another wing will be accommodation for the lay brethren of the novitiate; a church, 200 ft. long, will form another side of the square, and will include seven chapels. There will also be an infirmary wing. The cost of the present building was £3,600, the expense of laying out the ground alone being over 300. When finished the monastery will accommodate 200 persons. The present building provides lodging for about 60.

HYDRO, PEEBLES.—It has been decided to rebuild Peebles Hydro much on the lines of the building which was recently destroyed by fire. The east wing, which was built a few years ago, containing thirty-three bedrooms, and the large smoking-room with its panelled oak dado and ceiling, together with the gentlemen's lavatory and the whole of the kitchen stores and larders, has only been partially damaged, and some of the floors are intact. Its original cost was about 12,000. The new billiard-room for three tables, recently erected, is also intact. The recreation room, which was in course of being constructed when the fire took place, is not entirely destroyed. The walls are standing, and the new steel roof which had just been fitted up has not been injured, and the material for its completion is partly on the ground and partly in the workshops where it was being made. Practically the whole of the back wall of the main building is intact, and so also is the gable and return wall of the east wing, so that a large part of the old building can be utilised. The new plans embrace additions at the back of the building. It contains twenty bedrooms, with lavatories, and a large heater and engine house, etc., in the basement. Altogether the new building as planned will contain, in addition to the principal rooms, 180 single and double visitors' bedrooms and sitting-rooms, as compared with 165 rooms in the old



**FREE LIBRARY, TAUNTON.**—The Taunton Free Public Library is being immediately erected on the Municipal buildings, and the School of Art is being erected on the ground adjoining the building, which is of the red Williton stone, with Roman tile dressings, has a frontage of 60 ft. to Corporation-street, with a return elevation of 70 ft. on the west side of three bays by windows. The design is of Tudor-Gothic style, with an entrance hall, a reading room, a library, a museum, a lecture hall, and a central hall, which leads to the entrance. The building is 100 ft. long, 25 ft. wide, and 18 ft. high. It is fitted with bookshelves, and contains a counter for the convenience of borrowers, upon which the catalogue is placed. On the opposite side is a newspaper and magazine room, 48 ft. long and 25 ft. wide. The whole of the ground is under the supervision from the library. The first floor is the back of the premises. The first floor is approached by a staircase leading to the reference library, which is 95 ft. long and 17 ft. wide. Adjoining this is the stockroom for reference.



The whole of the building is heated by a central system, and is lighted throughout by electricity, and an electric fan is placed in each room for ventilation. Messrs. A. Colbourne, Ltd. and J. G. Goodson were the architects, and T. H. Moggridge the builder for the work.

**QUEEN VICTORIA MEMORIAL HALL, LAMPETER.**—The opening of the Queen Victoria Memorial Hall at Lampeter took place a short time ago. The hall will contain about 800 people, and has been built from designs by Mr. Bankes Price, architect.

**CLUB PREMISES, HULL.**—The new premises of the St. Andrew's Club Company, Ltd., at Hull, have just been opened. The work was carried out from plans prepared by Mr. Gaskill, architect, of Hull, builder.

**LECTURE-ROOM, ETC., EBENEZER CHAPEL, NEWBURN.**—The new lecture-room and classrooms of Ebenezer Baptist Chapel, Aberlady, have just been opened. The building consists of a hall with a gallery on three sides, with the floor under divided into four classrooms, two being for infants, and capable of seating about 150 each. Owing to the limit of ground, there is no room to build classrooms outside the hall walls, and so the architect has arranged a series of movable partitions, by which the large hall galleries are divided into seventeen smaller compartments and classrooms, some of them large enough to accommodate twenty scholars, so as to give the school a more modern appearance. The buildings are constructed of local stone, with Forest stone dressing. The contractor was Mr. Moses Adams, Aberlady, who carried out the work under the supervision of the architect, Mr. W. Beddoe Ross, Cardiff.

**HOSPITAL, NEWBURN.**—The new hospital for infectious diseases, erected at Newburn by the Local Board, and Castle Ward Joint Hospital Committee, was opened on the 5th inst. The new buildings were designed by Mr. Thomas Gregory, of Newburn, and the contract has been awarded out by Messrs. Davidson & Bolam, of Leydon (now E. R. Davidson), the contract price being £17,964. The site covers two acres, and the main part of the hospital is a long, low building, with a series of wings on the sunny side of Knop Law Hill, overlooking the river Tyne. The buildings are of brick, with red dressings. The administrative block is two stories high, the rest being one story. There are also an observation block, in two similar halves, each containing a two-bed ward for males and a two-bed ward for females, with nurses' room, and bathroom, and a typhoid ward, with six-bed wards for males and females; a scarlet fever pavilion, similar to the typhoid fever pavilion, and a laundry block.

**CLUB PREMISES, BRIMINGTON, DERBYSHIRE.**—The new premises of the Brimington Club were opened recently by Mr. C. P. Markham, J.P. The building consists of a large hall, with billiard-room, smoking-room, card-room, reading-room, and committee-room. There is also a bar, and the usual conveniences. The entrance hall is lined with white glazed bricks, with a pitch pine dado, and a wood block flooring. The premises, which are at the junction of High-street and John-street, have a frontage to the former thoroughfare of 78 ft. The architect is Mr. Sidney Allen, of Chesterfield, and the builders are Messrs. James Fox & Son, of Brimington, to whom the contract was let for 1,000.

**BOWLING PAVILION, FORRES, N.B.**—The Forres Bowling Club have just opened the extended pavilion. The pavilion has been lengthened by 10 ft. and the front filled in with glass. The plans were prepared by Mr. W. K. Cutlar, and the contract carried out by Mr. William Black.

# SANITARY AND ENGINEERING NEWS.

**TYNEMOUTH'S WATER SUPPLY.**—After many years the problem of providing the borough of Tynemouth with an adequate water supply has reached a stage when solution is within easy view. Instead of adopting the very expensive plan of draining Parliamentary powers to buy out the Newcastle and Gateshead Water Company's rights in the district and acquire the monopoly of the Corporation, in October, 1901, made a start with a scheme which is to cost the end nearly half a million of money. A huge embankment, being built across the valley of the river Pont, among the Rothbury Hills, and a reservoir will be formed a mile and an eighth in length, covering an area of 57 acres. Draining a watershed of 1,400 acres, over which the average rainfall for the last seven years was 36 in., the reservoir will eventually hold 720,000,000 gal. of water. The average daily flow of the Pont is 1,600,000 gallons, and the quantity required for the daily consumption in Tynemouth is 125,000 gallons, so that there will be a large surplus from which to supply neighbouring authorities who may desire to participate in the benefits of the scheme. There are five filter beds already constructed, and three more have to be constructed adjoining the reservoir. After being filtered the water is carried to the borough, 244 ft. away, by a gravitation main 18 in. in diameter. The engineers are Messrs. James Macdonald & Son, Mr. Francis R. Hill being the project engineer.—*Manchester Guardian*.

**WATER SUPPLY, LOSSIEMOUTH.**—The new water supply at Lossiemouth introduced from Black-hills has been completed and opened. The engineers for the scheme were Messrs. Gordon, of Inverness.

**EDINBURGH WATER SUPPLY.**—The new Talla waterworks for the increased supply of water to Edinburgh are now practically complete, and will be opened towards the end of this month. The works were begun ten years ago, and include an embankment across the Talla water, 1,200 ft. long and 90 ft. above the river bed, also a conduit leading to Edinburgh 35 miles in length, nine miles of which consist of tunnel and twelve miles of cut and cover aqueduct. The works will yield an average daily supply of 10,000,000 gallons, and the cost, which was originally estimated at three-quarters of a million pounds, will prove on completion to be over a million and a quarter. Owing to the death of the first contractor, the Edinburgh Corporation transferred the scheme to Mr. John Best, Edinburgh. Mr. W. A. Tait, of Messrs. J. & A. Leslie & Reid, is the engineer in consultation with Mr. G. H. Hill, M.Inst.C.E.

# STAINED GLASS AND DECORATION

**BISHOP JENNER MEMORIAL.**—Stained glass has been inserted in a two-light window in the south aisle of the parish church, Preston-next-Wingham, Kent, as a memorial of the late Dr. Jenner, Bishop of Dunedin, New Zealand, formerly vicar. The figures are of St. Gregory and St. Augustine of Hippo, with small groups depicting events in their lives. The window, designed by the late prelate's son, Mr. Henry Jenner, has been executed under his superintendence by Mr. T. F. Curtis, of Messrs. Ward & Hughes, Soho.

**MEMORIAL WINDOW, GLENCAIG, CRAIGAVAD.**—The unveiling and dedication of a stained glass memorial window which has been placed in the east chancel of Glencaig Church took place a short time ago. It was designed and made by the "Tiroler Glasmalerei," of Innsbruck, and represents "The Resurrection of our Lord." The centre panel shows the figure of the Saviour with angels at His feet, while the outer panels have replicas of Roman soldiers. Mr. Hartley Patterson was responsible for the designing of the architectural alterations.

# APPOINTMENT.

**THE** new City engineer of Newcastle, Mr. C. R. S. Kirkpatrick, who was appointed on the 6th inst. to the position with thirty-five votes as against thirty-three for Mr. W. J. Steele, of Bristol, is thirty-two years of age. He was educated at Repton, and received the ground work for his subsequent career at the Crystal Palace Engineering School. Mr. Kirkpatrick has had considerable experience of railway engineering, for after leaving the Crystal Palace School, he in 1891 became pupil to Mr. E. B. Thornhill, chief engineer of the London and North-Western Railway. His progress was rapid, and in 1893 he was assistant engineer on the London and North-Western Railway under Mr. A. W. Willet, M.Inst.C.E., at Wigan. Then in 1895 he was appointed engineer to Mr. J. T. Firbank, M.P., for the widening and deviation of the L. and N.W. Railway and Midland Railway main lines between New Street Station, Birmingham, and Salley. In 1896 Mr. Kirkpatrick accepted an appointment as engineer to Messrs. John Wilson & Sons on the first section of the new L.N.W. Railway between Leeds and Huddersfield, and later served as engineer to Messrs. Monk & Nevell on the third section of the same railway. He received his present appointment as engineer to the Cleveland Bridge and Engineering Co., Ltd., in 1898, when it fell to him to carry out the contract for the enlargement of Shrewsbury Station for the L. and N.W. and G. W. Railways at a cost of 160,000. After this Mr. Kirkpatrick went to Newcastle to assist in the construction of the new high level bridge over the Tyne.—*Newcastle Chronicle*.

# FOREIGN.

**FRANCE.**—The municipality of Saint-Cloud have opened a competition for the construction of a large scholastic establishment. The jury in the competition for an asylum for aged men at Saint-Dizier have awarded the first premium to M. Leauy, architect, of Paris. The new Hôtel de Ville at Corbeil is to be opened shortly. The architects are Messrs. Tavornier & Allorge (Paris), whose design was selected in a competition. A travelling bridge ("pont transbordeur") is to be constructed at Caen to serve the railway line projected between Havre and Pont-Audemer. A new stone bridge over the Rhone is shortly to be commenced, between Avignon and Villeneuve, at an estimated cost of 2 million francs. A statue of M. de Sévigné is to be erected on the principal public place in the town of Villars. The Société des Artistes Girondins have organised, for the occasion of their seventh autumn exhibition, an architectural competition, the subject being "A typical labourer's dwelling." The municipality of Saint-Claude (Jura) have decided on the construction of a theatre and museum, at a cost of

200,000 francs. A competition has been opened for the construction of a viaduct from Saint-Vaast to Valenciennes. The Departmental Council of the Oise has decided on the construction of a Museum and Library at a cost of 450,000 francs. The Government has founded a district architectural school at Lille. The erection of a monument to Henner is proposed, at Bornviller (Alsace). It is to be executed by M. Voulot, the sculptor. M. Francis Leray, architect, of Nantes, has been commissioned to carry out, at Redon, a hotel of important architectural character, to be completed in 1907. The Free thinkers of Paris have had erected in front of the portal of the church of the Sacré Cœur at Montmartre a temporary plaster statue of the Chevalier de la Barre. It is intended to have it ultimately carried out in bronze. M. Armand Bloch is the sculptor. A Society has been formed in the department of l'Indre to provide for the preservation of the sites and monuments of Gargilesse. The death is announced at Montgeron (Seine-et-Oise) of M. Esnault-Pelterie, architect of many private houses and business premises in Paris. He was a Chevalier of the Legion of Honour. The death is also announced, at the age of 77, of M. Auguste M. Breton, honorary architect to the City of Paris, and a member of the Société des Architectes Français. He was a pupil of Normand and Laisné, and carried out important works in the service of the Voeie Parisienne.

**SOUTH AFRICA.**—The new town hall for Kroonstad, Orange River Colony, has been commenced. The South Africa Mutual Insurance Co.'s building at Cape Town is in progress, from the designs of Mr. Stucker. At a meeting of the East London Master Builders' Association, Mr. Charles Keam, the president, referred to the forthcoming conference, the object of which, he said, was to raise the standard of the local building trade. It was also proposed to discuss a proposition that joint representation from the architects and builders of East London be made to the municipal authorities, urging that building plans should be approved only when prepared by recognised and duly qualified architects.

**EGYPT.**—According to a Cairo correspondent, building operations are proceeding in every direction in the Ismailieh, Towfikieh, Kasr-el-Nil, and other residential quarters of the metropolis, and the leading firms of contractors and builders are, and have been for some time, fully occupied in erecting new buildings in those localities. Among the new large blocks of buildings now approaching completion are those belonging to the Standard Life Assurance Co., the National Hotel, Daira Khassa in the Sharia Boulaq, and others.

# MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Messrs. Ingall & Son, architects, of 3, Temple-row West, Birmingham, have taken into partnership Mr. E. Stanley Mitton, and the title of the firm in future will be "Ingall, Son, & Mitton."

**THE CEMENTERIA ITALIANA.**—This, as is stated in a consular report, is a limited company recently formed in Leghorn for the manufacture of hydraulic cement of the Portland type, and of such wares as cement flags and cement pipes. The initial capital of the company is 1,000,000 lire. The raw material comes from quarries at Quasianella, some five miles to the south of Leghorn, which the company has secured for at least thirty years. It is the highly satisfactory chemical analyses of the stone made in Italy, Germany, and Denmark which has led to the formation of the company, and its promoters believe that they possess the finest cement stone as yet discovered. The geological conditions of the quarries correspond with those of Boulogne-sur-Mer. The works of the company will be situated in the manufacturing suburb of Torretta, and will communicate with the railway and with the port by canal. They will soon also enjoy the advantage of the new Leghorn-Vada Railway for the transport of the raw material from the quarries to the works.

**FRENCH CEMENT TRADE.**—Mr. Gurney, British Consul-General at Marseilles, writes:—"The share of France in the manufacture of Portland cement in Europe is small, and amounts to 450,000 tons per annum. Prices have gone down largely in the last fifty years; 80 fr. was the ordinary rate per ton half a century ago; now the price goes below 30 fr. The cost price is 25 fr. per ton, 22 fr. being the cost of manufacture. The figures of the export of French cements generally are going down. In 1902 only 210,000 tons were exported as against 242,000 tons in 1901. The import is small—some 16,000 tons per annum. In the immediate neighbourhood of Marseilles the production is making progress, having increased considerably of late years; in 1903 73,220 tons of hydraulic lime and 164,890 tons of natural and artificial cements were manufactured. The classes of cement produced in this district are (1) Valentine; (2) Portland, made at Roquevaire, Bedoul, Cassis, Aubagne, and Valdonno; and (3) Roquefort, made at Bedoul. Lime comes mostly from Cassis. The import of British cements at



Marseilles is steadily decreasing. On the other hand the imports from Belgium increase. The cheaper qualities of cements from this district are bought in the United Kingdom for re-exportation.

**THE NATIONAL PICTURE COLLECTIONS.**—Amongst the most recent purchases by the trustees for the National Gallery of British Art, Millbank, are two examples by Alfred Stevens—a chalk drawing of a female figure, and a design in monochrome for a lunette. The National Art Collections Fund have presented to the Galleries in Trafalgar-square a picture, "The Virgin and Child," by Lazzaro Sebastiani, and J. M. Whistler's painting of old Battersea Bridge, entitled "Nocturne in Blue and Silver." The trustees of the National Portrait Gallery have purchased a death-mask of Alfred Stevens taken immediately after his death (1876) by Mr. R. Townroe, and portraits of A. Welby Pugin; David Cox, painted by W. Redcliffe the younger in 1835; Miss J. W. Cross ("George Eliot"), in 1835; and a painting of old Battersea Bridge, painted in oils by M. d'Albert Durade of a likeness he painted at Geneva in 1849; Captain Cook, painted in 1766, three years before his death; and James Lonsdale's portrait of James Smith, author with his brother, Horace, of "Rejected Addresses." In accordance with the late G. F. Watts's disposition his executors have presented two unfinished portraits by him—one of the late Cecil Rhodes, the other of himself—and the trustees have received, by bequest, Frank Holl's portrait of Sir John Huddleston, last Baron of the Exchequer, and one, by Lemuel F. Abbott, of Edmund Lodge, who bought out the volumes "Portraits of Illustrious Personages."

**MILAN INTERNATIONAL EXHIBITION, 1906.**—At a meeting, held on August 25, of the Exhibition Committee, it was announced that the Government will make a grant of 10,000*l.* in aid of the British section of the exhibition. The exhibition, the first after its kind in Italy, is being organised, to celebrate the completion of the Simplon tunnel, under the auspices of the government of that country, whilst those of France, Germany, Austria, the United States, and other countries will be officially represented. Exhibitors should address their inquiries or applications to the secretaries of the committee at the London Chamber of Commerce. Sir Albert Kelly, M.P., is chairman of the International Exhibitions Committee of the London Chamber.

**ROYAL HIBERNIAN ACADEMY AND DUBLIN SCHOOL OF ART.**—A committee has been nominated by the Lords of the Treasury to inquire into the work carried on by the Royal Hibernian Academy and the Metropolitan School of Art in Dublin. The members of the committee are:—Lord Windsor (Chairman), the Earl of Westmeath, Mr. Justice Madden, Mr. George Holmes, C.V.O., C.B. (Chairman of the Board of Public Works, Dublin), and Mr. J. P. Boland, M.P.; Mr. H. P. Boland, of the Board of Works, Dublin, is appointed secretary.

**STATUE OF THE QUEEN, HONG-KONG.**—The Coronation Committee of Hong-Kong have commissioned Mr. George E. Wade to carve a statue of the Queen, in complement of the existing statues there of the King and the Prince of Wales, of which Mr. Wade was the sculptor.

**STATUE OF SIR WM. V. HARCOURT.**—Mr. Waldo Story, of Rome, is commissioned as sculptor of a statue of the late Sir Wm. Vernon Harcourt, M.P., to be erected in the House of Commons, where it will be, we believe, the first statue executed by an American artist.

**THE LATE C. FORSTER HAYWARD.**—The late C. Forster Hayward's estate is valued at 17,600*l.* 1*s.* 9*d.*, the net personality amounting to 12,675*l.* 16*s.* 5*d.* He bequeathed, we understand, 20 guineas to the Architects' Benevolent Society.

**REOPENING OF THE WORKING AND BASINGSTOKE CANAL: SURREY AND HAMPSHIRE.**—In pursuance of an Order in Chancery made in the suit "Ingrain v. The Working, Aldershot, and Basingstoke Canal and Navigation Company" the property, embracing a total land and water area of about 380 acres, was offered for sale at the mart in last October, but was withdrawn after a bid of 20,000*l.* It is stated that the present owner intends to open a regular daily service of motor boats for goods and passengers between Aldershot and Basingstoke. The canal is 22 miles long—of the canal offers facilities for the proposed quick traffic, being free from locks, though a tunnel, nearly  $\frac{1}{2}$  mile in length, is cut through the chalk of Grewell Hill, whence, as also from the River Loddon, was obtained the principal supply of water for locks, etc. The canal enters Surrey in crossing the Blackwater River at a point near Ash in that county; thence it bends northwards by Romping Down to Frimley, and so eastwards to Pirbright, Horsell, and its junction with the Wey at Woodham, between Weybridge and Byfleet. The Surrey portion—16 miles long—has twenty-nine locks, with an aggregate fall of 195 ft., between the Blackwater and the Wey. The canal was begun in 1778, in terms of the Act 18 Geo. III., c. 75, by subscribers to a capital of 128,000*l.*, who obtained in 1793 a further Act (33 Geo. III., c. 16) for raising an additional capital of 60,000*l.* in view of the heavy cost of the tunnel at Grewell Hill. The canal, opened in 1796 for vessels limited to 13 ft. beam and

72 ft. length, opens out from the Loddon near Basing village, and winding through Hampshire passes by Old Basing, Nateley, Deepford River, Odham, and Winchfield, and then, skirting Dogmersfield Park, is carried by a long aqueduct across the valley to Crookham and Aldershot, across the reservoir. That length had a top level 38 ft. wide and was  $5\frac{1}{2}$  ft. deep. A branch—six miles long and level—was made across Hook Common, northwards to Turgis Green, near Strathfieldsaye. The Itchen Navigation joins Southampton to Winchester; the latter city would place it in communication with the southern port.

**INSANITARY PROPERTY IN LIVERPOOL.**—The Report for 1904 by the Medical Officer of Health for Liverpool states that during the year further steps had been taken for the condemnation of insanitary houses. The property on this occasion consisted of 372 houses, with a population of 1,325 persons. The Report describes the nature of these houses:—"The houses are arranged in courts, which are so narrow and so shut in that sunlight and adequate ventilation are greatly obstructed, even to the courts themselves, one of the great sources of mischief being the aggregation and crowding together of houses on the ground without any open space about them. . . . Some of these courts are approached by narrow passages, many of them being converted into tunnels by the extension over them of the rooms above. These tunnels and passages, though constantly scavenged, swept, and washed down, become receptacles for filth and every description of refuse. . . . The houses themselves, which consist of three rooms, one above the other, and are back to back and side to side with houses similar in construction. This gives rise to the great fundamental fault, that no through ventilation is possible. . . . The atmosphere of the interiors of these dwellings is invariably foul and insalubrious, and, moreover, the rooms, etc., are saturated with vapour and organic matter from the skin and lungs of the occupants, which is manifested by the staining and discolouration of the plaster. In the majority of cases the water-closet accommodation consists of a trough placed in the court, and the inconvenience of access leads to the retention of excrement in various positions within the house during inclement weather and at other times. This is especially the case with regard to children, or in times of sickness. All of the property is dilapidated, a good deal of it being from 70 to 100 years old, and figuring upon maps prepared in the early part of last century." One is glad to find that the Liverpool authorities are continuing steadily in their good work of sweeping this class of houses.

**STATUARY, TAVERO CATHEDRAL.**—The Western and the Philipotts (south transept) porches of Truro Cathedral have been lately enriched by new statuary, designed and executed under the superintendence of Mr. F. L. Pearson, consulting architect to the Dean and Chapter, by Mr. N. Hitch, sculptor, of Kennington.

**BULLER MEMORIAL, EXETER.**—A bronze equestrian statue of General Sir Redvers Buller was unveiled at Exeter on the 6th inst. by Viscount Ebrington. The monument has been cast by Messrs. Hollinshead & Burton, of Thames Ditton, from a model executed by Mr. Adrian Jones, sculptor.

## CAPITAL AND LABOUR.

**NOTTINGHAM BUILDING TRADE DISPUTE.**—The Nottingham building dispute, which threatened to develop into a strike, has been practically settled. Into the much-disputed authority rule commencing "Each employer shall have power to conduct his business in any way he thinks advantageous," a clause has been drafted prohibiting piecework, and in one or two other ways the rule has been added to in a way which renders it possible for the men to accept it. All the committees have agreed that walking time shall be paid for from a radius  $1\frac{1}{2}$  miles from the Exchange Hall up to four miles, and that, in the event of the work being beyond four miles distance, the employers shall pay the whole of the men's out-of-pocket expenses. The employers have entered into arrangements with at least one of the societies—probably with all—to discuss the wage paid to any non-efficient workmen with a view to having the amount reduced.—*Nottinghamshire Guardian.*

**GLASGOW JOINERS' DISPUTE.**—The strike of the joiners in Glasgow, which has lasted fully four months, was brought to a close by the signing of the 1st inst., when, at a meeting of parties representing both masters and men, held in the City Chambers, under the chairmanship of Lord Provost Sir John Ure Primrose, a minute containing terms of agreement was duly signed. The dispute began in April last, when the masters intimated their desire to alter the date of signing the by-laws and reduce the rate of wages from 10*d.* to 9*d.* per hour—a course of proceeding which, they contended, was necessary because of the depressed condition of trade at that time. It has now been agreed that the rate of wages shall be 9*d.* per hour until July next.

**THE LONDON BUILDING TRADE.**—The acceptance by the Operative Society of Stonemasons of the new working rules, after it had been refused by the employers, brings half the trade in the building industry into agreement with the London Master Builders' Association, who had given notice to terminate the existing agreement, and had formulated a new proposal. It is believed that there is no danger of a strike in the industry such as appeared probable near the movement first commenced. No alteration in the present rate of wages is to be made, and the employers concede the amendment suggested by the operatives that there shall be one hour three weeks of the winter work, and that the hour rule shall apply to work in shops as well as on jobs. They also withdrew their request for permission to otherwise vary the winter and for "reasonable circumstances." A further important concession limits the night work, at the rate of a penny an hour addition to the ordinary rate, to nine hours a shift. The London district is altered to mean within twelve miles of Chancery Cross instead of ten as formerly.—*News and Advertiser.*

**BUILDING TRADE DISPUTES, TYNSIDE.**—The dispute in the building trade of Tyndale district continues to be settled by arbitration, and on the 6th inst. the matters over which the employers and labourers had been at variance were amicably adjusted, thus disposing of three of the four trades that were out on strike at the beginning of May. The masons, bricklayers, and labourers having now settled, only the plasterers remain. The conference between the employers' delegates and the employers, at the Employers' Association offices in Pilgrim-street, Newcastle, was really a continuation of that held last year, when the prospects of a settlement were considered to be very hopeful. The conference lasted for two and three-quarter hours, at the end of which it was intimated that the employers had agreed to accept 6*d.* per hour, or a reduction of a farthing. The original demand was 6*d.* to 8*d.* A compromise was that wages should be 6*d.* to 7*d.* A compromise has, therefore, been effected, and half of the proposed reduction accepted. In addition to this, certain amendments have been made in the rules, and the labourers have accepted the conciliation clause adopted by the other two trades that had been settled. In other words, they accept the principle of arbitration. The agreement comes into effect on the 15th inst. and the dispute affects both the Tyndale and Blyth districts. As a result of a conference between the representatives of the bricklayers on strike at Sunderland and the employers it is expected that the dispute will be settled amicably.—*Newcastle Chronicle.*

## PATENTS OF THE WEEK.

**APPLICATIONS PUBLISHED.**  
18,903 of 1904.—W. H. BRANES and H. W. H. Hot-Water Heating Apparatus.

This relates to a hot-water heating apparatus of the kind wherein water is caused to circulate in a pulsating or intermittent manner by alternately admitting steam under pressure to a water displacement vessel and afterwards condensing it, and consists in the use of a special steam generator of comparatively small internal capacity in producing the steam necessary for working the displacement vessel, the said steam generator being separate from the water heater employed for heating the water circulating in the system. A downtake is connected to the top and bottom of the steam generator, and is arranged externally of the displacement vessel, whereby circulation of water between the steam generator and displacement vessel and the discharging of the latter vessel with hot water or near the boiling temperature will be prevented.  
20,900 of 1904.—H. C. KING: Kitchen and Sink Grates.

According to this invention a grate is provided pivoted to the rear of a frame loosely placed on the range, and at the forward extremity, centrally or at one or both sides, a rack is provided, having recesses on one of its edges, the arrangement being such that, on the uplifting of the forward edge of the grate, successive teeth of the rack engage over the edge of the grate or grate frame under the action of the weight of the rack, so that the grate is lowered by displacing the rack to a determined extent, according to the degree of inclination required.

22,248 of 1904.—S. S. HELLIER: Water-closets and the like.

This relates to water-closets and the like, and consists in the combination of a trap having a screwed piece cast in its outlet and not a connecting piece screwed on to the said screwed piece, and turned on its outside for the attachment of the outlet pipe by a welded joint.

\* All these applications are in the stage which opposition to the grant of Patents upon them may be made.







## CONTRACTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Expiry of Tender.
2,400 yds. super. Paving, etc. Ashton to Oldham-rd.	Lancashire County Council.....	W. H. Schofield, County Surveyor, Preston.....	Sept. 11
Work at Stables, Commercial-road.....	Bedford Corporation.....	N. Greenhields, Borough Surveyor, Town Hall, Bedford.....	Sept. 11
Laths, Drilling Machine, etc.....	Warrington Electricity Department.....	F. V. L. Mathias, Borough Elect. & Tram. Eng., Howley, Warrington.....	Sept. 11
Street Works.....	Ilford U.D.C.....	H. Shaw, Engineer, Town Hall, Ilford.....	Sept. 11
Steel Fish Plates.....	East Indian Railway Co.....	C. W. Young, Secretary, Nicholas-lane, E.C.....	Sept. 11
Steel Fish Bolts and Nuts.....	do.....	do.....	Sept. 11
Painting Hospital Buildings.....	Lincoln County Hospital.....	W. Watkins, Surveyor, Silver-street, Lincoln.....	Sept. 11
Roofs & Repair. Barns, etc. Fardle Barton, Cornwood.....	Hythe Corporation.....	W. Pearce & Son, Surveyors, The Green, Mowbray.....	Sept. 11
1,500 cubic yds. of Granite, Quarries, etc.....	Glamorgan County Council.....	C. Jones, Borough Surveyor, Bank-buildings, Hythe, Kent.....	Sept. 11
Infant School, Cadiz, near Swansea.....	do.....	T. M. Franklin, Clerk, Westgate-street, Cardiff.....	Sept. 11
Hot-water Plant, Aberavon Council School.....	do.....	do.....	Sept. 11
Extn. of Laundry, etc. at General Hospital, Stroud.....	Padiham U.D.C.....	W. J. P. Marling, Hon. Sec. at the Hospital.....	Sept. 11
123 yds. of 9-in. Water Pipes, etc.....	Clacton U.D.C.....	Mr. Gregson, Engineer, Town Hall, Padiham.....	Sept. 11
1,700 yds. of Kewish Flats.....	Stockport Gas Committee.....	A. R. Robinson, Surveyor, Town Hall, Clacton-on-Sea.....	Sept. 11
Electric Lighting Cables.....	Salford Water Committee.....	A. J. H. Carter, Borough Electrical Engineer, Milgate, Stockport.....	Sept. 11
Socket and Spigot Pipes.....	Salford Corporation.....	L. C. Evans, Town Clerk, Town Hall, Salford.....	Sept. 11
Wrought-iron Tubes and Fittings.....	Totnes R.D.C.....	O. Thomas, Gas and Water Offices, Pentre, Glamorgan-shire.....	Sept. 11
Wiring at Council Schools, Devonshire-st., Brompton.....	Hove Corporation.....	Borough Electrical Engineer, Frederick-road, Pendleton.....	Sept. 11
335 ft. of 6-in. Glazed Drain Pipe, Stoke Gabriel.....	Chelmsford Grammar School.....	M. Luscombe, Yards Farm, Stoke Gabriel.....	Sept. 11
Incandescent Gas Burners, Mandles, etc.....	Rev. Canon Stuart.....	C. & W. H. Smith, Surveyors, Town Hall, Hove.....	Sept. 11
NEW GLASSROOMS AT SCHOOL, CHELMSFORD.....	Dorchester R.D.C.....	Aslin & Coleman, Architects, Sawson-street, Dublin.....	Sept. 11
Repairs to Roof Catholic Ch., Rosere, co. Tipperary.....	Norfolk Education Committee.....	D. Balfour & Son, Eng'rs, 3, St. Nicholas-hill, North-on-Tyne.....	Sept. 11
Main Sewerage, Bentley-with-Arkey.....	Solby U.D.C.....	C. C. Dolg, Architect, Elgin.....	Sept. 11
Business Premises, High-street, Elgin.....	Birmingham Guardians.....	A. J. Lacey, Architect, 6, Upper King-street, Norwich.....	Sept. 11
Alterations, etc. to Manham School, Norwich.....	W. Chiseman, Esq.....	F. Grubb, Engineer, 54, Parliament-street, S.W.....	Sept. 11
ENGINE AND BOILER HOUSE, COAL STORE.....	Manchester Gas Committee.....	W. H. Ward, Architect, Paradise-street, Birmingham.....	Sept. 11
PAINTING PARISH OFFICES.....	Heavwood Corporation.....	W. C. Poole, Architect, Prested-road, Clapham Junction, S.W.....	Sept. 11
PULLING DOWN & ERECT. PREM. CROYDON.....	Haverfordwest Town Council.....	J. G. Newbigging, Rochdale-road Station, Manchester.....	Sept. 11
Boiler House, etc., Rochdale-road Station.....	Briton Ferry U.D.C.....	J. T. Dickinson, C.E., 14, Victoria-street, Westminster.....	Sept. 11
Bacterial Filters, Contract No. 5.....	Consett U.D.C.....	J. Gibbon, Borough Surveyor, Haverfordwest.....	Sept. 11
1,000 yds. super. of Paving Flags.....	Corwall Education Committee.....	H. A. Clarke, Engineer & Surveyor, Council Offices, Briton Ferry.....	Sept. 11
Timstone Road-metalling.....	Bristol Docks Committee.....	W. S. Shell, Engineer, Parliament-street, Consett.....	Sept. 11
Sewage Disposal Works at Crookhill.....	Dist. Comm. Uphall and Broxburn.....	B. C. Andrew, Architect, Biddick's Court, St. Austell.....	Sept. 11
Council School, etc. St. Dennis, St. Austell.....	Dublin Corporation.....	W. W. Squire, Engineer, Cumberland Basin, Bristol.....	Sept. 11
Reconstruction of Shed, Portlhead Dock.....	Birmingham Guardians.....	A. Lindsay, 11, Jamaica-street, Glasgow.....	Sept. 11
Extension of Electric Lighting Works.....	Wimbleton Borough Council.....	City Electrical Engineer, Fleet-street, Dublin.....	Sept. 11
Sub-station Switchboards.....	Watford U.D.C.....	W. H. Ward, Architect, Paradise-street, Birmingham.....	Sept. 11
Addit. Nurses' Home Block, Dudley-road Infirmary.....	Mounmouthshire Education Comn.....	C. H. Cooper, Engineer, Council Offices, Broadway, Wimbleson.....	Sept. 11
Repairs & Improvements, Infants' Council School.....	Southampton Corporation.....	W. H. F. Colebrook, Elec. Engineer, 14, High-street, Watford.....	Sept. 11
Artisans' Cottages, Slime-street Area.....	Oystermouth U.D.C.....	D. Morgan, Architect, Charles-street-chambers, Cardiff.....	Sept. 11
Wooden Croyon at Southend, Mumbles.....	Croydon Guardians.....	C. J. Hair, Architect, 23, Portland-street, Southampton.....	Sept. 11
Additions, etc. to Public School, Rother.....	Hertford Corporation.....	J. Whitot, Architect, Elgin, N.B.....	Sept. 11
Small Relief Station, Oakfield-road, Anesley.....	Acton District Council.....	H. Renney, Architect, 104, George-street, Croydon.....	Sept. 11
Detached Residence and Stables, near Skipton.....	Edmonton U.D.C.....	J. Hartley, Architect, Skipton.....	Sept. 11
Surface Water Drains.....	do.....	J. H. Javans, Borough Surveyor, Hertford.....	Sept. 11
Making-up Streets.....	Newbury Town Council.....	D. J. Ebbett, Surveyor, 57, High-street, Acton, W.....	Sept. 11
Alterations, etc. to Wesleyan Methodist Ch., Seaton.....	Witleton Guardians.....	W. G. Scott & Co., Architects & Victoria-buildings, Warrington.....	Sept. 11
SUPPLY & DELIVERY OF PORTLAND CEMENT.....	Chiswick U.D.C.....	Council's Engineer, Town Hall, Edmonton.....	Sept. 11
SUPPLY & DELIVERY OF BROKEN GRANITE.....	Messrs. Usher & Barclay.....	do.....	Sept. 11
SUPPLY & DELIVERY OF STONEWARE PIPES.....	East Riding Education Committee.....	W. D. Sang & Lockhart, Engineers, Kirkcaldy.....	Sept. 11
Mount Pleasant Drainage, Newburgh.....	Richmond Town Council.....	C. Clegg & Son, Architects, 104, King-street, Manchester.....	Sept. 11
Two Pavilions, Washington Workhouse.....	Pembroke-shire, etc. Infirmary.....	J. H. Abbott, Eng. Sew. Wks., Corney-rd., Burlington-lane, Chiswick.....	Sept. 11
Limestone, Sludge Pit, etc. at Sewage Works.....	County Council.....	Norris & Duvall, 60, Fore-street, Hertford.....	Sept. 11
ROADMAKING, ETC. WORKS, HERTFORD.....	Paddington Borough Council.....	Building Surveyor, Bevelley.....	Sept. 11
Alterations, etc. to Council School, Langtoft.....	Birmingham Tramways Department.....	T. H. Jones, Secretary, High-street, Haverfordwest.....	Sept. 11
PUBLIC ELEMENTARY SCHOOL.....	Folkestone Corporation.....	C. H. Monney, County Surveyor, Carmarthen.....	Sept. 11
REPAIRS TO INFIRMARY, PEMBROKE.....	University College of Wales.....	W. J. Dawson, Architect, 11, Cranbrook-road, Ilford.....	Sept. 11
Repair and Restora. of Exter, Shire Hall, Carmarthen.....	Updon-on-Severn R.D.C.....	F. B. Osborn, F.R.I.B.A., 13, Bennett's-hill, Birmingham.....	Sept. 11
SUPPLY OF SHINGLE.....	Derbyshire Asylums Committee.....	A. E. Nichols, Borough Engineer, Folkestone.....	Sept. 11
Tramway Depot in Mosley-road.....	Rhyl U.D.C.....	Registrar at College, Aberystwyth.....	Sept. 11
Underground Conveyance.....	Gt. & Little Usworth Parish Council.....	C. J. Dawson, Architect, 11, Cranbrook-road, Ilford.....	Sept. 11
NEW LABORATORY, BUARTH MR., ABERYSTWYTH.....	Derbyshire Asylums Committee.....	Willcox & Raikes, Engineers, 63, Temple-row, Birmingham.....	Sept. 11
Sinking and Boring Well 200 ft.....	Metropolitan Asylums Board.....	Council's Offices, Hanwell, W.....	Sept. 11
SUPPLY AND DELIVERY OF BRKN. GRANITE.....	Derbyshire Asylums Committee.....	Guardians' Offices, 67, Broad-street, W.C.....	Sept. 11
REPAIRS AT CASUAL WARDS, DEURY-LANE.....	Hyth U.D.C.....	Union Offices, Edgware.....	Sept. 11
ERECT. OF LAVATORIES, WICKHILL, EDGWARE.....	Gt. & Little Usworth Parish Council.....	J. S. Story, County Surveyor, St. Mary's Gate, Derby.....	Sept. 11
Sewage Disposal Works, Mickleson Asylum.....	Derbyshire Asylums Committee.....	G. Buckley & Son, Architects & Surveyors, Towst-chbbs, Hallow.....	Sept. 11
Pair Semi-detached Villas, Skircoat Gr.-rd., Halifax.....	Hyth U.D.C.....	Town Surveyor, Clwyd-street, Rhyl.....	Sept. 11
FREE LIBRARY & EXTN. TO TOWN HALL.....	Metropolitan Asylums Board.....	Office of the Board, Embankment, E.C.....	Sept. 11
ENGINEERING WK., EAST EOS, HOMETOWN.....	Gt. & Little Usworth Parish Council.....	J. R. Elliott, Clerk, Fern House, New Washington, co. Durham.....	Sept. 11
Ten Electric and Sewage Gas Lamps.....	Derbyshire Asylums Committee.....	H. T. Sidwell, Engineer, Rochford, Essex.....	Sept. 11
Vertical cast Water Mains.....	Hyth U.D.C.....	Office of Architect & Quays-street, Carmarthen.....	Sept. 11
SANAT., ALLTYMYNYDD, CARMARTHENSHIRE.....	Derbyshire Asylums Committee.....	W. H. Byrne & Son, Architects, 20, Suffolk-street, Dublin.....	Sept. 11
Twenty-one Cottages, Vernon-avenue, Clonfert.....	Derbyshire Asylums Committee.....		Sept. 11

Those marked with an asterisk (\*) are advertised in this number.

Competitions, —

Contracts, iv. vi. viii. x.

Public Appointments, —

STONE (continued).			SLATES.			TILES.		
	s. d.		in. in.	2 s. d.			s. d.	
HARD YORK—			20 x 10 best blue Bangor	12 2	6 per 1000 of 1200 at r. d.	Best plain red roofing tiles	42	0 per 1000 at r. d.
Scappled random blocks	3	0 per ft. cub. deld. rly. depôt.	20 x 12	13 17	6	Hip and Valley tiles	3	7 per 1000
6 in. sawn two sides			20 x 10 first quality	13	0	Best Brocely tiles	8	0
landings to sizes			20 x 12	13 15	0	Do. Ornamental tiles	8	0
(under 40 ft. super.)	2	8 per ft. super.	16 x 8	7	5 0	Hip and Valley tiles	4	0
6 in. rubbed two sides			20 x 10 best blue Port-	12 13	6	Best Rusbon red, brown, or	57	6 per 1000
ditto	3	0	madoc	12 13	6	brindled do. (Edwards)	57	6 per 1000
8 in. sawn two sides			16 x 8	7	5 0	Do. Ornamental do.	60	0
(slabs random sizes)	1	2	20 x 10	12 13	6	Hip tiles	4	0 per 1000
2 in. self-faced random			16 x 8	7	5 0	Valley tiles	8	0
flags	0	5	20 x 10 best Eureka	15	17 6	Best Red or Mottled Slates	51	0 per 1000
			green	15	17 6	Do. Ornamental do. (Pikes)	51	0 per 1000
Hopton Wood (Hard Bed) in blocks	2	0 per ft. cub. deld. rly. depôt.	20 x 12	13 17	6	Hip tiles	4	0 per 1000
6 in. sawn both			18 x 10	13	8 6	Valley tiles	8	0
sides landings	2	7 per ft. super.	16 x 8	7	5 0	Best "Rosemary" tiles	52	0 per 1000
6 in. sawn both			20 x 10 permanent	11	12 6	plain tiles	52	0 per 1000
sides random			green	11	12 6	Best Ornamental tiles	52	0 per 1000
slabs	1	0	18 x 10	9	12 6	Hip tiles	4	0 per 1000
2 in. do.	0	8	16 x 8	6	12 6	Valley tiles	8	0



TILES—(continued).

For "Hartbill" brand s. d.	£ s. d.	per 1000 at rly. depôt.
Blue tiles, and faced, 30	0 0 0	12 0 0
Blue tiles, and faced, 30	0 0 0	12 0 0
Blue tiles, and faced, 30	0 0 0	12 0 0
Blue tiles, and faced, 30	0 0 0	12 0 0

WOOD.

At per standard.	£ s. d.
Best 3 in. by 11 in. and 4 in.	13 0 0
Best 3 in. by 11 in. and 4 in.	13 0 0
Best 3 in. by 11 in. and 4 in.	13 0 0
Best 3 in. by 11 in. and 4 in.	13 0 0

At per load of 50 ft.

Best 3 in. by 11 in. and 4 in.	4 10 0
Best 3 in. by 11 in. and 4 in.	4 10 0
Best 3 in. by 11 in. and 4 in.	4 10 0
Best 3 in. by 11 in. and 4 in.	4 10 0

At per standard.

Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0

At per standard.

Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0

At per standard.

Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0

At per standard.

Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0

At per standard.

Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0

At per standard.

Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0
Best 3 in. by 11 in. and 4 in.	24 0 0

METALS (continued).

Sheet Iron, Black—	Per ton, in London.	£ s. d.
Ordinary sizes to 20 g.	10 0 0	—
Ordinary sizes to 20 g.	10 0 0	—
Ordinary sizes to 20 g.	10 0 0	—
Ordinary sizes to 20 g.	10 0 0	—

Per ton, in London.

Sheet Iron, Galvanised, flat, ordinary quality—	£ s. d.
Ordinary sizes to 20 g.	12 10 0
Ordinary sizes to 20 g.	13 0 0
Ordinary sizes to 20 g.	14 0 0
Ordinary sizes to 20 g.	14 0 0

Per ton, in London.

Sheet Iron, Galvanised, flat, best quality—	£ s. d.
Ordinary sizes to 20 g.	15 10 0
Ordinary sizes to 20 g.	16 0 0
Ordinary sizes to 20 g.	17 10 0
Ordinary sizes to 20 g.	17 10 0

Per ton, in London.

Galvanised Corrugated Sheets—	£ s. d.
Ordinary sizes to 20 g.	12 10 0
Ordinary sizes to 20 g.	13 0 0
Ordinary sizes to 20 g.	14 0 0
Ordinary sizes to 20 g.	14 0 0

Per ton, in London.

Best Soft Steel Sheets, 8 ft. by 2 ft.	11 0 0
Best Soft Steel Sheets, 8 ft. by 2 ft.	11 0 0
Best Soft Steel Sheets, 8 ft. by 2 ft.	11 0 0
Best Soft Steel Sheets, 8 ft. by 2 ft.	11 0 0

Per ton, in London.

Best Soft Steel Sheets, 20 g. & 24 g.	12 0 0
Best Soft Steel Sheets, 20 g. & 24 g.	13 0 0
Best Soft Steel Sheets, 20 g. & 24 g.	13 0 0
Best Soft Steel Sheets, 20 g. & 24 g.	13 0 0

Per ton, in London.

Cut nails, 5 in. to 6 in.	9 10 0
Cut nails, 5 in. to 6 in.	9 10 0
Cut nails, 5 in. to 6 in.	9 10 0
Cut nails, 5 in. to 6 in.	9 10 0

Per ton, in London.

Cut nails, 5 in. to 6 in.	9 10 0
Cut nails, 5 in. to 6 in.	9 10 0
Cut nails, 5 in. to 6 in.	9 10 0
Cut nails, 5 in. to 6 in.	9 10 0

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 1000, unless in some exceptional cases and for special reasons.)

\* Denotes accepted. † Denotes provisionally accepted.

BARROW-IN-FURNESS.—For constructing a sewer in Cocker-lane, for the Corporation. Mr. J. Walker Smith, Borough Engineer and Surveyor:—  
J. Cleator, Abbey-road, Barrow-in-Furness..... £140 17 9

BARROW-IN-FURNESS.—For constructing a steel road bridge over the Walney Channel, for the Corporation. Mr. B. Baker, K.C.B., engineer, 2, Queen Square-place, Queen Anne's Mansions, Westminster, S.W.:—  
Sir W. Arrol & Co., Ltd., 85, Preston-street, Glasgow\*..... £87,900

CHISWICK.—For the construction of (1) egg-shaped concrete tube sewer, 42 in. by 30 in., about 658 yds. in length, along Chiswick Mall and New-road, to Pumping Station; (2) egg-shaped concrete tube sewer, 30 in. by 20 in. for a length of about 600 yds., 36 in. by 24 in. for a length of about 705 yds., 48 in. by 32 in. for a length of about 99 yds.; and an egg-shaped concrete tube surface-water sewer, 24 in. by 16 in. for a length of about 1,378 yds., in Duke's-avenue, the drive of Chiswick House, and Corner-road, and enlargement of sump at Sewage Disposal Works, for Chiswick Urban District Council. Mr. J. Barclay, Surveyor, Town Hall, Chiswick:—  
Laying 42 in. by 30 in. Sewer along Chiswick Mall to Pumping Station..... £4,275 0 0

R. W. Swaker & Co..... £4,275 0 0  
H. Morcroft..... £4,250 0 0  
C. W. Killingback & Co..... £3,800 0 0  
E. Wall..... £2,732 0 0  
J. Dean & Co..... £2,731 13 6  
T. Watson, jun..... £2,538 0 0  
J. Jackson..... £2,611 17 11  
T. W. Pedrette..... £2,405 0 0  
G. Wimpey & Co., Hammersmith\*..... £2,387 0 0  
T. H. Macdonald..... £1,400 0 0

Laying Concrete Tube Sewers and Surface-water Drains

along Duke's-avenue to the Pumping Station, Chiswick.  
C. W. Killingback..... £10,800 0 0  
T. H. Macdonald..... £9,900 0 0  
R. W. Swaker & Co..... £8,985 0 0  
H. Morcroft..... £8,460 0 0  
J. Jackson..... £8,372 3 4  
E. Wall..... £8,000 0 0  
J. W. Dean, Ltd..... £7,905 5 8  
G. Wimpey & Co..... £7,339 0 0  
T. Watson, jun..... £7,838 0 0  
T. W. Pedrette, Stamford Hill\*..... £7,450 0 0

CWMBACH.—For erecting a schoolroom in Ynaysayon, Cwmbach, Aberdare, for the trustees of Bethesda Chapel. Mr. D. Morgan, surveyor, Abernathys, Cwmbach, Aberdare:—  
M. Thomas..... £827  
R. O. Jones..... 715  
D. S. Davies..... 678  
J. Jones, Gwair Côtage, Aberaman\*..... £675

ENFIELD.—For a concrete retaining wall at the

side of the Turkey-street Brook, for the Urban District Council. Mr. E. Collins, Surveyor, Public Offices, Enfield:—  
Jennings & Grenfell, Waltham Cross.... £385

FAVERSHAM.—For erecting schools for 900 children,

for the Faversham Education Committee. Mr. W. L. Grant, architect. Quantities by architect:—  
Cornelius & G. Bowes..... £14,325 0 0  
Son..... £15,690 0 0  
Ratcliff Bros..... £14,050 0 0  
Whiting Bros..... £16,355 0 0  
G. Browning..... £14,995 0 0  
G. Wallis & W. Judge..... £18,938 0 0  
Sons..... £14,967 0 0  
W. J. Adecock..... £14,923 0 0  
Cann & Co..... £14,844 0 0  
Hayward & Paramor..... £14,749 0 0  
Wise..... £14,475 0 0  
G. H. Pett..... £18,834 0 0  
F. Fuller & Reeve..... £18,760 0 0  
A. S. Ingleton..... £18,583 15 7  
Horne Bay\*..... £18,583 15 7

FLEUR-DE-LIS.—For erecting twenty houses for

the Buttry Hatch Building Club. Mr. C. Telford Evans, architect, 8, Queen-street, Cardiff:—  
E. Hughes, Fleur-de-Lis, Cardiff..... £3,960

GLOUCESTER.—For George-street Branch Post

Office extension:—  
W. Bowers & Co..... £2,950  
A. J. Colborne..... £1,899  
A. S. Cooke..... £2,280  
W. Jones..... £3,350  
J. Byard & Sons..... £3,465  
A. Estcourt & Sons..... £3,447  
W. B. Blake..... £3,445  
J. Gurney..... £3,790  
A. E. Denby & Co..... £3,900  
A. King & Sons..... £4,582  
R. Wilkins & Sons..... £4,689

GRIMSBY.—For convalescent wards, etc., at Grimsby

and District Hospital, for the Amalgamated Friendly and Trade Societies' Gals Committee. Mr. H. C. Scapling, architect, Grimsby:—  
J. A. Thomas..... £291 15 9  
G. & J. Smith..... £80 8 5  
Cook..... £12 10 8  
Hewitts & Goodbund..... £791 0 0  
Holmes & Richardson..... £787 10 0  
Waterman..... £274 8 0  
Kitching..... £768 13 4  
Gilbert..... £764 0 0  
H. Marrows..... £84, Garden-st., Grimsby\*..... £744 2 11

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for model or examples sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

JOISTS, GIRDERS, &c.

In London, or delivered	£ s. d.	£ s. d.
Railway Vans, per ton.	6 0 0	6 15 0
Joists, ordinary	7 10 0	8 10 0
Joists, ordinary	9 2 6	10 13 6
Joists, ordinary	7 10 0	8 10 0
Joists, ordinary	7 15 0	8 5 0

At per standard.

Joists, ordinary	6 12 6	7 15 0
Joists, ordinary	6 12 6	7 15 0
Joists, ordinary	6 12 6	7 15 0
Joists, ordinary	6 12 6	7 15 0



**GRIMSBY.**—For erection of Sunday School and internal alterations to Baptist Church, Freeman-street. Messrs. Garside & Pennington, architects, Ropergate, Pontefract. Quantities by architects:—  
Henings & Goodband, Grimsby\*..... £1,377

**ILFORD.**—For additional stabling at depot, Ley-street, for the Urban District Council. Mr. H. Shaw, Surveyor, Town Hall, Ilford:—  
T. & A. Willmott, The Hill, High-road, Ilford\* £218

**KINGSTOWN.**—For laying a 6-in. water main at Glenagety, for the Urban District Council. Mr. H. Shaw, Surveyor, Town Hall, Kingston. Quantities by Surveyor:—  
J. Kelly, Newbridge, Ireland..... £498 12 6

**KIRTON (Lincoln).**—For lengthening the Market Stead Bridge, for the Holland County Council. Mr. L. Starkie, District Main Road Surveyor, Wellington House, Skirbeck:—  
Sherwin & Son, Boston..... £173

**LLANDAFF.**—For providing and laying 400 yds. of Newbridge stone kerbing in Cardiff-road, for the Llandaff and Dinas Powis Rural District Council. Mr. J. Holden, Surveyor, Park House, 20, Park-place, Cardiff:—  
Mags & Co. .. £105 15 0  
J. C. Evans .. 104 12 6  
T. B. Evans .. 79 8 4  
C. Davies .. 64 3 4  
For 100 lineal yds. of 9-in. Earthenware Pipe Sewer, etc., Highgate, Dinas Powis:  
J. Ashley .. £205 11 6  
Mags & Co. .. 165 5 3  
C. Osmond .. 152 8 11  
J. Brock .. 128 19 6  
J. C. Evans .. 127 19 10  
W. Ball .. 108 6 8  
J. Britton, Dinas Powis, Glam.\* .. 80 8 9

**MERTHYR TYDFIL.**—For alterations to Aberdare training schools, for the Merthyr Tydfil Guardians. Mr. T. Roderick, architect, Clifton-street, Aberdare. Quantities by architect:—  
M. Thomas .. £219 0  
D. Rees .. 210 0  
D. Davies, Aberdare\* .. £179 11

**NOTTINGHAM.**—For houses, Derby-grove, Derby-road. W. & J. Simons:—  
[Lowest of ten tenders received.] £911

**NOTTINGHAM.**—For house, Lucknow-drive, Mapperley Park. Messrs. A. R. Calvert & W. R. Gleave, architects, 18, Low-pavement, Nottingham:—  
G. Hopewell & Son\* .. £980  
[Lowest of ten tenders received.]

**SCROPTON.**—For laying 930 lineal yds. of 9-in. pipe sewer and 108 yds. of 6-in. pipes, etc., for the Repton Rural District Council. Mr. F. W. Bullock, Surveyor, Egginton, near Burton-on-Trent:—  
H. Bennett .. £216 8 10  
J. & J. Warner .. 205 0 0  
Brown & Son .. 180 5 6  
W. Wood .. 185 0 0  
T. Radford .. £185 0 0  
J. Blood, Hatfield\* .. 171 8 0  
R. Goodwin .. 140 0 0

**SHEFFIELD.**—For erecting training college hostel, Collegiate-crescent. Messrs. Gibbs & Flockton, architects, 15, St. James's-row, Sheffield:—  
Arncliffe & Hodgson .. £11,869 0 0  
W. Moss & Son, Ltd. .. 11,650 0 0  
J. T. Wright .. 11,464 0 0  
G. Carr .. 11,000 0 0  
J. Eshelby & Son .. 10,975 0 0  
Dyson & Son .. 10,914 10 0  
T. Lowe & Sons .. 10,790 0 0  
H. Turton .. 10,615 0 0  
W. & A. Fordlike .. 10,580 0 0  
T. & H. Whelan .. 10,580 0 0  
G. Longden & Son, Ltd. .. 10,497 11 0  
J. Fielder, Ltd. .. 10,850 0 0  
J. Wilkinson & Sons .. 10,950 0 0  
Ash, Son, & Biggin, Ltd. .. 10,280 0 0  
H. Brumby & Son .. 10,255 0 0  
Dawson, Jones, & Co. .. 10,209 10 6  
J. Martin & Son .. 10,175 0 0  
H. Boot & Son .. 10,160 0 0  
D. O'Neill & Son .. 9,982 0 0  
T. Roper & Son, Ltd., Sheffield\* .. 9,905 0 0

**SOUTH MOLTON.**—For new isolation ward at the Workhouse, South Molton, North Devon, for the Guardians of the South Molton Union. Mr. Fred. F. J. Sanders, architect and surveyor, 6, New-road, South Molton:—  
J. Westcott .. £282 0  
P. A. Hooper .. 250 0  
J. Southwood .. 210 0  
W. Sanders & Son .. £205 0  
W. Parsons, Chulmleigh\* .. 199 18

**WHITCHURCH.**—For private street improvement works, Belle Vue-crescent and Hawthorn-road, for the Llandaff and Dinas Powis Rural District Council. Mr. J. Holden, Surveyor, Park House, 20, Park-place, Cardiff:—  
S. Hewlett .. £977 2 4  
S. Shall .. 928 16 7  
J. Brock .. 922 18 6  
C. Davies .. 810 6 6  
E. Osmond & Sons .. £786 8 3  
F. Ashley .. 769 16 4  
T. R. Williams, Cardiff\* .. 734 4 4

**WHITCHURCH.**—For private street improvement works, Hawthorn-road West, Hazlehurst-road, and two back lanes, for the Llandaff and Dinas Powis Rural District Council. Mr. J. Holden, Surveyor, Park House, 20, Park-place, Cardiff:—  
J. Brock .. £1,072 10 0  
S. Hewlett .. 1,063 1 6  
S. Shall .. 1,032 13 10  
C. Davies .. 919 8 1  
J. Ashley .. £810 2 4  
T. R. Williams, Cardiff\* .. 831 11 8

**WHITCHURCH.**—For private street improvements in Evansfield-road and two back lanes, for the Llandaff and Dinas Powis Rural District Council. Mr. J. Holden, Surveyor, Park House, 20, Park-place, Cardiff:—  
J. Brock .. £721 0 3  
S. Shall .. 697 3 9  
S. Hewlett .. 665 1 9  
J. Rees .. 615 4 8  
C. Davies .. £690 18 5  
F. Ashley .. 564 15 0  
J. R. Williams, Cardiff\* .. 537 8 2

**WHITCHURCH.**—For private street improvement works in West-road, for the Llandaff and Dinas Powis Rural District Council. Mr. J. Holden, Surveyor, Park House, 20, Park-place, Cardiff:—  
S. Hewlett .. £270 10 3  
S. Shall .. 567 8 3  
J. Brock .. 558 8 0  
C. Davies .. 494 8 4  
F. Ashley .. 492 10 6  
E. Osmond & Sons .. £492 11 6  
J. R. Williams, Cardiff\* .. 431 15 3

**WIMBLEDON.**—For erecting ten small villas, Chateaux-avenue, Kingston-road, for the Polytechnic Estate, Ltd. Mr. W. C. Poole, architect, Prested-road, Clapham Junction:—  
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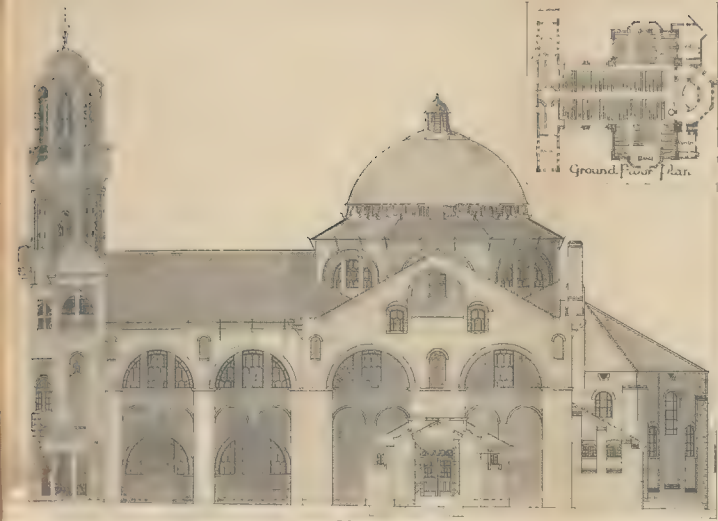
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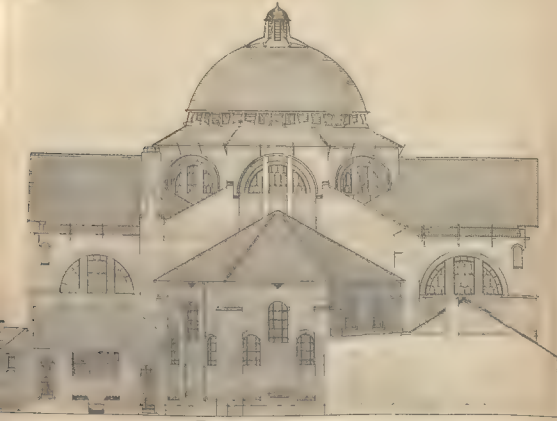
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Side Elevation



Longitudinal Section



Back Elevation



Front Elevation

Scale 1" = 10' 0" 20' 30'



Section Through Transepts

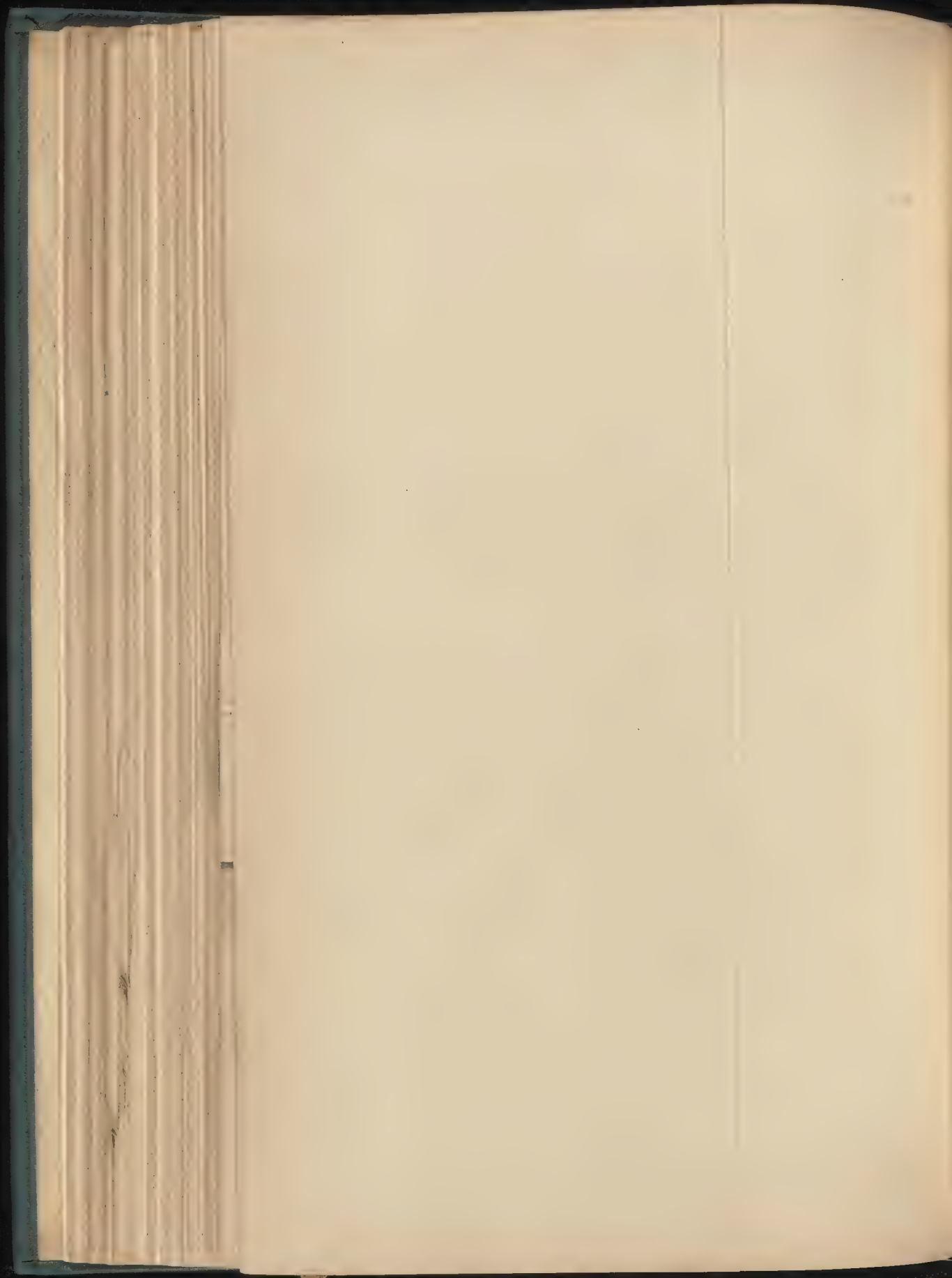






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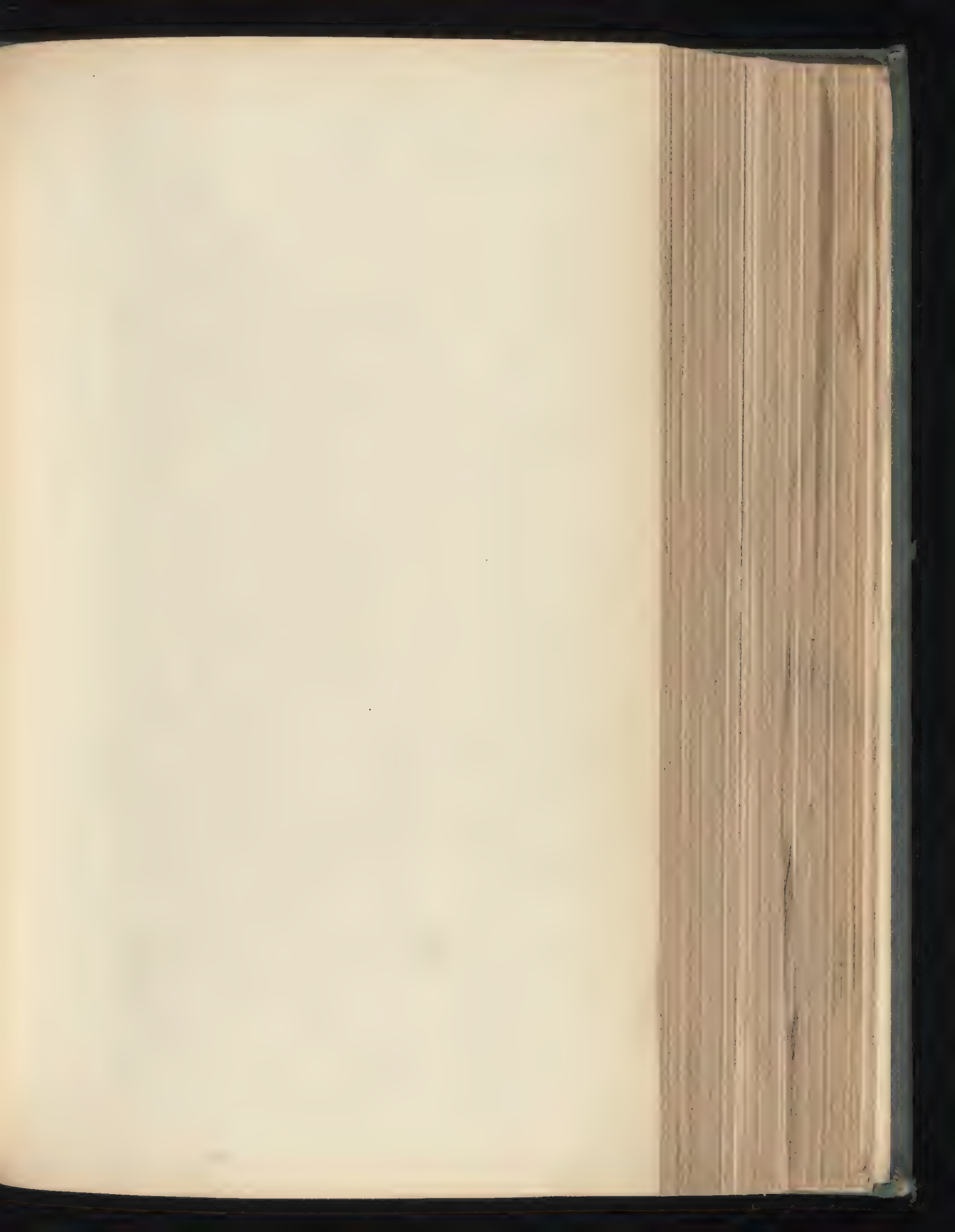




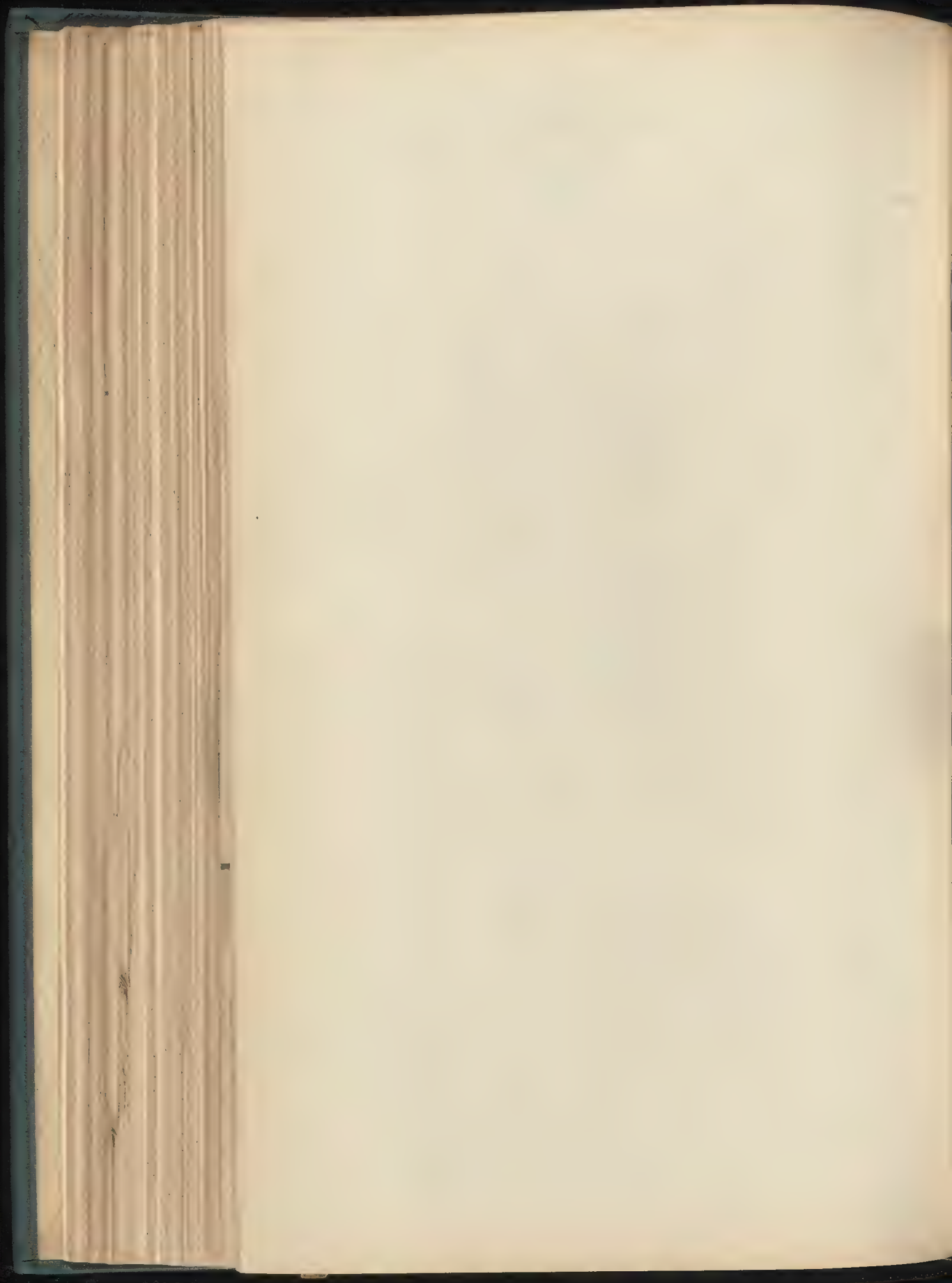




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# The Builder.

VOL. LXXXIX.—No. 3307.

SEPTEMBER 16, 1905.

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The Friari from the Scuola di San Rocco, Venice.....Drawn by Mr. W. Curtis Green.  
Competition Design for University College Schools.....By Mr. Paul Waterhouse, F.R.I.B.A.  
Ditto, ditto.....By Professor Simpson, F.R.I.B.A.  
Sketch for House at Johannesburg, South Africa.....Mr. E. A. Briggs, F.R.I.B.A., Architect.

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### The Trades Union Congress.

THE Trades Union Congress, which assembled on September 4 at Hanley, was attended by 457 delegates, and at the first day's sitting the Report of the Parliamentary Committee was received. This report was chiefly concerned with lamentations over the failure to obtain the Trades Disputes Bill and the Workmen's Compensation Bill, and it included a statement that capital was arrayed against the workers, organised as it never had been before, supported by the immense influence of an unjust state of the law. The President, on the following day, also indulged in some rhetoric and expressed the opinion that the late of the Trades Disputes Bill "threw a lurid light upon the boasted but absolutely fraudulent representative character of the House of Commons." We cannot help regretting that this annual meeting of the representatives of the Trades Unions should become the occasion of so much rhetorical effervescence. It has been our pleasure to point out from time to time the excellent work accomplished by the Trades Unions, especially in connexion with their organisation as provident clubs, and since they have also power to further the interests of their members by bringing their legitimate grievances before the public and Parliament, their leaders

have yet to learn that these interests are not forwarded by extravagant and irresponsible utterances so much as by the grave and businesslike conduct that they so ably display in many departments under their direction. To talk nowadays of class legislation is to waste the breath, since a study of the statute books of the last thirty-five years incontrovertibly proves that the only legislation that can so be denominated is legislation in favour of the working classes. The history of the Trades Disputes Bill itself is a testimony to the extreme consideration shown by Parliament to their interests. In the first place a Royal Commission was appointed to inquire into and report upon this question. The Trades Unions, in their wisdom, refused to take any part in this inquiry and prevented those whom they were able to influence from giving evidence before the Commission. This was conduct alone sufficient to alienate sympathy from a cause so conducted, but nevertheless a Bill introduced into Parliament dealing with the questions before the Commission, and before it had reported, received careful consideration. The history of this Bill is fresh in the minds of the public. The Trades Unions adopt the attitude of the spoilt child: unless they can have all that they choose to ask for they prefer to take nothing, and it is significant that the amendment upon which their representatives chose to wreck their own and premature Bill was one which compelled pickets to move away where any subject was suffering annoyance from such picket.

That Parliament should have considered that anomaly called "peaceful picketing" at all is a testimonial to the care it devotes to subjects connected with the working classes, but that annoyance to the public should have been legalised by Parliament would have been a grievance to a far larger class than the Trades Unionists, and a disgrace to any Parliament. We have frequently been able to show by reference to statistics that the law as laid down in the Taff Vale case has had a most salutary influence on the relations between the Unions and employers: a steady decrease has taken place in strikes, and trade disputes have been settled on a business basis by conference between those directly concerned. That some points require consideration, as, for instance, the exemption of sick pay and benevolent funds from liability, and the law regulating the authority and agency of individuals in relation to the Trades Union funds, is generally admitted, yet these points find no place in the address of the President, who preferred to thunder forth threats as to what the Trades Unions had to "avenge" in reference to acts of commission or omission alleged on the part of Parliament in connexion with recent legislation. One of these acts of omission was the failure to pass an amendment to the Workmen's Compensation Acts. The attitude of the Trades Unions towards this amending Bill is only another example of the impracticable attitude their leaders like to assume on such occasions. At the last Congress the Report of the Departmental Committee



of the Home Office was passed over in silence; and although that Report required careful consideration by those concerned, and the Bill framed upon it has, as we have from time to time shown in these columns, left some points in an unsatisfactory position, no attempt has in the past been made by the Trades Union leaders to draw attention to these questions and to secure a thoroughly workable measure.

This year in the course of the proceedings a fresh resolution was brought forward on the subject of Workmen's Compensation, and some discussion ensued as to whether a system of compulsory insurance on the part of employers against their liabilities under the Acts should be resolved on, or whether it should be State insurance, and in the result a resolution was passed in favour of State insurance. It will be remembered that this question was discussed before the Departmental Committee, and that although they considered it outside the scope of their inquiry, it was recognised that some system to secure the workmen might have to be considered, more especially if the Acts were extended. Another recommendation embodied in the resolution brought forward before the congress was the abolition in the Workmen's Compensation Acts of the clauses referring to wilful misconduct. It really is surprising that any reasonable body of men can be found to advocate a system of compensation to be paid to men who wilfully misconduct themselves. The Workmen's Compensation Acts marked a great departure from principles hitherto accepted when they provided that men who had contributed to an accident by their own negligence should nevertheless have a claim upon their employer; but how can it be to the interests of either the employer or the employed that a workman guilty of wilful misconduct should be placed on the same platform with others? It is possible for a workman still acting in the course of his employment and nominally furthering his employer's interests to injure machinery; if he injures himself in so doing, is he to claim compensation from the employer? The whole doctrine is too absurd.

The Unemployed Workmen's Act is a measure that marks a departure from all the economic traditions hitherto observed. It might have been imagined that such a statute would have been received by the Trades Unions with acclamation, as representing at least, from their point of view, the introduction of the thin edge of the wedge; but in the Presidential address we find it only alluded to as an "abortion" and "a bit of flimsy political window-dressing." It is hard to see how the Aliens Act can be twisted into anything prejudicial to the Trades Unions, yet in the mouth of the President this is made the subject of a grievance, whilst with delightful inconsistency he in the same breath condemns the introduction of alien labour into the mines of South Africa. On the usual resolution for an Eight Hours' Day it is noticeable that the representative for Lancashire stated that the operatives for Lancashire could not adopt a hard and fast eight hours' day, as their industry had to meet the keen

foreign competition of other countries, including America. We heartily congratulate the operatives of Lancashire on their good sense, and their appreciation of the principles which alone can govern commercial prosperity.

The Trades Unions now comprise a very large body of able workers and intelligent men, capable, as they have shown, of excellent management of some of their affairs, and the question for them to consider is, Is it to their interest that their affairs should be brought before the public in the spirit indicated above? They are not political organisations, and much of their influence will be lost if they appear merely as a federation to advance extreme socialistic doctrines. We venture to think a very great advance has been made in the three past years in the relations between capital and labour, the interests of which are in the long run identical. The absence of strikes and the increase in the spirit of conciliation are lasting tributes to the common sense of the Trades Unionists, and the Trades Unions funds are being applied more profitably than in providing strike pay and paying law costs; and, seeing how much is to be gained by a policy of compromise, it is to be regretted that an uncompromising attitude should be that assumed by the representatives at the annual Congress which is so publicly reported.

#### ON THE PLANNING OF MUNIMENT-ROOMS.

By WALTER H. GODFREY.

THE rapid growth of scientifically-conducted research and the corresponding increase in the value of actual and original documents, have made the preservation of records a matter of the very utmost importance; and this not only in the case of large institutions, or of town and national archives, for many a family and individual collection possesses a value sufficient to warrant the utmost care in the protection of the papers which it holds, as it were, in trust. Now that under the direction of Mr. Douglas Cockerell and Messrs. Hardy & Page, Messrs. W. H. Smith & Son have undertaken the good work of the repair and calendaring of private collections, we may hope that all these really priceless records of days whose oblivion is relieved alone by means of their existence—records which by their very nature are terribly subject to mutilation and decay—will have the full attention bestowed upon them that is their due.

The following notes may be of service in the design of buildings or portions of libraries, etc., devoted to this purpose,

and will serve at least to point out the chief features which such buildings should contain. The main considerations are complete ventilation, protection from fire, accessibility of arrangement, and in large buildings, economy of space.

The thorough ventilation of all documents is now, I believe, generally recognised to be essential. The shelves, therefore, on which they are placed should be quite open, which in itself is a great boon to the searcher, and where it is needful to enclose the papers in boxes or cases, these should have an aperture in the side, large enough to admit a free current of air, but kept fairly small to exclude dust. The ventilation of a room should be provided, if possible, by direct cross ventilation, with windows on one side and ventilators in the wall on the other. Movable shutters in the doors answer this purpose very well, and they should be repeated at every stage of the room if it is sub-divided into stories.

The usual precautions being taken of making the building itself fireproof (including fire-resisting doors), our main concern lies with the fittings. The stacks of shelves should be entirely of fireproof material, and nothing can be more convenient for this than lengths of T and L iron, of small section (say 2 in. by 1½ in.), bolted together. The main standards are carried from the floor to within a few inches of the ceiling, and are tied together by horizontal ties at the level of each floor and at the top. They are arranged to suit the required shelving, as shown in Fig. 1, and can easily be placed at any given distance from one another. The standards should be pierced every few inches with holes for the bearers of the shelves, thus making the latter adjustable at will. There is a good pattern of bearers made of two pieces of L iron, of a length equal to the depth of the shelf; one of the two is provided with iron pegs that pass through the holes in the standards and lock it to its fellow on the other side. They are quite easily adjusted (see Fig. 2) and form a very firm support for the shelves. In large establishments where there is pretty frequent need of altering the size and position of stacks of shelves, these iron cases are by far the most satisfactory; for a couple of men can take a large room to pieces in half a day, since the framework is entirely self-supporting and not in any way fixed to the building. Strong wire netting can be used to separate the shelves both lengthwise (Fig. 1, A-B) and between the divisions (C-D). This is quite sufficient to keep the various packets of papers apart, and can be used in any number of sub-divisions.

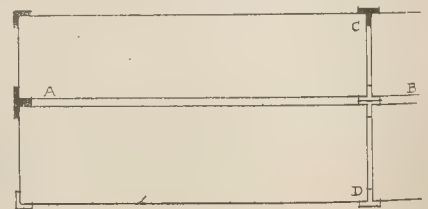


Fig. 1.

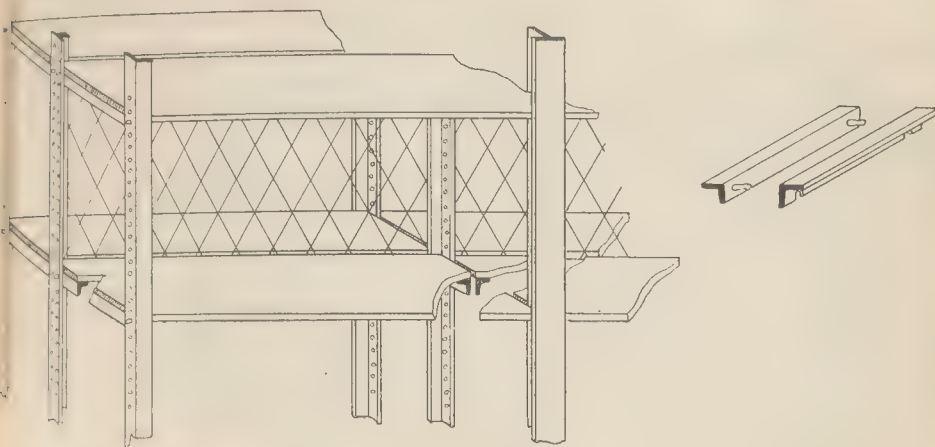


Fig. 2.

more it does not offer any appreciable obstacle to the light.

There is no doubt that the best material for the shelves is slate. It can be obtained in almost any width, is rigid, non-absorbent, impervious to moisture or decay, easily cleaned, and, above all, is proof against fire. Of course it is very heavy, but the iron framework above described will be found of ample strength for its support. It need not be more than  $\frac{3}{4}$  in. or  $\frac{1}{2}$  in. in thickness, and should be quite smooth in surface, and the front edge carefully rounded.

By this means we have a perfectly elastic system of storage, constructed entirely of fireproof material, and quite open to free ventilation. Usage will soon determine the various sizes of shelves most often required, and these can be stacked in readiness. When it is required to fit up a room afresh, or to adjust the existing fittings, the iron standards are set up in their positions and framed together by the horizontal bars, the wire netting is stretched across, the bearers are slipped into the holes that are ready to receive them, and with the placing thereon of the shelves the whole room is ready for occupation.

To facilitate the accessibility of the documents it is preferable to divide a library room into stages of, say, 7 ft. in height, making a floor at each stage of light open ironwork between each stack of books, the uprights of the cases being quite strong enough to support the framework of the floor. Connection can be made by an iron spiral staircase. These floors should be made in movable squares of cast-iron gratings, which can be easily lifted up from their framework, will admit of the passing of bundles of documents, in loading and unloading shelves. Provision may be made for these, but it will be generally found that their weight is sufficient to keep them in place. It is advisable also to provide a door, at each stage, into the passage (suitably placed directly above the door of the room), so that any large quantity of papers can be hauled up to any proper height; this will also give the

opportunity of ensuring more complete ventilation, as mentioned above.

The shelves themselves being of no height greater than 7 ft., are within a man's reach, and no steps are required. Each shelf should be kept as close to the other as may be practicable, both for economy of space and the exclusion of dust, as also to prevent the use of any leverage on the edge of the slate; boxes and papers should be drawn out horizontally to avoid damage, and this is ensured by keeping the shelves close to one another. The bottom shelf ought to be raised 5 in. or 6 in. above the floor; its contents will, then, not be liable to injury from the feet, and will escape the dust better; besides which, in the case of fire, they will not run such serious risk of damage from the water that will be poured into the building.

The stacks of shelves will be, naturally, placed at right angles to the light, so that the windows may look straight down the space between them: Where great economy of space is required, the width of these passages will be regulated in part by the depth of the shelves and of the packets that must be drawn from them. As long as this creates no inconvenience, the distance between the stacks may be as small as 3 ft., or even slightly less. A good passage-way should be left on the window-side of the room, along which, beneath the windows, it is convenient to place a long counter or table at each story, for the purpose of examining parcels and identifying documents; between the windows, too, a few shelves may be fixed for the temporary placing of unclassified bundles, or packets to which a borrowed paper has not yet been returned—a system that considerably decreases the possibility of the loss or mislaying of records. The index to each set of shelves is hung to most advantage at the end opposite the light.

If the record-room itself is to be used for research work, and is not merely a place of storage (as, for instance, when it forms the part of a private library), it may be furnished with a deep recess or bay window, divided from the main room by an arch, which can be fitted and

furnished as a small study. On the other hand, if the muniment-rooms are not large, and are merely an adjunct to the main hall or room of a library, the documents themselves may be stored in convenient recesses, which should be built as safes, and provided with sliding fireproof doors, quickly to isolate them from the accidental outbreak of fire.

But these are rather considerations of general planning, which it is scarcely my purpose to enter into here. It is for this reason that the above notes have been limited to a consideration of a muniment-room, in itself; the disposition and general plan of a building being so entirely dependent on special requirements and circumstances. But whether the storage-rooms are ranged around a central reading-room, or occupy a separate wing of the building to themselves, as long as they are kept cool and well-ventilated, the only serious consideration is the prevention of fire. But this is only too serious, where a loss, having once happened, is quite irremediable, and therefore no precautions can be too great. Electric-light should be admitted only in steel conduits, and its position should be carefully studied; but where all but the papers themselves are unflammable, it should be possible, with some thought, to reduce the risk to its extreme minimum.

**ELEMENTARY SCHOOL, ROMSEY TOWN.**—A new public elementary school was opened in Romsey Town on the 4th inst. The building comprises a central hall, with eight classrooms, opening off direct. Six of these are to accommodate fifty scholars each and the remaining two sixty. There are also cloakrooms and lavatories and storerooms, with a private room for the headmaster. The heating is by means of hot water. Outside, the playground is arranged in two sections, that on the north side being for girls and that on the south or farther side for boys. The yards are paved with asphalt, and contain out offices, shelters, and seating accommodation. The exterior is of red brick with white stone facings, and overlooking Mill-road is the bell tower, below which is a reproduction in stone of the borough coat of arms. On the north and south sides the school is bounded by walls and on the east and west sides by iron railings. The whole area occupied is some 3,000 sq. yds. Accommodation is provided for 420 children, and the cost will amount to about 7,000*l*. The architects were Messrs. Gooday & Cressall, of Colchester, and the contractors were Messrs. Clark & Son, of Cambridge.



## NOTES.

**Winchester Cathedral.**  
**EXAGGERATED** statements have been published this week in the daily papers as to there being recent cause for fresh anxiety in regard to the condition of Winchester Cathedral. Nothing new has come to light recently, and no official report on the condition of the cathedral has been made since that made by the cathedral architect, Mr. J. B. Colson, some months back, which report was laid before Mr. T. G. Jackson and Mr. Fox for their opinion on the case from the architectural and the engineering point of view respectively. They agreed with Mr. Colson that shoring was necessary as an immediate preliminary step, and this has now been done. Further than that nothing has been or will be decided upon until the next meeting of the Chapter in two or three weeks. It has for years been known to those responsible for the fabric that the state of the east end of the cathedral would eventually necessitate special measures being taken for its security, and nothing new has come to light recently. The terms of the interim report seem to have been made the basis for sensational paragraphs in some of the daily papers which, we understand, are not warranted by the facts.

**Wages and Strikes.**  
**THE** annual report of the Labour Department of the Board of Trade on wages and hours of labour shows the continued decline in wages during the year 1904 that would be anticipated in a time of depression, the mining industries, steel manufacture, shipbuilding, bottle making, and building trades being those principally affected. The building trade, it is stated, showed a net fall for the first time since 1893. The number of workpeople whose change in wages resulted in net decreases was, however, smaller than in the two years preceding. As we read the figures, however, the rate of wages in the aggregate still shows a net increase over the whole period during which the statistics were available, viz., from 1895. In the year under review, 1904, the coal miners represent 82 per cent. of those affected, as compared with 84 per cent. in 1903 and 83 per cent. in 1902. 16,018 workpeople had their hours of labour reduced, and 11,000 out of the 16,792 workpeople whose hours of labour were altered were engaged in the building trade. It is satisfactory, however, to note that for the first six months of the current year the reduction in wages is less than for the first six months of 1904. In our issue for August 12 we were able to show from the annual report of the Board of Trade on strikes and lockouts that 1904 was a record year for the small number of stoppages in industrial undertakings, and it is greatly to the credit of the working classes that this should be the case in view of the figures showing the above reduction in wages. Times of commercial depression used to be those marked by an increase in the number of strikes, and it seemed hopeless to inculcate the knowledge of the commercial unsoundness of such a policy. The alteration in the law made by the decision in the Taff Vale case in 1901 has lessened

the power of the agitator and has proved advantageous to the working classes by discouraging strikes; but, nevertheless, great credit must be given to the good sense of the working classes themselves, and it is to be hoped that both employers and employed will continue to foster the spirit of conciliation which is so important to the interests of both parties.

**The Witham Railway Disaster.**  
**AFTER** the evidence presented at the coroner's inquest, the jury could scarcely be expected to return more than a negative verdict so far as concerns the cause of the accident. The locomotive passed the critical point without derailment and without receiving the least injury, thus showing the advantage of weight. As for the other rolling-stock, all the witnesses examined on the subject were positive that no defects existed, and the evidence relating to the permanent way was of very similar character. A somewhat suggestive expression used by the guard in the carriage next to the engine does not appear to have attracted any particular attention. His words were to the effect that just before the train passed the bridge at the entrance to the station a jerk occurred which was "much more than usual." There is evidence here that previous shocks had regularly taken place at Witham, a fact that is corroborated by a letter written by a passenger well acquainted with the line. We have no doubt that the point will not escape the attention of Colonel Von Donop, who is now considering the circumstances on behalf of the Board of Trade. In the absence of any defect in the vehicles and of accidental obstructions on the line, the natural inference is that the permanent way was not suitable for high-speed traffic. The report of the Board of Trade inspector may throw some light upon this aspect of the disaster.

In a letter to the *Times* the British Canals suggestion is made that the chief trunk canals of this country should be converted into roads for fast motor traffic, the idea being that this would help to diminish the dust nuisance, the number of accidents, and the dislike entertained to the fast motor on existing main roads. We do not for a moment believe that it would do anything of the kind. No doubt plenty of cars would patronise the new highways and their owners would willingly pay any reasonable tolls necessary to provide return for the capital involved, but as more cars are put on the roads year by year, no reduction could be expected in the number using ordinary highways which, after all, are desirable for pleasure trips and indispensable for a large proportion of business journeys. Moreover, we cannot afford to give up the great possibilities of the canal system as an auxiliary means of transport. The amalgamation and co-ordination of British inland waterways for the purpose of through navigation is clearly the only permissible solution of the canal problem.

**Government Cement and Concrete Tests.**  
 In the matter of inquiring into the properties of structural materials the Americans are far more advanced than our own authorities and scientific institutions.

The latest evidence of this is to be seen in the programme drawn up by the United States Geological Survey Department. The investigations to be conducted during the ensuing twelve months include inquiry into the properties and character of sand, gravel, stone, rhyolite and kindred constituents of mortars, mortar, and concrete; tests of mortars and concrete; and tests of concrete steel beams. It is announced that the tests on mortar and concrete will be directed to show their tensile compressive and transverse strength, porosity, permeability, resistance to heat and cold, protecting properties, the effect of vibration, and the adhesion between the materials and metal. A comprehensive series of experiments will also be made to the strength of concrete beams, building blocks, and the subject of concrete steel will receive adequate attention. Surely here is an example worthy of imitation in this country.

**The Victoria Falls Bridge.**  
 By the opening of the Victoria Falls Bridge over the Zambesi River an important link has been completed in the railway connexion between Egypt and the Cape. Additional interest was imparted to the inauguration by the fact that the ceremony took place on the anniversary of the occupation of Mashonaland, and was conducted by the President of the British Association. Those who were present could not fail to be reminded of the great pioneer to whom the English people owe the inception of the Cape Cairo Railway, and of the increasing association of abstract and applied science. When Erasmus Darwin in 1785 wrote his prophetic lines—  
 "Soon shall they arm unconquered steam  
 Urge the slow barge and draw the flying car"  
 he could little have foreseen that his great-grandson would open a railway bridge in the heart of Equatorial Africa. The bridge itself crosses the river at a height of 400 ft. above water level by a single span of 600 ft., and ranks as one of the most remarkable structures of its class in the world.

**The Calcutta Improvement Scheme.**  
 THOSE of our readers who are familiar with the condition of Oriental cities will not be surprised at the statement that in one division of Calcutta the density of population is at the rate of nearly 150,000 persons to the square mile, and that in the northern wards of the city 80 per cent. of the total available space is covered by buildings. After discussions extending over several years a scheme of city improvements has been prepared by a joint committee representing the Imperial and local authorities, the ratepayers, and the mercantile classes. The chief proposals embodied in this scheme are the construction of main avenues, north to south and east to west with diagonal connecting roads; the improvement of existing thoroughfares; the provision of open spaces in places where more than one-third of the area is covered by buildings; and the formation of new quarters in accordance with suitable building regulations. Further, it is suggested that the execution of the project should be relegated to a permanent authority, comprising six members and a president. From this brief summary



it will be seen that the measures recommended for the improvement of Calcutta are not unlike some of those proposed by the Royal Commission on London Traffic. Another feature of resemblance may be found in the fact that the chief difficulty attending the realisation of the scheme is that of finance.

In excavating the ground for the new buildings of St. Bartholomew's Hospital, a burial-ground which formerly belonged to Grey Friars, since Christ Church, in Newgate-street. It was found that from seventy to eighty separate interments had been made in a small space abutting against the wall on the south side of the property of St. Bartholomew's Hospital, and extending to beneath the swimming-bath of Christ's Hospital. The burial-ground may be identified by a reference to a valuable set of plans which belonged to the Stowe Collection and were afterwards acquired by Frederick Crace. They consist of old hand-drawn copies of nine drawings and surveys, made in or about 1540, of the precincts of the Franciscans' Church, the adjoining property of St. Bartholomew's Hospital, and some parts adjacent. The plans delineate the now forgotten foot-thoroughfare (closed to the public in 1818) which extended from the Stone Gate, nearly opposite Warwick Lane, in Newgate-street, along the side of the West Cloister of Grey Friars, and on to a postern-gate in the City Wall, and thence by "The Walke" to St. Bartholomew's Hospital outside the Town-wall. In one drawing of the Grey Friars precincts are plotted two "churchyards" at the angles of the Walk and the postern, the one to the west as "belonging to Christ Church," and the other to the east as "the churchyard to Christ Hospital"; the two burial-grounds lying on either side of the footpath just beyond the Wall and at the Church. On the south-western side of the wall is plotted "churchyard for the Friars of the Hospitallers"—that is, of St. Bartholomew. Another drawing depicts the brew-house of St. Bartholomew's, adjoining the Stone Gate in Newgate-street, and, within the angle of the City Wall, the bakehouse and mill, and the brew-house court, and the Cloister in the area, seen through the railings from Newgate-street, called "the Mill-lane," by the Blue Coat boys, who were there for the last time on April 18, 1902. Their remoter playground, to the north-east, they called "the Ditch"; a doorway, near the swimming-bath, giving access to St. Bartholomew's. It simply replaced the postern-gate in the Wall.

The thirteenth annual exhibition of the Photographic Salon, now open at the rooms of the Society of Painters in Water-colours, is of the usual character, containing a certain proportion of photographs, portraits and other subjects, which command recognition simply for clearness of delineation, and a considerably larger proportion which aim at a special artistic effect. M. W. Gaby's studies of children, in a delicate kind of half tint, are very pleasing and quite in a category apart

from the ordinary portrait photograph. In "The Barrel" (4) Mr. A. Cochrane has succeeded in making a picture of the Dutch School in regard to subject and lighting; his "Mont St. Michel" (12) is a print on rough paper simulating the texture of a water-colour. Herr Kühn has succeeded in arranging a real picture in "Tuder Düne," showing two or three peasant women walking in file over the dunes. Mr. Benington gets a very soft aerial effect in "Surrey Woods" (20). Among other good landscape effects are that by Dr. Boon (38), with the trees showing strong in the foreground against a faint landscape behind; Mr. Hinton's large photograph "Hill-top" (52) with the sky light over the shoulder of the hill—very effective; and Mr. Arthur Marshall's "The Frontier" (209), a subject admirably selected to make a composition. There are several not unsuccessful attempts at poetic subjects expressed by nude figures, such as Mr. Steichen's "In Memoriam" (130) and Messrs. Liebreich and Stewart's "Peccavi" (253), a nude figure in a disconsolate attitude on the floor of a dismal room; the figure is very well posed in reference to lines of composition. There are two or three figure photographs in red, imitating (not unsuccessfully) the effect of drawings in "sanguine"; and M. Dubreuil's "Frise pour chambre d'enfants" (111), where two children are photographed as the centre point of a row of conventional trees (which must be photographed from drawings), is pretty. Architecture, as usual, receives far less attention than it deserves; but Mr. F. H. Evans shows two good little interiors in Wells and Ely (45, 46), and Mr. Somerford one "Through a Norman Arch" (198).

We may remind our readers who are members of the Institute of Architects, that the Annual Dinner of the Institute is this year to take place at Newcastle-on-Tyne, on October 13. The Northern Architectural Association, whose head-quarters are at Newcastle-on-Tyne, are exerting themselves to render the visit an agreeable one. On October 12 the President will receive the R.I.B.A. visitors at an "At Home" in the evening. On October 13 a river excursion, concluding with a visit to Tynemouth Priory, has been arranged for the morning, and the Association will invite the visitors to luncheon, at 1.30 p.m., at the Barras Bridge Assembly Rooms. On the afternoon of October 13 the Castle and Black Gate will be visited (under the guidance of Mr. J. Oliver Heslop, M.A., F.S.A.), also the Cathedral, the Guildhall, Trinity House, All Saints' Church, and the Laing Art Gallery, after which it is hoped arrangements will be able to be made for afternoon tea at the Association Premises. The dinner will take place on the same day at 8 p.m., at the Old Assembly Rooms, Newcastle; and on October 14 visits have been arranged to Durham Cathedral, etc., under the guidance of Mr. C. Hodgson Fowler, and to Hexham Abbey, etc., under the guidance of Mr. C. C. Hodges. Under these circumstances the visit ought to be a very interesting one, and it is to be hoped that it will be well attended.

#### COMPETITION FOR THE TECHNICAL INSTITUTE, ROCHESTER.

Who is responsible for the delay in declaring the result of this competition we do not know, but it is certainly strange that the competitors have had to wait more than three months for the announcement of the result of a competition for a building, the estimated cost of which is only 8,000*l*. It is true that one hundred and thirty-one designs were submitted, but, as probably not more than the odd thirty-one merited more than two minutes' consideration, the number cannot have added materially to the labours of either the assessor or the committee.

The instructions to architects were clearly drawn, and were not modified in any important respect (save one) by the answers to competitors' questions. The one exception was in the number of stories, which in the instructions was definitely stated to be three, but was afterwards altered to two or three. The accommodation required was not of a complex nature, consisting simply of two departments—an art school of ten rooms and a science school of seven rooms, with the necessary cloak-rooms and lavatories, bicycle store, and heating chamber. Provision had to be made for future extensions, but even this was not sufficient to render the problem of planning as difficult as many of the competitors appear to have found it. Nor can any particular fault be found in the site, which is an almost exact rectangle, measuring about 170 ft. by 82 ft., and very nearly level. The principal front is towards a private street on the north, and a new street will also be formed along the east end; there is no right of light over the south side, and competitors were instructed to set the building back 10 ft. from the west boundary. A comparatively simple problem like this ought not to have been the occasion of so many designs below mediocrity.

One other point deserves mention. Competitors were asked to design the new building so that it will "harmonise in appearance" with the neighbouring museum (Eastgate House), "which is a building of the Elizabethan Period (1591)." Some of the competitors appear to have had somewhat hazy notions of the characteristics of buildings of Elizabeth's time, or to have thought that anything would harmonise with such a transition style.

Messrs. Russell & Cooper (London), the authors of the first premiated design (No. 72), have designed an extremely simple and symmetrical plan. The entrance is in the middle of the north front, and leads through the entrance hall (16 ft. wide) to the principal staircase on the south side or rear of the building. These form the transverse axis, and at right angles to this central line is the main corridor (8 ft. wide). To the left and right respectively of the entrance hall the secretary's and porter's rooms are placed, with separate store-room for each, and beyond these are the woodwork-room on the left and the cookery-room on the right; the cloak-rooms, etc., are grouped around the three outer sides of the principal stairs. Future extensions (four classrooms on each floor) are shown at the two ends of the building, the longitudinal corridor being produced for the purpose, so that this corridor is lighted from the ends as well as from the principal staircase in the middle and from the south side between the staircase wing and the two future extensions. The plan of the completed building will be shaped like the letter *m*, the straight side forming the principal front. On the first floor the lecture-room is placed in the middle of this front, with a classroom at each end separated from it by folding screens. Behind the longitudinal corridor the two rooms for the masters are placed, with separate store-rooms, lavatories, and water-closets, the two groups being placed one on each side of the principal staircase. On the second floor the elementary art-room is placed over the lecture room, and the life-room and antique-room over the two classrooms, folding screens being again adopted between the three rooms. The four remaining art-rooms are shown over the two groups of masters' rooms. It is questionable whether the room for the headmaster of the art school is in the best position, and also whether a folding screen between the life-room and the elementary art-room is suitable; the depth of the classrooms (30 ft.



from the window wall) is also excessive, but the simplicity of the general arrangements counterbalances a number of small defects. The elevations are of a heavier and later type than that suggested in the instructions, and are not as satisfactory as the plans.

The second premiated design (No. 74) is by Messrs. Crouch, Butler, & Savage (Birmingham), and provides all the accommodation on two floors. Here, again, the completed building would be u-shaped, but on the ground floor the whole of the plan is occupied by the first portion of the building with the exception of the two wings are left for future extension. The entrance is in the middle of the front, and leads through a vestibule and hall to the principal staircase in the rear; at right angles to these there is the longitudinal corridor (7 ft. wide), with a secondary staircase and entrance at the east end. To the left of the main entrance there are the headmaster's room and two classrooms, and to the right the secretary's room, and woodwork and cookery rooms. The cloak-rooms, etc., adjoin the principal staircase, and are of one low story, windows being formed in the wall of the longitudinal corridor over the flat roofs. The lecture-room forms the left rear wing of the building, and is therefore near the two science classrooms. On the first floor the elementary art-room is in the middle of the front, with the life and antique rooms to the left, and the shading, modelling, and wood-carving to the right. The metal-room is in the roof over the wood-carving room, and is only 6 ft. high at the sides. The design of the principal front is a pleasing piece of work, Elizabethan in style, and more in accordance with the instructions than the accepted design.

No. 45, by Mr. W. H. Knowles (Newcastle-on-Tyne), has gained the third premium. The central portion of the building is three-storied, three of the art classrooms being placed on the second floor; the remaining accommodation is provided on the ground and first floors, and on a small mezzanine floor over the cloak-rooms. The lecture-room is on the ground floor at the east end of the building, and the two classrooms on the first floor at the west end. The planning is simple and compact, and the building appears to be inexpensive, but the design is certainly inferior to those placed before it by the assessor.

The unsuccessful designs are hung in numerical order, and it will be interesting to consider a batch of them in some detail, so that an approximate idea of the general quality of the designs may be obtained. It must be confessed that the survey is disappointing.

In design No. 1 there is only one staircase, and the side flights are only 4 ft. wide, although the instructions clearly call for two staircases—principal and secondary. No. 2 is the work of a beginner. No. 3 is interesting for its picturesque external treatment in brick and stone, with half-timber gables, the style harmonising more closely with that of Eastgate House than does the style adopted by most of the competitors; the plan, however, is of much less merit. The plan of No. 4 is decidedly above the average, and is well adapted for future extension, but more space might with advantage have been given to the staircases, and the separation of the cloak-rooms and lavatories into eight rooms (two on each of four floors) is not convenient. There is no redeeming feature in the next design, but No. 6 has a simple and attractive plan, marred by a dark and rather narrow corridor on the ground floor, and by the quite inadequate cloak-room accommodation. In No. 7 the secondary staircase is provided to comply with the instructions, but it serves no useful purpose whatever, as on each of the three floors it has no direct communication with the principal rooms and corridors; the only means of communication lies through the men's lavatories and cloak-rooms; the plans are also badly adapted for future extension. The author of No. 8 has produced an excellent elevation in the Elizabethan style, and, although the plan is also meritorious, it is clear that it has suffered from the author's love of his external design; thus, the top-lights of the five art-rooms are shown on the south slope of the roof, although the north

slope was available, but the principal front is towards the north, and top-lights would not have improved it. The plans of No. 9 are convenient and adapted for future extension, but the lecture-room is only 45 ft. by 25 ft., instead of 50 ft. by 30 ft., and the elementary art-room and some of the other rooms are also too small; the exterior is somewhat peculiar, but not ineffective.

We will say nothing about Nos. 10 and 11. No. 12 is much better, but the ground-floor corridors are too narrow (particularly in view of the future extensions), and the lecture-room and class-rooms would have been better on the same floor. Design No. 13 is shown by a very careful and complete set of drawings, and the plan is decidedly good in its main lines; the cloak-rooms, however, are planned in such a way as to block the wall-spaces which would otherwise have been available for lighting the corridors, and the secondary staircase is too narrow; the raising of the ground floor about 4 ft. above the street adds unnecessarily to the cost. Nos. 14 and 16 are bad in both respects. In No. 17 the cloak-rooms are entirely inadequate, and the corridors are not well arranged. No. 18 is feeble. No. 19 could not be extended without much difficulty and inconvenience. No. 20 has a simple plan, but the cloak-rooms are too small, and the class-rooms are not on the same floor as the lecture-room; the numerous steps in the corridors are also a defect. No. 21 is put out of court by the defective grouping of the rooms in the two departments; thus, the elementary art-room, wood-carving and metal-work rooms are on the ground floor, the shading-room on the first, and the other art rooms on the second floor. No. 22 suffers from the same defect, but not so seriously, and in No. 23 we find the lecture-hall on the ground floor and the two class-rooms on the second, the art school being, however, conveniently grouped on the first floor, but without much consideration for the direction of the light. In No. 24 future extension would be difficult, and neither the plans nor the elevations show any feeling for architectural effect. The plan of No. 25 is not without merit in its main lines, but is defective in detail. No. 26 is a well-drawn set, with picturesque elevations and plans of more than average merit, but lacking in directness and simplicity. The plan of No. 27 betrays too much ingenuity; the staircases are badly placed in relation to the principal entrance. We cannot say anything good about the next design, but No. 29 is well worthy of notice both as regards plan and elevation, but, unfortunately, nearly all the rooms are too small, some being nearly one-third less than the stipulated areas. The plan of No. 30 is on the whole well arranged, but might easily have been improved in detail. No. 31 has rather too narrow stairs and corridors, but in the next design there is a basement under the greater part of the building, and the cloak-rooms and bicycle stores are placed in it; all the other accommodation is conveniently arranged on two upper floors, the science department on the ground floor, and the art department on the first; this is a good design, but, unfortunately, the future extension as shown would have no communication with the first portion of the building; the elevations are picturesque and at the same time symmetrical, the upper story being in half-timber work. No. 35 is also above the average, the future extension being carefully considered. Nos. 34, 35, and 36 betray the 'prentice hand, but No. 37 is an able design both as to plans and elevations, and shows an intimate knowledge of the requirements for a building of this kind; the departments are well grouped, but the plans are somewhat lacking in directness; the secondary staircase is too small, and the narrow passages on both floors detract from the merit of an otherwise good plan. No. 38 is also above the average both in plan and elevation.

It is unnecessary to describe all the other designs in detail. Many of them are obviously too expensive, and the defects which have already been mentioned appear again and again, such as undue complexity of plan, insufficient lighting of corridors, faulty arrangement of the rooms in the two departments, and inadequate cloak-room accommodation. As regards the last, No. 62 goes to

the other extreme, and provides thirty-eight water-closets for the use of students, in addition to twenty-four urinals and forty-six lavatory basins. Some of the designs are worthy of more particular notice, as, for example, the plans of Nos. 42, 49, 55, 56, 61, 64, 66, 67, 69, 78, 86, 89, 95, 105, 107, 109, 112, 113, 114, 115, and 123, and the elevations of Nos. 54, 66, and others.

No. 63 is a clever piece of planning of a monumental type, with the entrance in the middle of the principal front, leading to a circular hall, from which the longitudinal corridor branches off to the right and left; the staircases, however, are not well planned, and the future extension is small, and will interfere somewhat with the lighting of the corridors. The science department is planned entirely on the ground floor, and the art department on the first floor. The design, as regards both plan and elevation, is an able piece of work, and must have been "in the running." No. 75 is another able design, which would be even more seriously affected by the future extensions; if the first portion only of the building had to be taken into consideration this would be regarded as one of the best designs submitted, the principal defects being in the lighting of the ground-floor corridor and the narrowness of the staircases. The plans and elevations of No. 83 are also well above the average, but the plan would have been greatly improved by disposing the staircases and cloak-rooms at the same direct light would have been maintained at the ends of the large corridor, or hall, on the ground floor; even better results would have been obtained by placing the lecture-room with one end towards the hall, instead of one side.

The designs will be on view in the Central Exchange, Rochester, until Monday next, between the hours of ten and five. One hundred and thirty-one designs for a building to cost 8,000l. The price of the visit was of an inquiring turn of mind. "What," he asked, "are all these drawings worth?" People ask me, and I should like to know." He whistled in surprise when he was told that he might calculate the cost in principals' time and assistants' wages at 2l. or 25l. a set.

#### MAGAZINES AND REVIEWS.

In the *Art Journal* Mr. Howard Jones writes an article on "Aerial Architecture," referring thereby to such word-paintings of imaginary architecture as have been made by poets or imaginative writers. All the principal passages of the kind occurring in English poets have been quoted in the series of articles on "Architecture Among the Poets," published a good many years ago in this journal, and since republished by Messrs. Batsford in book form and under the name of the author (the present editor). Mr. Ince, however, without going beyond English, goes into translations, at least from one foreign poet, Dante, from whom he takes one or two descriptions, especially that of the City of Duino, scarcely comes under the title "aerial architecture," unless we are to take the expression as equivalent to architecture which endures in the fancy. Of this internal architecture Dante's vision, one of the most striking points of which is that it looked as if built of wax. Mr. A. Goodwin has made a remarkable and successful version in painting, to which Dante's detailed and materialised descriptions lend itself rather well. In the case of these poetic descriptions of architecture the vision is apt to evade the grasp of the painter who endeavours to materialise it; the impression of glory and grandeur which can be conveyed to the mind vaguely by poetic description or imagery, does not leave exact distinction of fact for the painter to copy, or will not bear reducing to actual delineation in form. This is rather the case with Milton's description of the gate of Heaven as seen by Satan on his journey to earth. The poetic description fills the mind with a vague image of a sublime effect of architectural vision. Mr. Ince has made a courageous attempt to illustrate this in a drawing occupying a whole page; we can see him for making the attempt, and there are fine points in it; but the drawing is imprecise and materialised a repro-



expressing to this kind of spiritual (standard); the details are obliged to be given by definitely lined forms which possibly show too much of the reminiscence of earthly architecture. It would be possible to give some kind of translation of Milton's imagery in brush-work, in which one could have a broader and vaguer effect and could evade detail which is apt to become prosaic. For if we have got to the detail of a celestial architecture we can only do it by reminiscences of terrestrial architecture; we cannot invent details for our celestial architecture save out of the memory of what we know. Mr. Ince's criticism on the description of the effect on the open Hell Gate, in which he says it—

"a forth redounding smoke and ruddy flame," is too mechanical and logical. He says Milton ought to have remembered how heat does in a current of air; but he forgets that chaos was not atmosphere, except where there were rushing storms of matter; it was, as the poet says further on, "a vast vacuity," essentially, Milton is quite right.

In the *Burlington Magazine* Mr. J. C. Holmes writes an article on "Turner's Theory of Colour." It might perhaps be better termed "Turner's practice," for we doubt if Turner theorised much. Mr. Holmes's point is that a colour may appear harmonious—a shadow colour especially, which is added in such a manner as to produce the appearance of relief, but may be harmonious in effect if the whole is treated in that manner; when a thing such as a stage wall-paper pattern is treated so as to produce relief, we compare it with the real colour of nature in similar positions, and are shocked by combinations of colour which appear un-natural; but if the whole is in fact and conventional no such comparison is suggested. The application of this is that Turner in his later and more highly-coloured paintings had, comparatively at all events, given up the attempt at realism in simulating light and laid on colour simply as colour, with no attempt at realism of effect. There may be something in this, as an explanation or justification after the fact, though we doubt if it was an intentional principle on Turner's part; an artistic instinct it might not be. Mr. Laurence Weaver concludes in this issue his illustrated notes on "English Architectural Leadwork." We entirely agree in his lamentation over the barbarism, occasionally met with, of painting lead in the XVIIIth Century, dealing chiefly in this number with the work of pupils in the master's atelier, is interesting, and tends to show, on the basis partly of translations from Karel van Mander's biography of Jan van Scorel, how much the Dutch painter's art was a craft, to be learned, like the crafts, according to a system of apprenticeship. There are in fact, in other times, not a few painters whose work is a craft rather than an art—only they are not aware of it.

Neither the *Architektonische Rundschau* nor the *Berliner Architekturwelt* present anything special for comment this month. The *Architekturwelt* is largely occupied with plans and their furniture, some of it nice, some of it simple and good. The thing among the illustrations is an iron stove for a summer villa at Marienfeld, the subject of several illustrations. The house itself is eccentric and unpleasant in design and detail, but the stove is both original and artistic.

The *Architectural Record* (New York) has with a good many interesting subjects. Its first article is on "A New Series of Set Settings for 'Romeo and Juliet,'" edited by an architect, Mr. F. Chouteau. A good many illustrations of the play, on a small scale, and also photographs of old street scenes in San Gimignano, etc., which are used to have been taken as the basis for designs designed for the play. We do remember to find in these so much of the play that examples as we should find from their being designed by an architect who was apparently under the impression that historical truthfulness. Stage architecture is always theatrical, even architecture it seems to be bitten by the theatrical what in a double sense may be said to be a theatrical character in archi-

ture. We are never allowed to have a simple bit of real architecture. We remember, in Messrs. Gilbert and Sullivan's opera "Haddon Hall," the elaborate production of an open timber-roofed ball-room which was not only unlike anything in Haddon Hall, but anything possible in English architecture at all. It would have been so easy, and (one would have thought) so much more satisfactory, to have copied the actual ball-room at Haddon; but for your scene-painter that would be far too simple and obvious a proceeding. When we pointed out, some years ago, that the scenes in the interior of Canterbury Cathedral painted for the production of Tennyson's "Becket," contained unrealities and anachronisms, the reply both of scene-painters and theatre critics was that architectural accuracy on the stage was of no consequence. We should have thought that it gave more reality to the scene; but apparently reality is not what is wanted. From Mr. Chouteau Brown's testimony it would appear that the same prejudice exists in the theatrical world in the States:—

"That there exist to-day certain prejudices against the architect as a scenic designer among even the best theatrical managers is apparent from a previous personal experience of my own. Some six years ago, when work was just commencing on a certain important production, I called on Mr. Daniel Frohman, the producing manager, to suggest the possible advantages of having the Colonial and Georgian architectural settings reproduced, with more fidelity than the scenic studio would ordinarily compass, the actual local surroundings of this early period in our development and history. He proved to be most approachable, but when it developed in the course of the conversation that his caller was an architect, he immediately became apparent that he had no inclination to further discuss the matter with anyone belonging to that profession.

From the impression obtained at that time it appeared that previous experience had quite convinced him that such gentlemen were, as a class, too narrow and assured in their point of view, as well as too impracticable and expensive in their designs, to make it worth his while to undertake any additional bother for what was—so far as any direct financial return or artistic appreciation from an audience could be counted upon—a comparatively unimportant detail. And this represents the position taken by one of the most enlightened, intelligent, and probably least commercial among our theatrical producers."

Accordingly the writer was agreeably surprised on being asked by a manager to work up a series of designs for the stage setting of "Romeo and Juliet." Yet he seems, as we said, to have been bitten by the mania for theatricalising stage architecture, and none of his street or garden scenes or interiors could be taken for a representation of an actual place. As to the interiors, that is partly due to the want of scale from the fact of the whole stage being used alike whether for palace or cottage. Friar Laurence's cell, for instance, is the interior of a big Gothic warehouse; and "The inside of the Capulet's tomb" suggests a place four times the size of the exterior of the same tomb shown in a previous scene. The article on "A Novel College Chapter-House" illustrates a really original architectural treatment arising out of a special condition of site. The building is the Chapter-House of the Alpha-Delta-Phi fraternity at Cornell University; it is situated on a point of land jutting out over the valley, which is 350 ft. below, and there is apparently a great difference of level on the site itself. The building is on the plan of an inverted L, the shank, however, expanding at the end into a polygon which forms the dining-room. But the remarkable point is the Lodge, which stands at a distance from the cross block but on the axis of the building, and at the very edge, apparently (from the view) of the hill; it is connected with the main building by an underground passage, and is treated on an in-and-out star plan which makes it look like a bit of a Vauban fortification with a dome over it. The appearance of this group is very striking and original. "Some California Bungalows" are illustrated in another article; some of them show a very happy combination of picturesqueness and simplicity. And then we have an article on "The American Pantry," which in its simpler form does not seem to differ much from the English pantry; but pantries of three degrees of comparison are illustrated, and the pantry of the third or superlative degree is palatial; it is stated to have been planned by a lady inspired by the contemplation of some ruins of a Roman residence during a visit to Europe. It is 20 ft. long, with an arched ceiling, a marble floor, an electrically heated closet to keep

plates and dishes warm, and two electric lifts from the kitchen.

"Built in the wall at the rear is a large, well-lighted silver room. Burglars feel discouraged when they consider the many clever contrivances for rendering its valuable contents absolutely secure. The thick iron door, swinging heavily on its hinges, concealed in the panelling when closed, is the only sign of the safeguards employed. Inside rows of wide, shallow drawers, white like the rest of this immaculate place, hold dozens of forks, spoons, etc., arranged with exquisite regularity on soft white mats. Heavy pieces of plate, removed at night from the sideboard, are placed each in its own particular niche in this great safe.

The wide counter-shelf and the table running down the centre of the room are of marble, the three sinks of porcelain. No woodwork shows anywhere, even the dressers being fitted up with plate glass doors set in narrow nickel-plated frames."

It must, however, be difficult to live up to such a pantry as that.

In *Public Works*, Mr. G. Henry Kinahan, M.R.I.A., discusses the effects of "Tidal Currents and Wind Waves" with reference to the destruction of cliffs, the shifting of shoals, and the filling up of estuaries and harbours. The article is a very thoughtful one, and deserves special attention for the reason that it deals largely with forces that are sometimes forgotten because they are silent and undemonstrative. Among the most important of such forces are the deep-sea currents about which little is yet known, except that they frequently cause erosion, commencing in deep water at the outer edge of frail materials, and slowly but surely sap the foundations of cliffs and coast-protection works of all kinds. Mr. Kinahan's illustrations are chiefly drawn from Ireland, but this in no way detracts from the merits of his able contribution. The subject of coast protection is also treated by Mr. Gerald O. Case, who describes the system of groyning invented by his father, the late Mr. E. Case, and refers to its later developments. The method in question has been described on several previous occasions, but the present article is well worth reading, and the photographic views with which it is illustrated are interesting as showing the remarkable results achieved at different seaside places. "Steel-Frame Building Construction," by Mr. B. H. Thwaite, is a contribution which architects may read with advantage, although they cannot be expected to share the enthusiasm of the author for lofty buildings of this class. We fully admit the advantages of steel as a structural material, and its perfect safety when adequately protected from the effects of fire and corrosion. But height is by no means a necessary accompaniment of steel-frame construction, and those who desire to popularise the system in this country would do well if they paid less attention to panegyric comments on American monstrosities in the way of building design. Among the remaining articles we may specially mention that upon "The Advantages of Pneumatic Tools," by Mr. F. D. Johnson, M.I.Mech.E., and one upon the "Water and Its Measurement," containing a useful account of the Venturi Meter.

The *Westminster Review* contains an article by Mr. George Trobridge on "The Nude in Art and Semi-nude in Society." With the latter we are not concerned, though we agree that it is open to criticism, much more indeed than the nude in art, the objects of which are much higher than mere display. The article is of course to a certain extent an attack—one of those which supervene every few years; but it is not unreasonable or Philistine in spirit. The author recognises that painting in the higher sense is impossible without life models, and yet seems to lament their existence—in regard to women at least. Managers of life schools, we believe, will tell him that it is easier to get women as models than men. The solution of the dilemma lies in the consideration that custom and the circumstances and object of an action to a great extent determine whether it is decorous or the contrary. A bathing dress would be indecorous in a drawing-room. A woman who poses as a life model may be said to be making a better use of her figure than one who has her ball-dress cut as low as possible to attract attention. As to the product—the nude in painting, some of the writer's remarks are true about some modern French pictures; not about any English ones that we can remember. But he misses, like so many others, the real point as to nude figures in painting and sculpture. It is not a mere



question of "beauty" (are we even agreed what "beauty" is?); it is that the nude figure represents the abstract and essential in human expression. Dress is the accidental and changeable element; hence it is in conflict with the highest poetry of art, even in painting; still more in sculpture, where abstract form is everything.

Harper contains an article by Mr. W. D. Howells on "Twenty-four Hours at Exeter," interesting as giving the effect of an English Cathedral and Cathedral City on the mind of an exceptionally cultured American, who has no cathedral cities on his own shores. No one, he observes, "without standing in that presence or another of its kind, can realise what the ages of faith were. Till then the phrase will remain a bit of rhetoric, but then he will live a meaning out of it which will die only with him."

Scribner contains a very good article on Timagad, under the title "On the Edge of the Desert," by Mr. Dwight L. Elmendorf, with illustrations from photographs and telephotographs by the author.

The Century contains an article of considerable interest to architects on "The Proposed Changes in the National Palace," i.e., the Capitol at Washington, with elevations and plans. The alterations are being carried out by Messrs. Carrère & Hastings. The criticism of a satirical senator was that the Capitol "was not a building with a dome on it, but a dome with a building under it"; in which there is some truth. The present architects, in order to meet this point, are bringing forward the portico and pediment a little, so as to throw the dome back, and have also added a column at each end of the portico colonnade. The demand for more interior space is to be met by the erection of two large and dignified blocks of new building, symmetrically in reference to the Capitol, and on opposite sides of the axis, one for the Senate House, the other for the Offices building. The whole should form a very fine group of buildings. A coloured illustration of "The New Madison-square Presbyterian Church" is oddly entitled "a new departure in church building"; it is a square domed church with a portico and pediment, like many in this country, at all events. The only new thing about it is the effect of coloured material—buff brick and glazed terra-cotta on a white marble base, with portico columns of pale green granite. The combination ought to have a good effect. Messrs. McKim, Mead, & White are the architects.

In the *Antiquary* Mr. Mann concludes his article on "Prehistoric Pile Structures in Pits in South-West Scotland," to the earlier portion of which we have already referred. He shows reason to think that the theory of dwellings, or at least of shelters or sleeping-places, for these timber-lined pits, is the most probable. "Letters from a Westmoreland Man in London, 1719-1734," throw some interesting light on London life of that day.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

At the meeting of the Building Act Committee held on August 30, the proceedings were governed by the clause in the order of reference which empowers the Committee at certain seasons to act on behalf of the Council in relation to matters included in the Committee's order of reference:—

##### Lines of Frontage and Projections.

**Hampstead.**—The retention of open arched screens on the north side of All Souls' Church, Loudoun-road, Hampstead, abutting upon Alexandra-road (Messrs. Nicholson & Corlett).—Consent.

**Fulham.**—Houses on the north and south sides of Langthorne-street, Kenyon-street, Ingelthorpe-street, Harbord-street, and Grewell-street, and the north side of Finlay-street, Fulham (Mr. C. Botterill for Mr. G. Murray).—Consent.

**Hampstead.**—An iron and glass shelter in front of the stable next No. 22, Belsize-square, Hampstead (Mr. H. Hogg).—Consent.

**Newington.**—A building on the site of No. 83, New Kent-road, Newington (Mr. G. A. Lansdown for Lord Glenesk and the Countess Bathurst).—Consent.

**Wandsworth.**—Buildings on the east side of Mitcham-road, Tooting, at the corner of Back (or Rectory) lane (Messrs. Milner, Son, & White).—Consent.

**Bow and Bromley.**—The retention of a building

on the west side of Monier-road at the corner of Wick-lane, Bow (Messrs. J. Chessum & Sons).—Consent.

**Chelsea.**—A porch to Nos. 38 and 40, Beaufort-street, Chelsea (Mr. P. Hoffmann for Mr. F. L. Linzell).—Consent.

**Fulham.**—The retention of a wooden fence in front of No. 554, Fulham-road, Fulham (Fulham Electric Joinery works, Ltd.).—Consent.

**Hackney, North.**—An iron and glass porch and a bay window at No. 218, Green-lanes, Finsbury Park (Messrs. Hodson & Whitehead for Mr. A. R. Bagley).—Consent.

**Hampstead.**—A one-story shop and office building on the north-east side of High-road, Kilburn (Mr. A. Whitelaw for the London and North-Western Railway Company).—Consent.

**Kensington, South.**—The retention of a projecting glass and metal sign at No. 30, Fulham-road, Kensington (Messrs. Cooper & Co. for Messrs. J. C. Oford & Sons, Ltd.).—Consent.

**Lewisham.**—Porches to Nos. 111 to 129 (odd numbers only) inclusive, Longhurst-road, Lee (Mr. A. J. Wood).—Consent.

**Lewisham.**—Four houses on the west side of Brookly-rise, Lewisham (Mr. E. C. Thomas).—Consent.

**Marylebone, West.**—Extension of the period within which the rebuilding of Nos. 72, 73, 74, and 75, High-street, and No. 25, Nottingham-street, St. Marylebone, was required to be commenced be granted (Mr. F. M. Elgodd for Mr. J. A. Michell).—Consent.

**St. George, Hanover-square.**—The retention of an iron and glass porch at the main entrance of No. 4, Hanover-street, Regent-street, W. (Mr. F. M. Hornsby for Whitehall Court, Ltd.).—Consent.

**Wandsworth.**—Porches to eight semi-detached houses and one detached house on the west side of Enmore-street, Putney (Mr. J. C. Radford for Mr. W. H. George).—Consent.

**Woodstock.**—The retention of bay windows to a block of four houses on the south side of Glen-shiel-road, Eltham (Mr. J. J. Bassett for Mr. A. Cameron Corbett, M.P.).—Consent.

**Kensington, South.**—The retention of an illuminated sign at the "Kensington Arms" public-house, Warwick-road, Kensington (Mr. T. H. Smith for Mr. N. Foley).—Consent.

**Clapham.**—Houses on the northern side of a continuation of Thurlough-road, Clapham (Mr. J. Smith).—Consent.

**Strand.**—Permission to affix a projecting Chappuis' reflector in front of No. 6, Charing-cross, Strand (Mr. H. No order).

**Fulham.**—The erection of an addition to a bake-house at the side of No. 168, Munster-road, Fulham, to abut upon Swift-street (Mr. R. Burr for Mr. J. M. Groesse).—Refused.

**Kennington.**—A wood and glass covered way in front of St. Mark's Vicarage, Kennington Oval (Mr. W. Fitch for the Rev. J. Darlington, D.D.).—Refused.

**Kensington, South.**—An iron and glass awning over the entrance to No. 43, Pembroke-square, Earl's Court (Messrs. T. W. Heath & Son).—Refused.

**Lewisham.**—A wood and iron sign at No. 30a, Sydenham-road, Sydenham (Mr. J. M. Tillett).—Refused.

**Lewisham.**—One-story shops on part of the fore-courts of Nos. 103, 105, and 107, Brownhill-road, Lewisham (Messrs. Norfolk & Prior for Mrs. Staines).—Refused.

**Paddington, South.**—An iron and glass conservatory at the first floor level in front of 14, Heath-street, Paddington (Mr. E. C. Macpherson for Sir Clifton Robinson).—Refused.

**St. Pancras, South.**—A bay window and four balconies in front of No. 14, Fitzroy-square, St. Pancras (Mr. M. M. Smith for the Trustees of the Hostel of St. Luke).—Refused.

**Strand.**—A projecting flue on the eastern side of the Savoy Hotel extension, projecting over the public way in Savoy-buildings (Messrs. T. E. Colcutt & S. Hamp for Savoy Hotel, Ltd.).—Refused.

**Strand.**—Two iron and glass signs at No. 11, Wardour-street, St. James's, Westminster (Mr. J. Richardson for Messrs. Sam Isaacs & Co., Ltd.).—Refused.

**Wandsworth.**—Buildings at the corner of Cavendish-road and Grove-road, Balham (Messrs. J. D. Mathews for Mr. H. King).—Refused.

##### Width of Way.

**Bermondsey.**—Buildings on the north and south sides of Sterry-street, Tabard-street, Southwark (Mr. P. Curry for the Governors of St. Thomas's Hospital Estate).—Consent.

**City of London.**—A warehouse building on the north side of Tenter-street, Moorfields, at less than the prescribed distance from the centre of the roadway of the street (Messrs. Nash & Debnar for Messrs. Raphael Tuck & Son).—Consent.

**Camberwell, North.**—A one-story building on the north side of Canal Bank, Camberwell (Mr. R. A. Jack for Messrs. Findlater, Mackie, Todd, & Co.).—Consent.

**Greenwich.**—Buildings on the south-east side of Lamerton-street (late Queen-street), Greenwich (Mr. G. A. Lansdown for Mr. J. E. Lamer-ton).—Consent.

**Hackney, South.**—The retention of a wooden fence in front of an addition to a warehouse on the north side of Essex-street, Hackney (Mr. J. Willmot).—Consent.

**Kensington, South.**—A building at No. 5, West-road, Campden Hill, Kensington, at less than the prescribed distance from the centre of the roadway of the street (Mr. T. P. Egan for Mr. C. Bell).—Consent.

**Kensington, South.**—A fence in front of No. 16 and 17, Newcombe-street, Notting Hill, Kensington, at less than the prescribed distance from the centre of the street (Messrs. C. Bell, Withers, & Messrs. for Mr. W. J. Manser).—Consent.

**Peckham.**—The retention of a one-story building at the rear of No. 58, Peckham-rye, Peckham (Mr. W. L. Dowton for Mr. F. L. Mitchell).—Consent.

##### Space at Rear.

**Lewisham.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to an irregular open space at the rear of Nos. 2 and 5, Salehurst-road, Crofton Park (Mr. J. W. Webb).—Consent.

**Wandsworth.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of three buildings at Amen-corner, Back (or Rectory) lane and Micham-road, Tooting (Mr. R. Schneider for Mr. R. H. Miller).—Consent.

**Battersea.**—A deviation from the provisions approved for the erection of cottages on a portion of the open space about "The Cedar" Clergy House, High-street, Battersea, to also upon a portion of the open space at the rear of J. Brinkley's premises, Battersea (Mr. J. S. Quiller for Mr. J. Brinkley).—Consent.

**Kensington, South.**—A modification of the provisions of section 41 so far as relates to the erection of a back addition to No. 7, Miss-year, Kensington (Messrs. John Barker & Co., Ltd., & Miss Dancer).—Consent.

**Lewisham.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a shed for a gas engine on the open space at the rear of No. 161, Brookbank-road, Lewisham (Mr. J. Kerslake).—Consent.

**Wandsworth.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a shed for a gas engine on the open space at the corner of Drevall-road, Wandsworth (Messrs. Taylor & Sons for Messrs. Mess Goodall).—Consent.

**Wandsworth.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a stable and coach-house on the open space at the rear of No. 102, Revelock-road, Wandsworth (Mr. C. Botterill for Mr. C. Barwell).—Consent.

**Westminster.**—A deviation from the plans approved for the erection of Hopkiss House, upon a site abutting upon Vauxhall Bridge-road, Edward-street, and Douglas-street, Westminster, so far as relates to the omission of an air duct, and the provision of an additional open space to the building (Mr. R. S. Ayling for the British House Co., Ltd.).—Consent.

**Strand.**—A deviation from the plans approved for the erection of a building on the site of Nos. 36 and 38a, St. James's-street, and No. 41, Jermyn-street, St. James's, so far as relates to the substitution of one air duct for two air ducts (Mr. W. Woodward for Mr. L. Thomas).—Refused.

##### Formation of Streets.

**Islington, South.**—That an order be issued to Mr. H. Porter sanctioning the formation or laying out of a new street for carriage traffic to lead from Richmond-road to Cloudeley-square, Islington (for the Trustees of the Cloudeley estate).—Consent.

**Dulwich.**—That an order be issued to Mr. Barry, sanctioning the formation or laying out of a new street for carriage traffic, to lead from Woodward-road to Court-lane, Dulwich (for the Governors of Alley's College, Dulwich).—Consent.

**Fulham.**—That an order be issued to Mr. T. T. Kenton, sanctioning the formation or laying out of a new street for carriage traffic to lead from Ranelagh-gardens (late Hurlingham-avenue) Fulham (for the Hurlingham Club).—Consent.

**Greenwich.**—That an order be issued to Messrs. Crickmay & Heath, sanctioning the formation or laying out of a new street for carriage traffic to lead from Westcombe Park-road to Wynne-road, Greenwich (for Mr. C. Johnson).—Consent.

**Hackney, Central.**—That an order be issued to Mr. W. Lewis, sanctioning the erection of a stable building in a yard approached from the south side of London-lane and west side of Barn-street, Hackney (for Messrs. N. Forrester & Sons, Ltd.).—Consent.

**Hampstead.**—That an order be issued to Mr. F. Hingston, sanctioning the formation or laying out of a new street for foot traffic to lead from High-road, Kilburn, to Kilburn Priory (Mr. W. Stephens).—Consent.

**Lewisham.**—A deviation from the plans approved for the formation of a portion of a road, Brockley, so far as relates to the alteration in the position of a portion of a road, Brockley, southwards of Baltham-street (Messrs. Tompkins & Conner).—Consent.



**Wandsworth.**—That an order be issued to Messrs. Milner, Son, & White, sanctioning the laying out of new streets for carriage traffic on the Wandsworth Park estate, Back (or Backs) Lane, Streatham.—Consent.

**Approved.**—That an order be issued to Mr. E. Milner refusing to sanction the formation or laying out of two streets for carriage traffic on the Haver estate on the west side of Brixton Hill (for Mr. R. A. Johnston).—Refused.

**Refused.**—That an order be issued to Mr. E. Milner refusing to sanction the formation or laying out of a street for carriage traffic to lead out of Troy Town, Peckham (for Mr. J. Thompson).—Refused.

**Wandsworth.**—That an order be issued to Messrs. Brant & Son refusing to sanction the formation or laying out of new streets for carriage traffic out of Wandsworth-road and Downton-road, Brixton (for the Westminster Investment Society, Ltd.).—Refused.

**Line of Frontage and Width of Way.**

**Wandsworth, North.**—Five houses on the north side of Hargrave-hill, at the corner of Ivy-terrace, Upper Clapton (Mr. W. Stone for Mr. J. L. Sargent).—Consent.

**Mile End.**—Buildings on the south side of 10, End-road (on the site of No. 500), at the corner of Bantlett-road (Mr. W. E. H. Crawley for Mr. H. Doe).—Refused.

**Leamington.**—A two-story warehouse on the north side of Loampt Vale (on the site of Nos. 61 and 63), Lewisham, at the corner of Shrubbery-road (Mr. A. W. Osborn for Messrs. G. A. Harvey & Co.).—Refused.

**Wandsworth, West.**—Permission to retain a building on the forecourt of No. 26A, Deverell-road, Southwark, at less than the prescribed distance from the centre of the roadway of the street, and in advance of the line of the adjoining houses (Mr. G. Groves).—Refused.

**Width of Way, Line of Frontage, and Construction.**

**Camden, North.**—A wooden gantry at the rear of No. 148, Wyndham-road, Camberwell, at the corner of Westhall-road (Mr. J. J. Freeland for the Automobile Wheel Co., Ltd.).—Refused.

**Mile End, West.**—The retention of a shed at No. 12, Gray-buildings, at less than the prescribed distance from the centre of the roadway of Eleazar-mews, St. Marylebone (Messrs. Sney & Sons).—Consent.

**St. Pancras, South.**—Buildings on the site of Nos. 148 and 149, King's Cross-road, and Nos. 81 and 83, Field-street, St. Pancras (Mr. E. J. Berman for Mr. D. L. Cohen).—Consent.

**Width of Way, Space at Rear, and Projections.**

**St. George, Hanover-square.**—A building on the site of Berkeley Chapel on the north side of Charles-street at the corner of John-street, Mayfair, with an irregular open space at rear, and a projecting porch, balcony, and an angle turret of oak (Mr. R. G. Hammond for Mr. J. H. G.).—Consent.

**Lines of Frontage and Space at Rear.**

**Strand.**—A building for the United Universities at Suffolk-street, and Pall Mall East, with a projecting porch and balconies in Suffolk-street and Pall Mall East, and an irregular open space at rear (Mr. R. Blomfield, A.R.A.).—Consent.

**Means of Escape from the Top of High Buildings.**

**Westminster.**—Deviations from the drawings showing the means of escape to be provided from Nos. 14, D. E., and F. St. James's-court, and Nos. 14 and 15, an alteration in the positions of escapes (H. Bushell).—Consent.

**Alteration and Addition to Building.**

**Westminster.**—The construction of an additional story to Iddesleigh Mansions, Canton-street and Palmer-street, Westminster (Mr. H. A. for Mr. W. A. Fleming).—Refused.

## ARCHAEOLOGICAL SOCIETIES.

**NEWCASTLE SOCIETY OF ANTIQUARIES.**—**QUESTIONS TO CHESTER-LE-STREET.**—The Newcastle Society of Antiquaries held an outdoor meeting last week at Chester-le-Street. They first visited the Church, which was described by the Rev. A. B. de Molayns. The church is mostly in the Early English style; it was added probably when the bells were made in 1409. At the time the parish extended from Gateshead to the north to Durham on the south, and from the Spring on the east to the west a distance of seventy square miles. When the Danes invaded Lindisfarne the monks left that place and fled to Chester-le-Street, carrying with them St. Cuthbert with them. Chester-le-Street was subsequently formed into a priory, and it had had eight bishops. The priory was removed to Durham in 995, the reason being that the Danes invaded Chester-le-Street. The monks then

carried the bones of St. Cuthbert away, and interred them at Durham. The bishopric of Chester-le-Street at one time extended right from Edinburgh to York, and the diocese of Chester-le-Street was one of the richest livings in the whole of England. Under Henry VIII. the collegiate establishment, with those at Lanchester, Bishop Auckland, Darlington, and other places was dissolved, and the revenues went to the Crown, the value of the living being reduced to the sum of 10*l.* a year. What remains is a fine church not very much altered from its original design. The party subsequently visited Lumley Castle, the seat of the Earl of Scarborough, an Edwardian castle, which retains on one face its ancient turrets and machicolations.

## COMPETITIONS.

**TECHNICAL INSTITUTE, ROCHESTER.**—Mr. F. Bagallay, the assessor in this competition, has made his award as follows:—First premium, Design No. 72; second premium, Design No. 74; third premium, Design No. 45. No. 72 is by Messrs. Russell & Cooper, 11, Gray's Inn-square; No. 74 by Messrs. Crouch, Butler, & Savage, 39, Newhall-street, Birmingham; No. 45 by Mr. W. H. Knowles, 37, Granger-street, Newcastle-on-Tyne. The designs are on view at the Corn Exchange, Rochester, from Wednesday the 13th to Monday the 18th (excluding Sunday).

**CHAPEL AND SCHOOL, BRADFORD.**—At the request of the trustees, four Bradford architects recently submitted plans for a chapel and school at the corner of Shearbridge-road and Woodhead-road, to take the place of Mannville Chapel and School. Mr. W. E. Potts, of the firm of Messrs. Potts, Son, & Hennings, architects, of Manchester and Bolton, who was the assessor, has awarded the first premium of £10 10*s.* to Mr. Edgar H. Parkinson, the designs of Mr. Abraham Sharp being placed second. Mr. Parkinson has been entrusted with the carrying out of his plans.

## Correspondence.

### THE LONDON TRAFFIC COMMISSION AND THE GARDEN CITY MOVEMENT.

SIR,—The report of the London Traffic Commission involves the spending of a very large sum of public money, which is particularly undesirable considering the enormous load of public debt which exists already. It seems doubtful whether the expenditure of this money is either desirable or necessary at the present time.

The report proceeds on the basis that the traffic in London will always be as great as it is at present, and will tend to increase.

The increased advantages for carrying on work at a distance which are afforded by the telegraph and telephone, and also by the increased railway and tramway facilities, seem to have been overlooked.

It is quite unnecessary at the present day for a large number of the trades which are carried on in London to remain there; they can be carried on more cheaply and under better conditions elsewhere. This has already been proved in many instances by manufacturers such as Messrs. Cadbury and Messrs. Lever, who have removed their premises out of large cities and have gained very considerably by doing so. We often find, from our experience as quantity surveyors, that in the case of builders, those who have their yards at a considerable distance from London are able to compete with London builders who are on the spot. I need only mention Messrs. Foster & Dicksee and Messrs. Barnall, of Rugby; Messrs. Thompson, of Peterborough; Messrs. Rudd, of Grantham, as well as many others. These builders gain by the fact that their joinery is made out of London. The advantage is of course much greater in a factory where the whole of the goods are made out of London, as in the case of the builder a great deal of work must be done on the spot, such as brickwork and the carcass work generally.

It is generally recognised now that the congestion of industries in very large cities

is a grave danger both to the cities themselves and to the country districts, which are drained of their inhabitants. It is, of course, as a rule, necessary and desirable to have the head office of a business in London owing to the facilities of communication, but it is quite possible to have the offices connected with the work at a very considerable distance by telegraph and telephone, and almost as good control is obtained in this way as by having the works in London. The saving in rent is enormous, and the premises can, as a rule, be built on far more convenient plans owing to restrictions of space, light, and air being removed. The benefit to the workpeople employed is also very great, as they are able to obtain better accommodation and fresh farm produce at lower prices, besides living in far more healthy surroundings. The surrounding farmers benefit by having a market for their produce brought close to them instead of paying heavy railway rates and market dues in London. London itself gains in every way, partly owing to the increased space allowed by the removal of the factories and also of the homes of those they employ. The smoke caused by the factories and houses is abated, the congestion on the suburban railways is lightened, and the facilities of traffic in London are immensely increased. Everyone knows how frequently, when time is important, a cab is entirely stopped by the fact that some street is blocked by two or three large waggons which are standing in front of factories either taking in or discharging goods, and the value of time lost in this way must, in the course of the year alone, be a very large item.

I cannot help thinking, therefore, that the lines on which the Garden City is moving are the right ones, and that every effort should be made in the future to move the factories into smaller towns scattered throughout the country, rather than to persist in concentrating them in huge cities. It would probably, to a large extent, help to prevent the depopulation of the country districts to the extent which is now going on, and the advantages to the health and convenience of the large cities would be incalculable.

At present London is perpetually increasing its already huge debt by efforts to cope with the cheap housing of the working classes on expensive sites, their cheap conveyance by railway and trams, the education and holidays of their children, and many other problems.

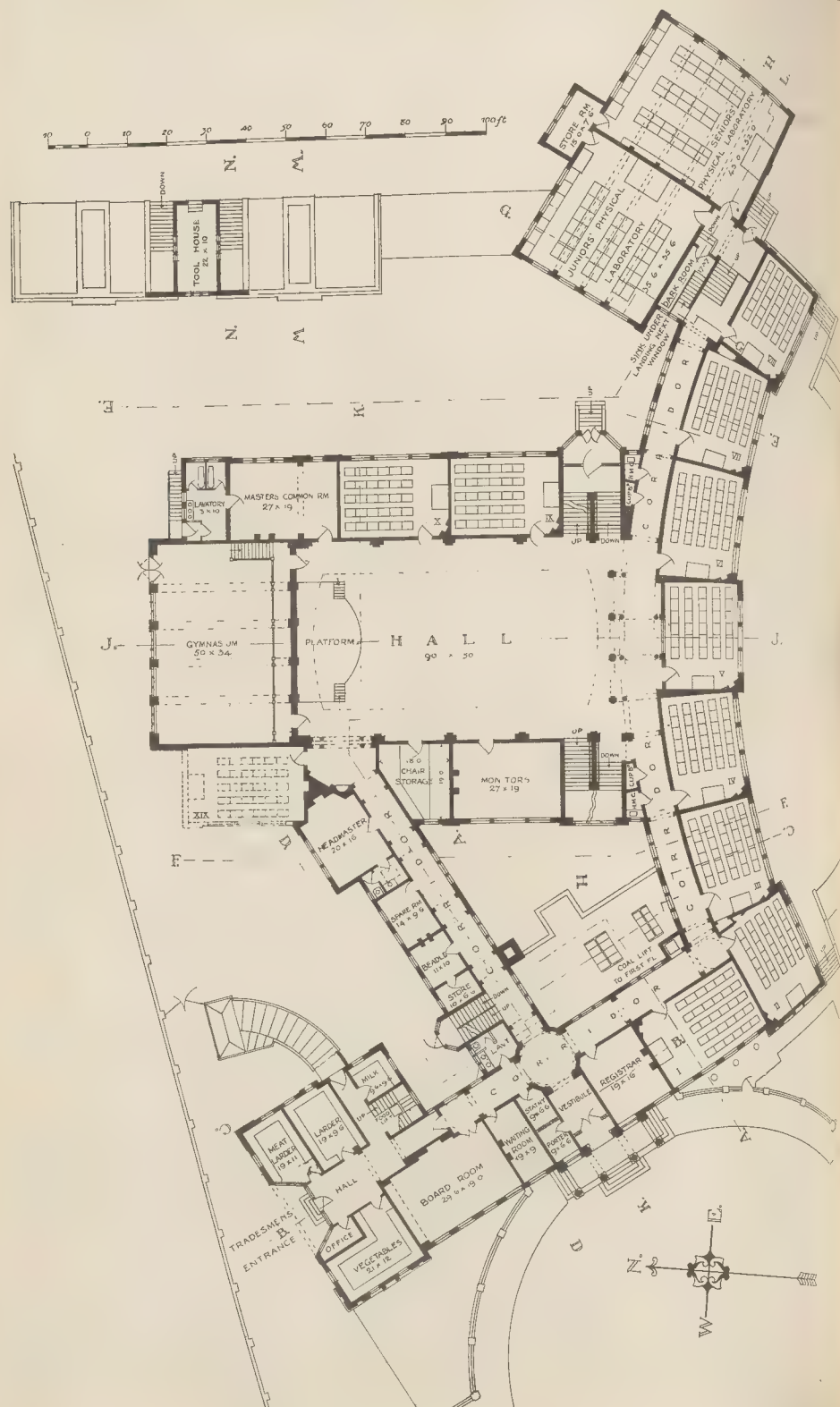
I think, therefore, that although there are some practical defects in the way the present Garden City is being carried out, principally owing to inexperience in the problem with which they have to deal, the movement deserves every encouragement from all who desire to see the public burdens lightened. It is a far cheaper method than that proposed by the Traffic Commission, and the effects would be permanent. It would also have the great contingent advantage that the physique of the workers and their children would be improved, which is acknowledged now to be a very important object, and they would be placed in such a position that they could enjoy all the benefits of the country without the additional expense of travelling, which is a very serious item where the wages are small.

It would not be necessary in every case to build a new town on the lines of the Garden City. There are plenty of small towns, such as Guildford, Godalming, etc., which already exist on the main lines of railway between London and the chief seaports, which could be developed in this way with very great benefit to the general population, although, in these instances, the conditions of land tenure would not be so favourable to the tenant as those enjoyed by the tenants of the Garden City Company.

GUY M. NICHOLSON.

**MEMORIAL TO PROFESSOR HUGHES, CORRIS, MERIONETH.**—A monument was unveiled last Saturday in memory of Dr. Alfred Hughes, who organised the Welsh Hospital for the South African war. The memorial, in the form of a Celtic cross, is situated on a bank called Braich Coch, and overlooks the village of Corris. It was designed by Mr. Goscombe John, and executed in Isle o' Fair Rose granite.





ENGINEERING STANDARDS COMMITTEE.

The British Standard Specifications for Telephone Material included in Report No. 16 have been drawn up by the sub-committee on telephones under the chairman-ship of John Gavey, C.B., the duties of the sub-committee overlapping those of the

committee on cables. The standards for copper given in the present Report have been agreed by the two committees, and have been previously published in Report No. 7, entitled "British Standard Tables of Copper Conductors and Thicknesses of Dielectrics." Specifications are now issued for galvanised iron wire for electrical and mechanical purposes, as well as for galvanised ironwork as is generally used for telegraphs and telephones. In addition to the specifications and tables, a number of very useful annexes are given of ironwork, such as that of cables, and to the fact that manufacturers are not likely to stock it in large quantities, it was decided not to prepare a specification for copper wire, and not to do anything further in the way of standardisation than the preparation of tables giving data based on the standards already published. We notice also that no attempt has been made to standardise submarine or underground cables or telegraphic and telephonic apparatus. Report No. 23, containing the British standards for trolley groove and wire, consists of a single page giving the dimensions of a standard trolley wire groove for tramway use, and specifying the metal strength of trolley wire. It seems a pity that the design of trolley wheels was not also standardised, but we presume that the committee have found it difficult to prepare a design acceptable to all parties concerned.

BOOK RECEIVED.  
PARNELL'S REFERENCE BOOK: FOR HOME OFFICE. (The Granville Press. 6s. 6d.)

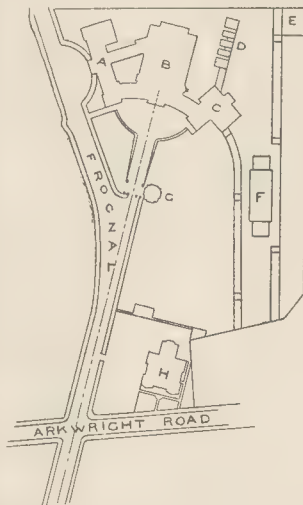
Illustrations.

THE FRARI FROM THE SCUOLA DI SAN ROCCO.

THE view of the Frari here illustrated is that seen from the steps of the Scuola di San Rocco in the little square of that name. As is often the case in Venetian churches, the apse is the most interesting feature of the church externally. The reproduction is from a water-colour drawing made by Mr. W. Curtis Green in 1900.

COMPETITION DESIGNS  
FOR UNIVERSITY COLLEGE SCHOOLS,  
HAMPSTEAD.

THE first of the two designs here illustrated is that submitted by Mr. Paul Water-



Mr. Waterhouse's Design for University College Schools. General Block Plan.

REFERENCES.

- A—Administration block.
- B—Hall.
- C—Science block.
- D—Sanitary blocks.
- E—Carpenter's shop.
- F—Covered playground.
- G—Lodge.
- H—Preparatory school.

house in the recent limited competition. The governing factor was the recommendation that the class-rooms should have a sunny aspect, and an attempt was made to obtain balance and symmetry on the resultant

long southern frontage by taking the centre line of the straight part of Frognal as the axis of the composition. The divergence of the roadway at the north end of the site made a convenient expansion of the ground to provide for an administrative block which should be both square to Frognal and at the same time radial to the curve of the south or class-room frontage.

The fact that the playground entrance would be 15 ft. below the principal or west entrance made it possible, while keeping the central hall at the level of the latter, to secure boys' entrances in a basement which would be still above the ground. In the basement ample accommodation was provided for the cloak-rooms, lavatories, cycles, boilers, etc. The gymnasium was to be at a higher level, and with a gallery approached from and level with the hall.

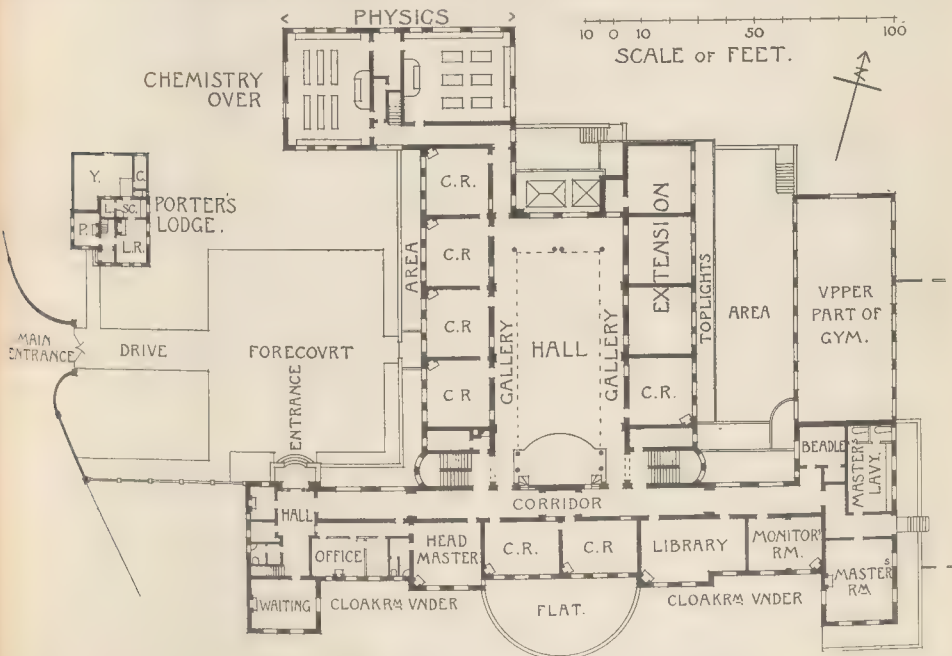
The arrangement of the ground floor is largely explained by the published plan. The science block is intentionally kept distinct from the other class-rooms. The hall was so arranged as to be quickly filled or emptied from the adjacent corridors and staircases. On the first floor accommodation was provided for thirteen ordinary class-rooms, besides art rooms, chemical laboratories, library, and kitchen department. The second floor comprised the dining-hall (occupying the whole length of the Frognal frontage) and convenient serveries. In the south-east pavilion were the music and practising-rooms.

For the elevations it was proposed to use red and brindled bricks, with dressings of Ham-hill stone. All roofs were to be of concrete, the flat roofs being asphalted, and the pitched ones covered with green Cumberland slates.

The approximate cost was estimated at from 70,000l. to 75,000l.

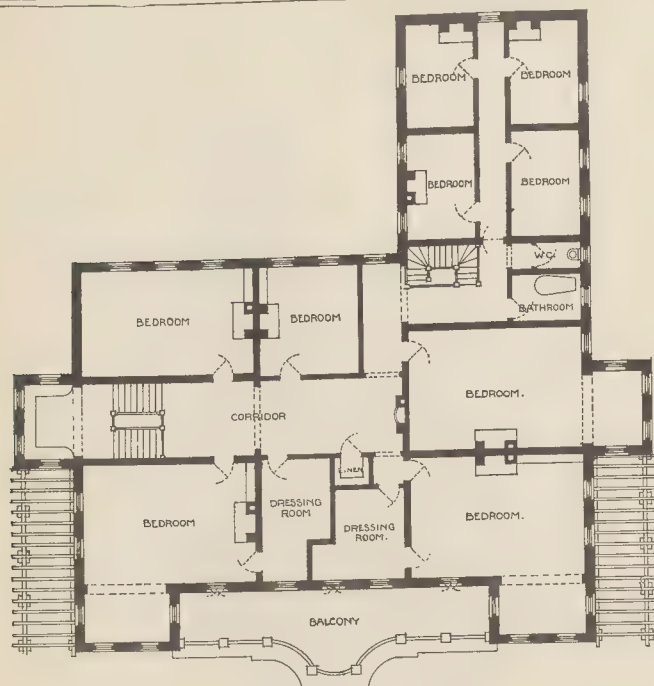
DESIGN BY PROFESSOR SIMPSON.

In this design, the building was planned on the high ground at the north end of the site in order to (1) leave as much ground as possible available for playground, (2) to obtain a principal front facing south towards the bottom of Frognal, (3) to obtain south aspect for as many rooms as possible, (4) to screen the latrines, carpenter's shop, etc. The class-rooms are grouped round a central hall, ten



Competition Design for University College Schools: By Professor Simpson.





FIRST FLOOR PLAN



GROUND FLOOR PLAN.

SCALE OF FEET  
Sketch for House at Johannesburg. Plans.

on the ground floor, fourteen on the first, eight classrooms face south, eight face east and eight face west. The principal entrance of the south front, the library and reading rooms, etc., in the other. The classrooms, lavatories, and covered playground face north in the basement (which on this side is entirely above the ground); the dining-room, kitchens, etc., are also in the basement, but the first is partly lighted, and all the windows are above the wide area between the main block and gymnasium. The art rooms face north and east (over the master rooms), and the science wing is to the north.

#### SKETCH FOR PROPOSED HOUSE AT JOHANNESBURG.

This is an illustration of a design, made alternatively, for a house proposed to be built at Johannesburg, South Africa. It was intended that the walls should be built of rough cast externally. The roofs would be tiled, and the woodwork generally painted white, except the doors and shutters, which would be bright green. R. A. BRAY.

### The Student's Column.

#### STEAM BOILERS AND PIPES.—II

##### MAIN FLUES AND ECONOMISER SETTING

MAIN FLUES, connecting the boiler setting proper with the chimney, vary considerably in construction and length with the type of boiler. The flue may be of stone, brick, steel, or steel lined with fire-brick, but brick is the material most generally employed.

Being horizontal, the main flue is subject to somewhat heavy accumulations of soot and dust, which reduce the effective area to a considerable extent. Therefore the dimensions should not be cramped, especially for boilers of small diameter. Sufficient space should be afforded, wherever possible, for the passage of a man through the flue for the purposes of cleaning, inspection, and repair.

A common practice is to make the area of the main flue equal to from one-fifth to one-third of the area of the grate surface of the boiler, and to reduce the area so found by about 20 per cent. for a range of two or three boilers.

Computed in this way, the areas for the main flues of Cornish and Lancashire boilers of average proportions are approximately as stated in Tables XV. and XVI.

TABLE XV.—APPROXIMATE DIMENSIONS OF MAIN FLUES FOR CORNISH BOILERS.

Diameter of Boiler Shell.	Main Flue for One Boiler.	Main Flue for Two or Three Boilers.
ft. in.	Sq. ft.	Sq. ft.
3 0	0.80 to 1.33	1.33 to 1.94
4 0	1.00 " 1.66	2.40 " 3.60
4 6	1.50 " 2.50	3.60 " 5.40
5 0	2.10 " 3.50	5.40 " 8.10
5 6	2.70 " 4.50	6.48 " 9.72
6 0	3.00 " 6.00	8.64 " 12.96
6 6	4.10 " 6.85	9.81 " 14.72
7 0	4.90 " 7.96	11.64 " 17.42

TABLE XVI.—APPROXIMATE DIMENSIONS OF MAIN FLUES FOR LANCASHIRE BOILERS.

Diameter of Boiler Shell.	Main Flue for One Boiler.	Main Flue for Two or Three Boilers.
ft. in.	Sq. ft.	Sq. ft.
6 0	4.00 to 6.66	6.66 to 10.00
6 6	5.00 " 8.33	8.33 " 12.50
7 0	6.00 " 10.00	10.00 " 15.00
7 6	7.00 " 11.66	11.66 " 17.50
8 0	8.00 " 13.33	13.33 " 20.00
8 6	9.00 " 15.00	15.00 " 22.50

A more precise method of settling the proportions of the main flues is to calculate the areas by the following formula:—

$$A = \frac{(G \times C \times z)}{\sqrt{H}}$$

Where A=area of main flue in square feet; G=grate area of the boiler or boilers in square feet; C=coal consumed per sq. ft. of grate area; z=height of chimney shaft in feet; and H=coefficient, the value of which is 0.125 for one boiler and 0.1 for two or three boilers.

The convenience of this rule is shown by  
Example (1).—Required to find the area of  
the main flue for three Cornish boilers, each  
of the same size as those in Example (1) and  
burning a maximum of 20 lb. of coal per  
square ft. of grate, the height of the  
main shaft being 75 ft.

$$A = \frac{30 \times 20 \times 0.1}{\sqrt{75}} = 3.75 \text{ sq. ft.}$$

Example (2).—Required to find the area of  
the main flue for three Cornish boilers, each  
of the same size as those in Example (1) and  
burning the same amount of coal per square  
ft. of grate, the chimney being also 75 ft.

$$A = \frac{30 \times 20 \times 0.1}{\sqrt{75}} = 13.85 \text{ sq. ft.}$$

The advantage of using a rule such as  
the foregoing is that the flue area bears a  
definite relation to the chimney draught and  
the consumption, as well as to the grate  
area. The direct influence of these factors  
is clearly shown by the results of the two  
preceding examples, calculated in accordance  
with the data assumed in Examples (1) and  
(2), except that the height of the chimney  
is altered to 100 ft. and the coal consump-  
tion to 15 lb. per sq. ft. of grate area.

Example (10).—For one boiler the area of  
the main flue becomes

$$A = \frac{20 \times 15 \times 0.125}{10} = 3.75 \text{ sq. ft.}$$

Example (20).—For three boilers the area  
of the main flue becomes

$$A = \frac{60 \times 15 \times 0.1}{10} = 9 \text{ sq. ft.}$$

Having settled the area of the main flue in  
accordance with the proportions of the boiler,  
the height of the chimney-shaft, and the  
maximum coal consumption proposed, the  
flue can be adapted to suit the boiler  
setting and the building in which the plant  
is to be installed.

The very small flues fireclay pipes can be  
used with advantage, but the section most  
generally adopted in practice is a combination  
of the circular and rectangular forms, the  
flue being built with a horizontal floor,  
vertical sides, and an arched roof, as illus-  
trated in Fig. 31, p. 236.

Wherever possible, the width of the flue  
should be enough to permit the passage of a  
man and in fixing the height, allowance  
should be made for a few inches of soot and  
flue dust at the bottom.

For the flues calculated in the preceding  
examples any of the following dimensions  
will be suitable

	Square.	Rectangular.	Rectangular with Arch.
10	ft. in.	ft. in.	ft. in.
1	2 0	9 4	10 4
2	2 0	18 8	20 8
3	2 0	28 2	30 2
4	2 0	37 6	40 6

In planning a main flue the shortest and  
most direct route should be taken to the  
chimney. All sudden bends and changes of  
direction must be avoided, and the interior  
surfaces should be smoothly finished. The  
flue leading from the boiler, or boilers,  
should be led into the main flue so that the  
flue is not required to pass over sharp  
bends, and care should be

every possible way to facilitate the  
passage of the gases to the chimney-shaft.  
Provision for access should be made by fix-  
ing a manhole at some suitable point, and in  
this case it is necessary to provide floors  
at all bends and elbows, so that soot and  
flue dust may be removed at intervals or  
as required.

Flues are built with a lining of fire-  
brick set in freelay. The outer masonry  
should be of hard brick, and thick enough  
to prevent loss of heat by radiation within  
the flue.

The flues of boilers sometimes  
have considerable distances, it is desir-  
able that the length should be  
as short as possible.

Loss of head due to friction at various

velocities in flues of different diameters can  
be calculated by any reliable formula,  
although, of course, the exact amount of loss  
in any individual case will necessarily depend  
upon the original character of the interior  
surfaces and the extent to which the flues  
are choked and roughened by the presence  
of soot and dust.

Our present purpose will be served by  
employing an adaptation of the formula  
recommended by Mr. Hawksley\* for the  
flow of water in pipes, and which experi-  
ence shows may be used also for the flow of  
air in smooth pipes and other conduits. This  
formula is—

$$v = 48 \sqrt{\frac{h d}{l}} \quad (3)$$

where  $v$ =velocity in feet per second,  $h$ =head  
in feet of air,  $d$ =diameter in feet, and  
 $l$ =length in feet.

To make the rule applicable to cases where  
the head is expressed in inches of water,  
the coefficient 48 must be divided by  
 $\sqrt{0.761} = 0.871$  being the weight of  
a cubic foot of air at 62 deg. F., 62.3 the  
weight of a cubic foot of water at the same  
temperature, and 12 the number of inches in a  
foot. Using round numbers, this gives

$$v = 396 \sqrt{\frac{h d}{l}} \quad (4)$$

and

$$h = \frac{v^2 l}{166,800 d} \quad (5)$$

Table XVII. has been calculated by  
formula (5) for flues of different diameters,  
all 100 ft. long. For greater lengths, the  
figures in the table must be increased pro-  
portionately with the length of the flue.  
Thus, for flues 200 ft. long the values should  
be multiplied by two, for 300 ft. long by  
three, and so on. It should be noted that,  
as Mr. Hawksley's formula refers to smooth  
pipes, the figures in this table represent  
comparative rather than actual losses of head  
in sooty flues.

To illustrate the use of the table, let us  
suppose that 64 cubic ft. of gases have to be  
discharged through a main flue at a velocity  
of 20 ft. per second. This discharge corre-  
sponds with an area of 3.2 sq. ft., or a  
diameter of about 2 ft. According to  
Table XVII., the loss of head for a velocity  
of 20 ft. per second in a flue of this diameter  
is 0.127 in. of water, but if the length were  
600 ft. the loss would become  $(0.127 \times 6) =$   
0.762 in. To avoid this excessive loss, the  
area of the flue could be increased, with a  
corresponding reduction of velocity. Making  
the flue diameter 3 ft. (area=say 7 sq. ft.),  
the velocity would become about 9 ft. per  
second, and the loss of head rather less than  
 $(0.0212 \times 6) = 0.1272$  in. of water.

The importance of proportioning flues in  
this manner will be recognised when it is  
remembered that the loss of head due to  
friction in a long flue has to be made good  
by increasing the draught power of the chim-  
ney. For lengths up to 100 ft. the rules  
already given may be taken as allowing  
sufficient area, but when the length is above  
this limit, compensation should be made by  
increasing the area of the flue. Table XVII.  
is only calculated for a few diameters and  
velocities, but our readers can easily prepare  
a more extended table by the aid of  
formula (5).

\* Proceedings of the Institution of Civil Engineers,  
vol. xxxiii.

TABLE XVII.—COMPARATIVE LOSSES OF HEAD DUE TO FRICTION IN LONG FLUES.  
(Calculated in inches of water for circular flues 100 ft. long.)

Diameter of Flue.	Velocities in Ft. per Second.					
	5 ft.	10 ft.	15 ft.	20 ft.	25 ft.	30 ft.
Ft. in.	in.	in.	in.	in.	in.	in.
1 0	0.0169	0.0687	0.143	0.255	0.398	0.574
1 6	0.0176	0.0425	0.095	0.170	0.265	0.382
2 0	0.0079	0.0318	0.071	0.127	0.199	0.287
2 6	0.0063	0.0255	0.057	0.102	0.159	0.229
3 0	0.0053	0.0212	0.047	0.085	0.132	0.191
3 6	0.0045	0.0182	0.041	0.072	0.113	0.164
4 0	0.0039	0.0159	0.035	0.063	0.099	0.143
4 6	0.0035	0.0141	0.031	0.056	0.088	0.128
5 0	0.0031	0.0127	0.028	0.051	0.079	0.114
5 6	0.0028	0.0116	0.026	0.046	0.072	0.104

For application to passages of irregular  
outline formulae (4) and (5) must be modified  
by the addition of factors representing area  
and perimeter, but can be used without  
alteration for conduits of rectangular section,  
as the relation of area to perimeter for such  
is the same as for circular sections.

Mention has already been made of the  
advantages to be derived from the use of  
fuel economisers. As apparatus of the kind  
is fixed in or in connexion with the main flue  
of a boiler or range of boilers, we now  
describe and illustrate some of the different  
ways in which economisers may be con-  
nected.

Fig. 53 contains cross and longitudinal  
sections of the brickwork for a Green's  
economiser. These drawings are sufficiently  
clear, and require no explanation.

Fig. 54 is a section illustrating a simple  
arrangement for the installation of an econo-  
miser behind a Cornish boiler.

Fig. 55 shows a somewhat similar arrange-  
ment applied in connexion with a watertube  
boiler where the main flue passes below the  
floor level.

Fig. 56 is a section showing the economiser  
placed above the main flue leading from one  
or more boilers to the chimney. As shown  
in this drawing, the reserve flue is closed by  
a damper, and the flues leading to and from  
the economiser are provided with wing  
dampers. Thus the gases can be made to  
pass either through the economiser or the  
reserve flue as required. At times when the  
economiser has to be shut down for examina-  
tion, cleaning, or repair, the reserve flue is  
used, so that no interference with the opera-  
tion of the boilers shall be caused.

Fig. 57 shows the arrangement of an econo-  
miser for three Lancashire boilers. Two  
openings are provided from the main flue—  
one giving access through the economiser to  
the chimney and a reserve flue affording  
direct connexion with the chimney.

Although the economiser is usually fixed in  
one or other of the positions shown by the  
illustrations, there is no limit to the varia-  
tions open to the designer, and it is quite  
easy to arrange the apparatus to suit every  
kind of boiler and to comply with any  
structural requirements in new or existing  
buildings.

As in the case of boiler setting, the brick-  
work of an economiser should be designed so  
as to facilitate access to the flues, and for  
this reason the adoption of removable flue  
covers, as shown in Figs. 53-55, are prefer-  
able to brick corbelling. Contact of brick-  
work with the apparatus should also be  
minimised by employing blocks of semi-  
circular section in place of ordinary bricks.

DISCOVERY OF AN UNDERGROUND PASSAGE.—  
According to an account in the *Yorkshire Post*,  
during some excavations at Dewsbury the opening  
has been found of a secret passage which extended  
from the Manor House gardens, opposite the  
Town Hall, across what is now Leeds-road,  
beneath Manor-place gardens, and (it is believed)  
beneath the dwelling to a house known as the  
"Haunted House." Manor House formerly  
belonged to Mr. John Peables, and his gardens,  
noted for their extent and beauty, included in  
their limits the so-called Haunted House, and  
this passage is believed to have been built as  
affording a means of escape in case Manor House  
was besieged by the Parliamentarians. If this  
surmise is correct, it forms rather an interesting  
justification of the incidents imagined by Scott  
in "Kenilworth," where the coming and going of  
people through secret passages led to the inference  
that the house was haunted.



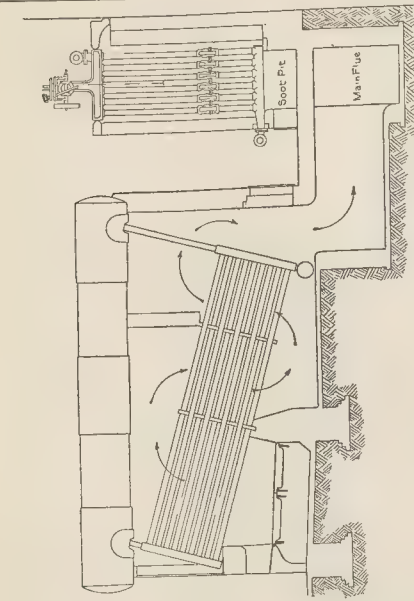


FIG. 54

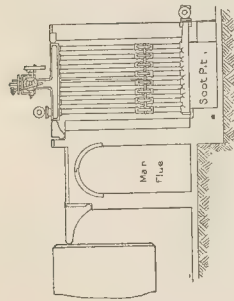


FIG. 55

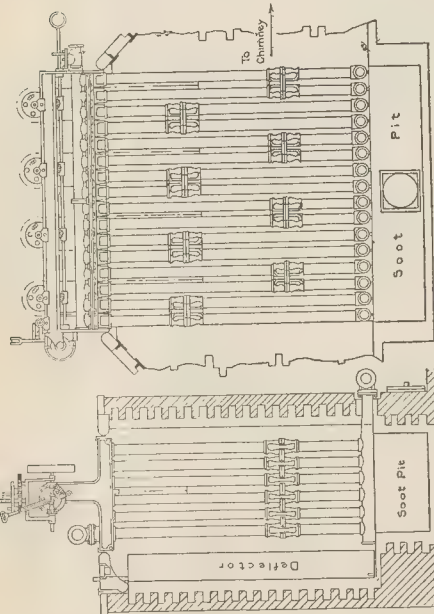


FIG. 53

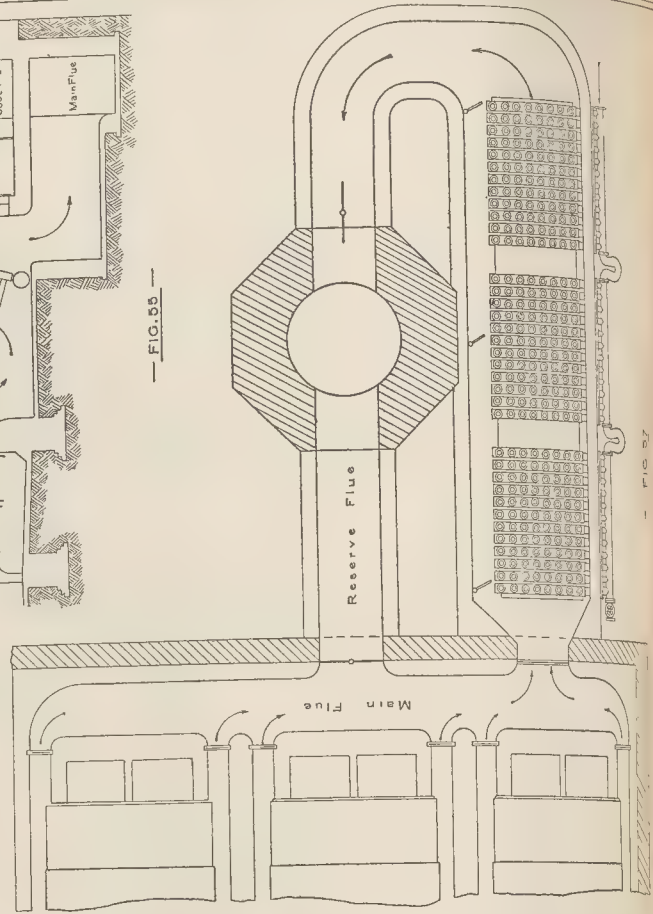
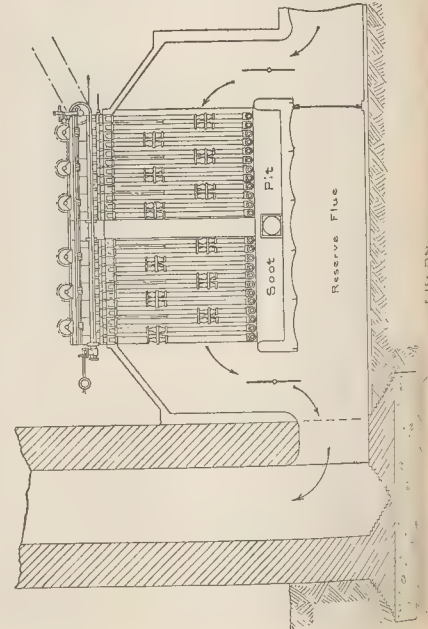


FIG. 51

**THATTO HEATH.**—The new church and of the new chapel in use for the past eleven years, erected by Messrs. Thomas Welsby & Co., of Messrs. R. W. & Mr. L. Quirke about 450 people, being 110 ft.



incorporations. The erection of the buildings was carried out under the supervision of Mr. Alexander Macdonald, the Burgh Engineer. The cost of the work has been 11,000l.

**CENTRAL BATHS, BRADFORD.**—On Wednesday last the new central baths in Morley-street, Bradford, were opened. The principal accommodation provided consists of a swimming bath and a series of slipper, douche, and medicated baths, with Turkish and Russian baths. The hall containing the swimming bath is 130 ft. long and 60 ft. wide, and the bath itself is 100 ft. by 30 ft., the depth varying from 3 ft. 6 in. to 7 ft. The hall is surrounded by a gallery, which has a seating accommodation for 380 persons, and a promenade capable of holding 800 persons. The old style of dressing-boxes has been abandoned, and a special apartment has been provided for dressing-rooms. The hall, when used for meetings in the winter, will provide seating accommodation for 800 persons, or for 1,540 when the galleries are occupied. The partitions for dressing-boxes are removable, and will be taken down during the winter, leaving a room 55 ft. 6 in. by 30 ft. 9 in. available for other purposes. The laundry connected with the establishment is capable of dealing with 800 towels per hour. The machinery is driven by a 10-h.p. motor, the current being derived from the Corporation mains. There are two washing, boiling, and disinfecting machines, two 26-in. friction-driven self-balanced machines, a drying chamber with twenty-three sliding racks, and one 108-in. ironing machine. The buildings are ventilated on the "plenum" system. For heating the water for the baths there are two Lancashire boilers, working in conjunction with a Green's economiser. The pumps for feeding the boilers are connected with a Chevrolet heater. The swimming hall is lighted with "Lucas" gas lamps, while electricity is adopted for the Turkish, Russian, medicated, and special baths. A house for the manager is provided over the entrance in Great Horton-road. On the other side of the building, between the swimming bath and Morley-street, a space was left for the erection of eight lock-up shops with store-rooms over. The Turkish baths are situated in the lower ground floor. There are three hot-rooms, 36 ft. by 13 ft., 21 ft. 9 in. by 13 ft., and 13 ft. 6 in. by 8 ft. 6 in. respectively. A plunge bath, 30 ft. by 10 ft., has also been provided. The shampooing-room is 20 ft. 9 in. by 13 ft., and is fitted with three fixed marble shampooing slabs, a portable slab for occasional use, and a needle and a sitz bath. There are also two cooling-rooms. In addition to the baths already mentioned, there are twelve slipper baths for men and four for women. The contractors for the various works have been as follows:—Excavator, mason, and bricklayer, Mr. Walter Booth; carpenters and joiners, Messrs. Jackson Bros.; plumbers and glaziers, Messrs. H. Braithwaite & Co.; plasterers and concreters, Messrs. B. Dixon & Son; slaters, Messrs. Hill & Nelson; painter, Mr. Walker Priestley; ironworkers and smiths, Messrs. J. Hitchen & Son; electric lighting, Mr. C. W. Webster; gas lighting, Messrs. Atkinson & Smith; steam boilers, Messrs. Hewitt & Kellett; heating and ventilating, the Lancashire Heating Co.; laundry fittings, Messrs. W. Summerscales & Sons, Ltd. The preparations of plans were first entrusted to Mr. A. H. Russell, Titmarsh, London, and modifications were subsequently made by Mr. F. E. P. Edwards, City architect, who was entrusted with the supervision of the work of construction. The cost amounts to about 7,000l.

#### SANITARY AND ENGINEERING NEWS.

**RESERVOIR, DOUGLAS.**—The opening of the West Baldwin Reservoir took place on the 6th inst. The scheme was designed by Messrs. G. H. Hill & Sons, of London and Manchester, and carried out under the management of Mr. F. Thorpe. The total cost has been 90,000l.

**WATER SUPPLY, CHELMSFORD.**—The new reservoir at Long Stumps, which provides Chelmsford with an improved supply of water, has just been opened. The site is 200 ft. by 200 ft., and the area of the top of the reservoir is 1,385 sq. yds. The outer walls are composed of concrete, and are 6 ft. thick at the bottom and an average of 12 ft. high, with an inner lining of 6 in. of concrete, the whole being rendered with 1 in. of cement rendering and finished on top with 1 in. of neat cement. The floor is composed of concrete, and is 18 in. to 21 in. thick, according to the nature of the subsoil, and an extra 6 in. under each brick pier, and is rendered in a similar manner to the walls. The roof is supported by ninety-five blue brick piers, 18 in. square, varying in height from 10 ft. 4 in. to 11 ft. 6 in., each pier standing on a Yorkshire stone base from Pateley Bridge. The piers carry 10-in. by 5-in. steel girders, which weigh in all 21 tons, and carry the concrete roof, in which is embedded the New Expanded Metal Co.'s steel sheeting. The ventilation is obtained by twenty-six Gregon patent ventilators, and three manholes are provided for access to the interior. A Venturi meter has been fixed on the 10-in. delivery main. A valve house has been built, enclosing the valve to the outlet pipe and electrical transmitter. The bricks are of local

manufacture, with stone dressings, and the borough arms are over the entrance doorway. The capacity of the new reservoir is 716,000 gallons. A new 10-in. pumping main extends from Midway-road pumping-station to the new reservoir, and is 2,300 yds. in length. The contract for the reservoir amounted to 4,777l., and the pumping main to 1,852l., making a total of 6,629l. The contractors were Messrs. Potter & Sons, Chelmsford, and the pumping main was laid by the Council's own staff. The cement rendering on the inside of the reservoir was done by Mr. G. T. Beddingfield, plasterer, of Chelmsford. The cement was supplied by the Associated Cement Manufacturers, of Grays; the blue bricks by Messrs. Wragg & Co., of Swadlowcote; the steel girders by Messrs. Dorman, Long, & Co., of Middlesbrough; the special fittings and valves by Messrs. Glenfield & Kennedy, and the Venturi meter and electrical recorder by Messrs. Kent & Co., of London. The whole of the reservoir is lined with Callender's bituminous sheeting. Mr. Cuthbert Brown, the Borough Surveyor, was responsible for the scheme, and the clerk of the works was Mr. E. Mansbridge.

**ELECTRIC LIGHTING AND DESTROYER WORKS, BURSLEM.**—The opening of the new electric lighting and destructor works which have been erected at Burslem took place on the 5th inst. The buildings have been erected under the direction of the Borough Surveyor (Mr. F. Bettany), and the whole of the engineering work has been under the control of the Borough Electrical Engineer (Mr. Ernest J. Pott). The buildings have been designed so that the steam generated in the destructor boiler is utilised to generate electricity. They consist of a destructor-house, boiler-house, engine-room, offices, test-room, and battery-room, and the smoke and gases from the boilers are carried away by an octagonal chimney-shaft 120 ft. above ground level. The building contractors were Messrs. W. Grant & Son, Burslem. The refuse destructor, which was supplied by Messrs. Henaa & Froude, Ltd., Manchester, is of the three-cell front feed type, and is capable of burning 50 tons of refuse in eighteen hours to a hard clinker. The total cost of the electricity works was 19,000l. and the destructor works 4,000l.

#### FOREIGN.

**FRANCE.**—A monument to the memory of Fromentin, the painter, is to be inaugurated at La Rochelle on October 1st. The Departmental Council of La Nièvre have decided on the erection of a bridge in ferro-concrete over the Nièvre, at a cost of 340,000 francs. The Municipality of Nancy have passed a vote for 450,000 francs for the enlargement of the Lycée for girls in that town. A hospital is to be built at Roubaix at a cost of 400,000 francs. A statue of Vauban, the architect, is to be inaugurated last Sunday at Saint Léger-Vauban (Yonne). Twelve competitors entered for the competition opened by the "Société Nationale des Architectes de France," for a design for the offices of a daily paper. The prize was awarded to M. Dangle. The Conseil des Ministres have decided that the Comité des Ministres should be transferred to the building in the Rue Odéon now occupied by the "Frères de la Doctrine Chrétienne," and in exchange for this the Municipality of Paris is to have possession of the Caserne Napoléon, Place Lobau, which will become an annex of the Hôtel de Ville. A normal school for girls is to be built in the Parc Clatigny, Versailles, at a cost of 1,026,000 francs. It is reported that the municipality of Lorient intend to demolish the old Morbihan gate at the entry to the town. The death is announced, at the age of 93, of the marine painter François Bernard Barry, pupil of Gudin. He had received medals in the Salons of 1840 and 1843, and was Chevalier of the Legion of Honour. He painted several views of Marseilles, his native town, and some other important pictures, among which was that representing the arrival of the Queen of England at Tréport, in 1843. The museums of Versailles, Lyons, and Marseilles, possess various examples of his work. He exhibited regularly at the annual Salons down to 1882, his last work exhibited there being "The Taking of Stax." The death is also announced, at the age of 74, of M. Alphé Dubois, the medal engraver; son of another celebrated medallist, Eugène Dubois. Alphé Dubois had been a pupil of Duret and of Barré, and obtained the Prix de Rome in 1855. His works are remarkable both for originality and conception and finish of execution. Among the principal ones may be mentioned the Napoléon Centenary Medal; the portrait of Napoléon III.; the bronze money for the kingdom of Spain; and the medal commemorating the building of the Mairie of the Xth arrondissement. He obtained a silver medal at the 1889 exhibition. The death is also announced, at the age of 76, of M. André Delort, the sculptor, a former pupil of Bonnat, who obtained the Second Prix de Rome in 1857. His best work, "Mercury," is in the museum at Lyons. He received medals at the Salons of 1861, 1863, and 1889, and also in 1900 Exhibition.

**SOUTH AFRICA.**—At East London, the great fire of November, 1902, now becoming obliterated. At Mombasa, the R.C. Church and Basilica Mission Church are going alterations and enlargement; St. Peter's will soon have a chancel and apse added. It is expected the Wesleyans will soon commence the erection of a chapel, there is a new mission, boys' public school, and a new school. A satisfactory arrangement has been entered into between the Pretoria Municipality Association and the carpenters and joiners of the town, who have been out on strike. The agreement agreed upon provides that the men shall instead of at the higher wages of 2s. 6d. per hour as paid formerly, and that the whole wages of the dispute about wages—be referred to arbitration. The men, on the basis, have returned to work, and the masters have agreed to accept should the arbitrator, after hearing both sides, give his award in favour of the 2s. 6d. per hour they will pay that wages as from the date of building was resumed work. A considerable number of buildings were destroyed in East London during June, no more than 413 houses, including 176 dwellings, 44 educational, 100 shops and 47 stores, shops, and other buildings were by the municipality. These were within a radius of six miles of the Municipality, the majority of them in the suburbs. A meeting of the Durban Master Builders Association final measures were taken for the erection of a Building Trades Conciliation Board, which consists of four representatives of employers and men. The scheme was inaugurated by Mr. W. R. Poynton, Durban, President of the Association of South African Builders. The meeting will deal with all trade disputes occurring as from July 31st. The death of Elizabeth the second, as occurred of Mr. Robert Ernest Abbot, in his seventy-second year. Mr. Abbot arrived in Durban in 1843; he was a successful architect and building contractor. Amongst the buildings erected by him are the Union-Castle Company chambers and the Roman Catholic Church. In connection with the competitive designs for the new public school at Mowbray, which are estimated to cost 100,000l. to erect, the first premium has been awarded to Messrs. McGilray & Grant, and the second premium to Mr. William Black & Mr. Robert Black, architects, of Standard Bank, Johannesburg.

**NATAL.**—The contract for the new town hall, public buildings, and municipal offices of the Municipality of Durban has been signed, and the contractors have now commenced the execution. The accepted tender amounted to 232,000l., which provides for the external elevations, the remainder to be finished in cement plaster. Provision is made, however, in the agreement to proceed with the whole of the elevations of the town should the Council decide at a later date to do so, in which case the total cost of the work would be increased to 320,000l. The architects are Messrs. Scott & Hudson, of Johannesburg and Durban.

#### MISCELLANEOUS.

##### PROFESSIONAL AND BUSINESS ASSOCIATIONS.

Mr. W. H. Ansell, architect, has removed his office from 11, Great James-street, to 10, Bedford-street, Russell-square, W.C. Moffatt & Co., constructing engineers, have removed their works from Green-street, near Friars, to Eagle Works, 328, St. James-road, Kent-road, S.E. Since the death of Mr. Joseph Howe, the head of the firm of Messrs. Joseph Howe & Co., contractors, in Harlepool (see Obituary notice in our issue of August 26), his executors have arranged to sell on the firm under its old title, retaining the present staff, with Mr. William Black as manager.

**OLD SQUARE, LINCOLN'S INN.**—Since the demolition some years ago of the Vice-Chancellor's Courts, an unsightly and inconvenient structure on their site has formed the gravelled area on the east side of the old Hall. The ground is now being dug up in order that it may be re-planned, and kerbed, room being left for the passage of vehicles, as in the adjoining the Square on the other side of the Church. This will be an improvement of the former and will enhance the view seen through the gateway in Chancery Square, 1904-5. The report is that the twelve months ended on March 31 last, that, whilst much attention has been paid upon the preparation and issue of maps, good progress is being made with the larger scales. The completed maps will include the one-millionth scale map, the country for all of the United Kingdom; the county and district surveys, with main roads columns, the whole of Great Britain; the outline maps, and the 1-in. outline and half of the whole of the United Kingdom; and the coloured edition for England and Wales, in progress comprise the 1-in. coloured map for Scotland and Ireland; the 2-in. survey, which the drawing for England and Wales.



and the drawing for Scotland is in that the maps to that scale for the south of England and parts of the Midland are published; the 10-mile map, coloured, is published for Great Britain and is nearly finished. Amongst the special maps which have been undertaken are some for the reports of the London Traffic Commission, and to illustrate the progress of the South African War, 1899-1902. The official year many maps especially for the purpose were sold at nominal prices and conditionally upon their use for educational objects only—to school authorities, at the request of the Geographical Association. A number of men are being trained as topographical surveyors for the proposed survey of the Irish.

**DESERTED VILLAGE FOR SALE.**—One curious corner of London, that of the deserted village of St. Giles, may soon be removed, for a new notice has just been erected indicating that "this village is to be let on building lease." This deserted village has existed for some forty years, but its name is not generally known. Its situation is at the bottom of Greyhound-lane, Streatham, and the village could be more desirably placed, it is surrounded by the most beautiful scenery. The village comprises ten detached dwellings. The only one tenanted, the remainder being in an advanced state of decay. Roofs and walls which are not gone are going, and gigantic trees have their branches into bedroom windows, whilst ivy bushes are forcing their way into parlours and kitchens. Originally the main road was severed and made up, but now it is covered with grass and luxuriant weeds. Some of the houses have never been occupied. The village was a failure from the beginning, for the people who did settle there soon fled. The owner recognised that his speculation was a bad one and simply left the village to fall to pieces. Now the houses are rapidly collapsing, and eight persons are warned to keep away from the dangerous place.

**TRAFFIC AND ELECTRICITY.**—It is stated that the Board of Trade have sanctioned the construction of the water-mill at Whitechurch into a generating station for the supply of electrical power for lighting and other purposes, including the running of motor boats and launches. The return power of the station being derived from a river driven by the stream.

**LIVERPOOL CATHEDRAL.**—The work in preparing the foundations of the Liverpool Cathedral is reported to be proceeding satisfactorily. The foundations have been completed for the western transept and it is expected that the whole foundation will be completed by March, and the erection of the Lady Chapel and Chapter house will then be commenced.

**MEMORIAL LIVERPOOL.**—On the 9th inst. Mr. George White unveiled the monument erected at John's Gardens to the officers and men of the 1st Liverpool Regiment who fell in the campaigns of Afghanistan, Burma, and South Africa. The monument is composed centrally of a pedestal, upon which stands a figure of Britannia. The pedestal is flanked by a lower wall or parapet, against which stand at either side two soldiers. Upon a sloping step at the base of the central pedestal are placed military instruments of various kinds and periods, surrounded with wreaths and palms and covered with the Union Jack. At the back of the pedestal is a ruined earthwork, a drummer, and a call to arms. Upon the front of the monument is the inscription, and on either side of it, upon the flanking wall, the names of those who have died in the more recent campaigns. The back of the pedestal and the flanking wall are figured the badges and honours of the regiments. Upon the plinth in the front of the monument and flag is the regimental motto, "FOR THE CITY OF LIVERPOOL." Britannia stands with her right arm upraised in the act of blessing. She is armed with the weapons of defence alone. Her left arm hangs a shield, and in her left hand is a spray of laurel. The shield is decorated with sea horses, and the helmet with a crown and galleys and a sea-horse crest, all symbols of maritime power. The soldiers on either side stand at ease, with their muskets slung. The total height of the monument is 44 ft., and the width 25 ft. The sculpture, the work of Mr. W. Goscombe John, is all of bronze, and the architectural portion of grey granite. The bronze casting has been carried out by Mr. A. B. Burton, of Thames Ditton, and the granite work by Messrs. Joseph and Sons, of Trafford Park, Manchester.

**ST. PETER'S GATE (SOUTH).**—The Office of the Metropolitan Public Works has been about to effect an improvement of the approach to St. Peter's Gate, opposite the gardens of the Palace, by widening the gate by the removal of the brick wall of the railings, and the removal of the toy and confectionery stall from its present position.

**ROADS OF LONDON STREETS.**—We observe that the streets of London and Charlotte-street, Mary-le-bone, parallel with Portland-place on the north, have recently been incorporated and named Albert-street, Albert-street, Shadwell,



The "Deserted Village" near Streatham.

will henceforth be known as Solander-street, in memory of Dr. Solander, the eminent Swedish botanist, who lived in the vicinity.

**INSTRUCTION IN MINING, INDIA.**—The Secretary of State for India has approved of a recommendation made by the Bengal Government for the making of provision for instruction in mining at the Sibpur Engineering College, Calcutta, and the appointment from England of a professor of mining, at a maximum salary of Rs.1,000 per mensem, and of a peripatetic instructor, with a native assistant. The five years' course will include training in the mining districts, where the students will work under the direction of the local mine managers.

**ABBAY CHURCH, NUNTRATON.**—The restoration committee have accepted a tender of 3,395l., by Messrs. Wilcock & Co., of Wolverhampton, for the rebuilding, after Mr. Harold Brakspear's designs, of the church of St. Mary's Abbey Church. Within the precincts stand the ruins of the Priory of St. Mary the Virgin, founded temp. Stephen, by Robert Earl of Leicester, for some Benedictine nuns from Fontevault, of which at the Dissolution the revenues were computed at 290l. 15s. 0qd. The church was built about thirty years ago by Mr. Clapton Rolfe, who adopted the style of the former fabric, with Transitional nave and transept, and Early English choir.

**HOLY TRINITY, BLYTHBURGH.**—A committee is formed to raise a sum of 3,000l. for a reparation of the well-known XVth century parish church which was restored by Mr. Arthur E. Street in 1882-4, after plans prepared by G. E. Street. The church contains some curiously carved choir-stalls, together with the oak carving of the clock-jack; and among the bench-ends are some curious "poppy-head" carvings of figures symbolising "the seven deadly sins," one of which, however, has been sawn off, probably for reasons of modern decorum. The paintings, sculpture, and brasses, and most of the stained glass, were destroyed in the days of the Commonwealth. The now ruined priory of Black Canons was bestowed temp. Henry I. upon St. Osyth Abbey, in Essex. The committee includes Mr. Crofts, Mr. Seymour Lucas, Sir Ernest Waterlow, Sir C. Purdon Clarke, Sir Ralph Blois, and the Bishop of Norwich.

**LONDON COUNTY COUNCIL SCHOOL OF ARTS AND CRAFTS.**—The London County Council's Central School of Arts and Crafts will reopen on Monday, September 18, thus entering on the tenth year of its career. During the past session 789 individual students were enrolled, mainly apprentices or journeymen in artistic trades, this number being an advance upon previous records. The school provides at nominal fees practical instruction by specialist teachers in a wide range of handicrafts, grouped generally into (a) architecture, furniture, decoration, (b) silver, smithing and kindred trades, (c) bookbinding and other crafts of book production. Pending the completion of the permanent building in Southampton-row, additional temporary premises are being equipped to meet the increasing demand. New classes are being formed in building construction, printing, book illustration, costume designing and dressmaking, painting in tempera, etc. Prospectus and full particulars can be had on application to the Curator at the School, 318, Regent-street, W.

**A NEW GULLY.**—It is not often that a new gully with important and distinctive features is designed, but Wood's patent gully is an invention of this kind. The trapped gully has a conical

inlet, about 9 in. in diameter at the top and tapering to 3 in. below the level of the standing water; the outlet has a diameter of 4 in. The grating is dome-shaped, and a vertical nozzle or spout is fitted through an opening in the crown, the lower end of the nozzle being about 3 in. above the standing water. The wastepipe is connected to the top of the nozzle by a movable shoe. By these means the full force of the discharge is utilised for cleansing the gully and flushing the drain, while at the same time external splashing is avoided. It is a simple and sensible invention.

**MONUMENT, NEWBOLD-ON-AVON.**—In restoring the church of Newbold-on-Avon, near Rugby, what appears from the description to be a fine early Renaissance monument has been discovered hidden behind a family pew. It consists of a fluted marble slab on an altar tomb, with "incised figures" representing a knight and his lady. From the inscription it is the tomb of Thomas Boughton and his wife Elizabeth, one of whom (but as to which the inscription seems ambiguous) died in May 1454. If the description "incised figures" is correct, this is rather interesting, for it is certainly not a usual way of representing monumental figures otherwise than in brasses.

**CULROSS ABBEY RELICS.**—According to the Standard, some further interesting discoveries have been made in the course of the operations at Culross Abbey during the past few days. A beautifully sculptured stone has been found, upon which is carved a Maltese cross and an ancient form of sword. While there is nothing beyond the sculpture on the stone to indicate the origin of the relic, it is believed to be part of an ancient chieftain's headstone. Near the same place was also found a small baptismal font. Recent operations have revealed part of the original foundations of the building. At any rate, there are unmistakable evidences that the hewn stones were the work of the Culdees. Most of the old stones, which are being taken out, are being refaced and put back in their original positions. Another interesting discovery is a stone coffin—one of the largest found in Scotland—a unique feature of which is the addition of a leather shroud. This is being carefully preserved, awaiting a thorough investigation by representatives of the Crown.

**THE USE OF GAS IN WORKSHOPS.**—The following remarks are extracted from the last Report of the Medical Officer of Health for the City of London (Dr. W. Collingridge).—"The dangers attendant on the use of gas in workshops for heating purposes, whether in stoves, heaters for irons or tools, or in gas irons, when no means of carrying off the fumes is provided, are very little realised by occupiers of workshops and work-places, especially in those cases where no smell of gas is detected. In this relation it may be of interest to quote the remarks made by H.M. Chief Inspector of Factories with regard to the inodorous gas, carbonic oxide (carbon monoxide CO), in a report on water and other gases published in September last. In this Report attention is drawn to the danger of poisoning from the carbon monoxide given off by water and other gases of a similar nature, and in a smaller degree by coal gas. It was pointed out that carbonic oxide poisoning may occur in many ways. Thus danger of this kind may arise from the use of gas irons and from defective gas fittings, and from gas stoves, especially where no provision is made for the products of combustion to be carried away by a flue or chimney. The absence of a chimney



A pavement light consisting of a number of prisms of varying length, the said prisms some of them being partially coated with a reflecting coating so that light may be reflected in the required direction.







## COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.
Baptist Chapel, Maesteg .....	The Committee.....	Not stated .....

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Extension of Sewer .....	Southwick U.D.C.....	Council's Surveyor, Council Offices, Southwick .....
Construction of Clyde Bank Branch .....	Caledonian Railway Co. ....	Formans & McCall, Engineers, 160, Roper-street, Glasgow .....
Repairs and Improvements at School .....	Monmouthshire Education Com. ....	D. Morgan, Architect, Clarence-street-chambers, Cardiff .....
Bacteria Beds at Sewage Works, Haslemere .....	Hambleton R.D.C. ....	J. H. Howard, Surveyor, Lower-street, Haslemere .....
Paint Work and Small Repairs at Town Mills .....	Guildford Town Council .....	Borough Surveyor, Guildford .....
Ceiling, Boarding, Painting, etc., Roofs of Baths .....	Manchester Corporation .....	City Architect, Town Hall, Manchester .....
Wall and Floor Tiling and Terrazzo Paving at Baths .....	do. ....	do. ....
150,000 Hardwood Sleepers .....	Central South African Railways .....	Crown Agents for Colonies, Whitehall-gardens, S.W. ....
Painting of Schools and Carpenters' Houses .....	Bradford Education Committee .....	Secretary, Education Office, Manor-row, Bradford .....
Furniture and Fittings for Generating Station .....	Handsworth U.D.C. ....	Hemman & Cooper, Architects, 19, Temple-street, Birmingham .....
Collection of Dust .....	Edmonton U.D.C. ....	Inspector of Nuisances, Town Hall, Edmonton .....
Stoneware Pipes .....	do. ....	Council's Engineer, Town Hall, Edmonton .....
Portland Cement .....	do. ....	do. ....
Construction of Water Supply Works .....	Colwyn Bay U.D.C. ....	Council's Engineer, Council Offices, Colwyn Bay .....
Two New Annexes, with Baths, etc., at Infirmary .....	Belfast Union .....	Clerk's Office, Union Workhouse, Belfast .....
Iron and Glass Verandahs at Union Workhouse .....	Reigate R.D.C. ....	R. B. Grantham & Son, 28, Northumberland-avenue, W.C. ....
NEW ROAD WORKS, HERTFORD .....	Leeds Guardians .....	T. Winn & Sons, Architects, 84, Albion-street, Leeds .....
Centrifugal Pumps .....	Messrs. Usher & Barclay .....	Norris & Duvall, Surveyors, 60, Fore-street, Hatford .....
Stoneware Pipe Sewer .....	Kettering U.D.C. ....	Council's Engineer, Market-place, Kettering .....
Re-erecting Jacketed Boiling Pans & Building Work .....	Hendon R.D.C. ....	Council's Surveyor, St. Stanmore .....
Flagging Yards at Cottage Homes, near Warrington .....	Devonport Guardians .....	Borough Engineer, Town Hall, Brighton .....
Dressed Granite Kerb and Channel .....	Freestwich Union .....	Town Clerk, Town Hall, Richmond, Surrey .....
Equipment of Washhouse at Workhouse .....	Salford Union .....	W. T. Jones, Union Offices, Cheetham Hill-road, Manchester .....
MAKING-UP AND PAVING LAUDERDALE-RD. .....	Brighton Town Council .....	H. Lord, Architect, 42, Deansgate, Manchester .....
Supply of Shingle .....	Chorlton & Man. J. W. House Com. ....	A. J. Murtagh, Architect, 23, Strutt-street, Manchester .....
Unclimbable Wrought-iron Fencing .....	Paddington Borough Council .....	do. ....
New Works, Ingress Abbey Park, Greenhithe .....	do. ....	Borough Surveyor, Town Hall, Paddington, W. ....
Underpinning and Repair of Infirmary Buildings .....	Leigh Corporation .....	Borough Engineer, Bank-chambers, Leigh, Lancs. ....
Iron Pipes and Specials .....	Wall Paper Manufacturers, Ltd. ....	Company's Offices, 11, Southampton-row, W.C. ....
Causewaying of Carriageway of South-street .....	Pembrokehire Infirmary .....	T. H. Jones, Secretary, High street, Haverfordwest .....
New Building for Children, Euston-station .....	Epsom U.D.C. ....	W. Young, Waterworks, East-street, Epsom .....
Granite .....	Perth Town Council .....	Borough Surveyor, 12, Tay-street, Perth .....
Use of Steam Roller and Scarifier .....	Brantree U.D.C. ....	A. P. Macalister, Architect, 20, St. Andrew's-street, Cambridge .....
Sinking and Boring a Well .....	do. ....	Council's Surveyor, Vestry Hall, Brantree .....
Square Brick Water Tower .....	Upton-on-Severn R.D.C. ....	Wilcox & Raikes, 63, Temple-row, Birmingham .....
Water Tanks and Mains .....	Uxbridge U.D.C. ....	F. S. Courtney, Engineer, 25, Victoria-street, S.W. ....
NEW LABORATORY, RUARH MR. ABERYSTWYTH .....	do. ....	do. ....
COOKERY CENTRE AT DOWNEND, LLOROE .....	University College of Wales .....	Registrar, at College, Aberystwyth .....
ERECTION OF SCHOOLS ON WATER-LANE SITE .....	Ilford U.D.C. ....	C. J. Dawson, Architect, 11, Cranbrook-road, Ilford .....
MAKING-UP OF RIDER-ROAD .....	do. ....	do. ....
Earthwork and Construction of Bridge, Darwen .....	Wood Green U.D.C. ....	Council's Engineer, Town Hall, Wood Green, S.W. ....
ERECTOR OF LAVATORIES, WREKSE, EDGWARE .....	Panel U.D.C. ....	Council's Surveyor, Public Offices, Enfield .....
Blue Guernsey Granite Chippings and Dust .....	Lane & Yorks. Railway Co. ....	Engineer's Office, Hunt's Bank, Manchester .....
Steam Rolling and Scarifying .....	Hendon Union .....	Union Offices, Edgware .....
WOOD PAVING WORKS .....	Bomford U.D.C. ....	Council's Surveyor, Council Offices, Romford .....
New Pavilions, Nurses' Homes, etc., at City Hospital .....	Hampstead Borough Council .....	Council's Engineer, Town Hall, Hampstead, N.W. ....
Broken Granite .....	Newcastle-on-Tyne Sanitary Com. ....	City Property Surveyor's Dept., Town Hall, Newcastle-on-Tyne .....
Public Elementary School .....	Hitchin U.D.C. ....	Council Offices, Town Hall, Hitchin .....
Overhead Equipment and Cables for Tramways .....	Warrington Education Committee .....	Education Office, Sankey-street, Warrington .....
MAKING-UP ROADS .....	Pontypidd U.D.C. ....	R. P. Wilson, Engineer, 66, Victoria-street, S.W. ....
Roadmaking and Paving Works .....	Swanage U.D.C. ....	Council's Surveyor, Town Hall, Swanage .....
Telephones & Elec. Bells, Langho Epileptic Colony .....	Lewisham Borough Council .....	Council's Surveyor, Town Hall, Catford .....
Furniture for Manor Park School Enlargement .....	Essex Education Committee .....	Clerk, Chorlton Union Offices, All Saints, Manchester .....
CONSTRUCT LIGHT RAILWAY, WOOD GREEN .....	Middlesex C.C. ....	Secretary, Education Office, East Ham, E. ....
NEW ELEMENTARY SCHOOLS, TAUNTON .....	Taunton Education Committee .....	County Engineer, Middlesex Guildhall, Westminster S.W. ....
Sewerage Works, Casewbridge District .....	Watford U.D.C. ....	Bryan & Roberts, Architects, 2, Hammet-street, Tandon .....
Sewerage of Rickmansworth-road and Bagden-lane .....	do. ....	Council's Surveyor, Watford .....
Earthenware or Stoneware Sewer Pipes .....	do. ....	do. ....
Broken Granite .....	do. ....	do. ....
SUPERSTUCCO, NEW BLOCK, HOMERTON INF. ....	Hackney Guardians .....	Clerk's Office, Hackney Union, Homerton, N.E. ....
ENLARGEMENT OF POST-OFFICE, HARROGATE .....	Commissioners of H.M. Works, etc. ....	H.M. Office of Works, Storey's Gate, S.W. ....
NEW FIRE STATION .....	Eastbourne Corporation .....	Borough Surveyor, Town Hall, Eastbourne .....
SUPERSTUCCO, NEW P.W.R. STA., BLACKFERS, S.E. ....	Commissioners of H.M. Works, etc. ....	H.M. Office of Works, Storey's Gate S.W. ....
ERECTION OF BATHS .....	Southall-Norwood U.D.C. ....	Council's Engineer, Public Offices, Southall .....
NEW SCHOOL, ETC., BRAINTREE .....	Wandsworth Borough Council .....	Council House, East Hill, Wandsworth, S.W. ....
Re-building Farm Buildings, Alton, Hants .....	Essex Education Committee .....	Chancellor & Son, Architects, Duke-street, Chelmsford .....
Erection of St. Patrick's School, Leeds .....	J. G. Wood, Esq. ....	Hunt & Chalcroft, Architects, 48, Bishopgate Within, E.C. ....
Alterations and Additions to Harrogate Infirmary .....	Foresters' Homes Committee .....	E. Simpson, Architect, Marnham, Bradford .....
ADDITIONAL WING, BEXLEY HEATH HOME .....	do. ....	H. B. & A. Bown, Architects, Jame-street, Harrogate .....
do. ....	do. ....	J. S. Paul & Son, 31, Bedford-row, W.C. ....

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be made
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General Foreman .....	Altrincham U.D.C. ....	40s. per week .....	Sept. 11
Assistant Surveyor .....	Tipperary C.C. ....	140L .....	Sept. 11
Inspector of Nuisances .....	Sheerness U.D.C. ....	100L .....	do.
Clerk of Works for new Fire Station .....	Blackburn Corporation .....	100L .....	do.
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ASSIST. INS. MANUAL TRAINING, METAL WORK .....	do. ....	80L .....	do.
ARCHITECTURAL ASSISTANT .....	Hull Education Committee .....	100L .....	Oct. 1

Those marked with an asterisk (\*) are advertised in this number.

Competitions, —

Contracts, iv. vi. viii. x.

Public Appointments, vii. viii.

WOOD (continued).

A. & F. Mannelle, Gracechurch-street,  
London\* ..... £1 6 5  
[Quantity required about 1,350 tons.]



**MILL HILL, N.W.**—For the erection of two villa residences, Hendon Wood-lane, Mill Hill, N.W., for Mr. C. G. Boyer and Mr. S. Nadale. Mr. S. Doddmeade Edmunds, architect and surveyor. St. Albans: Pearson & Son £1,476 0 H. Phillips .. £1,140 0 J. Christie .. 1,182 10 W. Goodchild & Son .. 1,145 0 .. 087 10

**MOUNT HAWKE.**—For restoration of Wesleyan Methodist Church, for Wesleyan Church. Mr. Sampson Hill, architect, Green-lane, Redruth. Quantities by architect:—  
J. Trevellick .. £867 8 6 T. Willoughby .. £642 0 0  
T. Rodiffe .. 766 18 0 W. H. Moyle .. 631 0 0  
J. Odgers .. 696 0 0 W. S. Tippett .. 630 0 0  
W. C. Hodge .. 666 0 0

**PRESTON (Lancs.)**—For erecting a scullery at Fulwood Workhouse, for the Guardians. Mr. T. Whitwell, engineer:—  
M. Shorrocks, Fulwood, Preston\* .. £273

**RHYMNEY.**—For covering two tanks at the Sewage Disposal Works, for the Urban District Council. Mr. W. Lloyd Marks, Surveyor, 61, High-street, Rhydney:—  
D. Davies .. £235 0 W. Lewis, Cefn Bryn, Britbair, New Tredegar\* £200 0  
D. Jones .. 269 10

**RYDE.**—For iron fencing at the Waterworks, for the Corporation. Mr. C. Mathew, Borough Engineer and Surveyor:—  
J. Elwell, Birmingham\* .. £508 2 6 [including fixings.]

**RYDE.**—For erecting cottages at Waterworks, for the Corporation. Mr. C. Mathew, Borough Engineer and Surveyor:—  
G. Hayles .. £1,200 0 Wheeler Bros. .. £920 0  
H. Limington .. 1,195 0 J. Whitewood, Ryde\* .. 893 10  
M. A. Newman & Co. .. 1,090 0

**SAWBRIDGEWORTH.**—For erecting a fire-station in Church-street, for the Urban District Council. Mr. A. T. Watts, Surveyor to the Council:—  
W. H. Hinkins .. £424 0 T. W. Burton & Son, Sawbridge-worth\* .. £350 0  
W. Robinson .. 418 7 E. & N. Lawrence .. 380 9  
E. H. Hockley .. 415 10 Parren & Son .. 375 0  
W. Finch .. 415 0

**SEDGFIELD (Co. Durham).**—For sewerage and sewage disposal for Ferryhill Station, Chilton, and Mainsforth, for the Rural District Council. Messrs. D. Balfour & Son, engineers, 3, St. Nicholas-buildings, Newcastle-on-Tyne:—  
J. Jameson & Co., Temple-row, Birmingham\* £4,634

**SOUTHWELL.**—For sewerage works (Contract No. 1), for the Rural District Council. Messrs. H. Walker & Son, engineers, Albion-chambers, King-street, Nottingham:—  
T. H. Harper, Carlton, Nottingham .. £5,396

**SOUTHWELL.**—For sewerage works (Contract No. 2), for the Rural District Council. Messrs. H. Walker & Son, engineers, Albion-chambers, King-street, Nottingham:—  
Stanton Iron Co., Stanton, Derbyshire .. £551

**ST. ALBANS.**—For the erection of a detached residence, No. 1, Clarence-road, St. Albans, for Mr. A. J. L. Gliddon. Mr. S. Doddmeade Edmunds, architect, St. Albans:—  
Vail & Williamson, St. Albans\* .. £747 9

**ST. ALBANS.**—For the erection of a detached residence, No. 2, Jennings-road, St. Albans, for Mr. A. J. L. Gliddon. Mr. S. Doddmeade Edmunds, architect, St. Albans:—  
C. W. Dumptelton .. £994  
W. Goodchild & Son, St. Albans\* .. 920 [Accepted with modifications.]

**ST. ALBANS.**—For the erection of pair of villa residences, Blandford-road, St. Albans, for Mr. T. R. Yates. Mr. S. Doddmeade Edmunds, architect, St. Albans:—  
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W. Sharp .. 895 0 H. J. Skelton .. 780 0 [All of St. Albans.]

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J. T. Gosling .. 398 10 6 G. Burgoine .. 290 0 0  
G. Double .. 389 13 9 Ipswich\* .. 290 4 10

**UPPERTHORPE.**—For erecting an infant school for 400 children, with cookery room, manual instruction workshops, etc., Daniel Hill-street, for the Sheffield Education Committee. Mr. H. L. Paterson, architect, 19, St. James's-street, Sheffield. Quantities by the architect:—  
J. W. Winter .. £10,398 10 J. & H. Wheen .. £8,566 0  
A. Moore .. 9,888 0 J. & T. Robert-son .. 8,461 10  
Ash, Son, & Biggins .. 9,100 0 F. Frothingham .. 8,400 0  
W. & A. Fors-tyke .. 9,100 0 O'Neill & Son .. 8,381 0  
W. R. Unwin .. 8,320 0 Hollingworth & Sons .. 8,339 0  
Fidler & Sons .. 8,300 0 Bedford .. 8,325 0  
Scott & Son .. 8,775 0 H. Turton .. 8,269 0  
Wallerman Bros. .. 8,715 0 Wilkinson & Sons .. 8,250 0  
S. Boul .. 8,705 0  
Lee & Kirk .. 8,675 0 Ishely & Son, Sheffield .. 8,088 0  
Longdon & Son .. 8,650 0  
J. White & Son .. 8,620 0

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Drowley & Co. .. 336 0 F. Aylott\* .. 305 10  
A. H. Gale .. 325 0

**WOKING.**—For alterations and additions to the Constitutional Club premises, Woking, for the Directors. Mr. H. A. Whitburn, architect, 22, Surrey-street, W.C., and Woking:—  
W. Aird .. £418 7 Harris & Son .. £370 0  
A. E. Millard .. 390 0 F. J. Kemp .. 362 10  
G. Allard .. 385 0 J. Whitburn .. 328 10

**WOKING.**—For the erection of a lock-up shop for Mr. M. Pratt. Mr. H. A. Whitburn, architect, 22, Surrey-street, W.C., and Woking:—  
J. Whitburn .. £220 0 F. Aylott .. £195 14 0  
Drowley & Co. .. 207 10 0 W. Aird .. 178 5 0  
A. E. Millard .. 201 5 6 G. Allard\* .. 172 10 0

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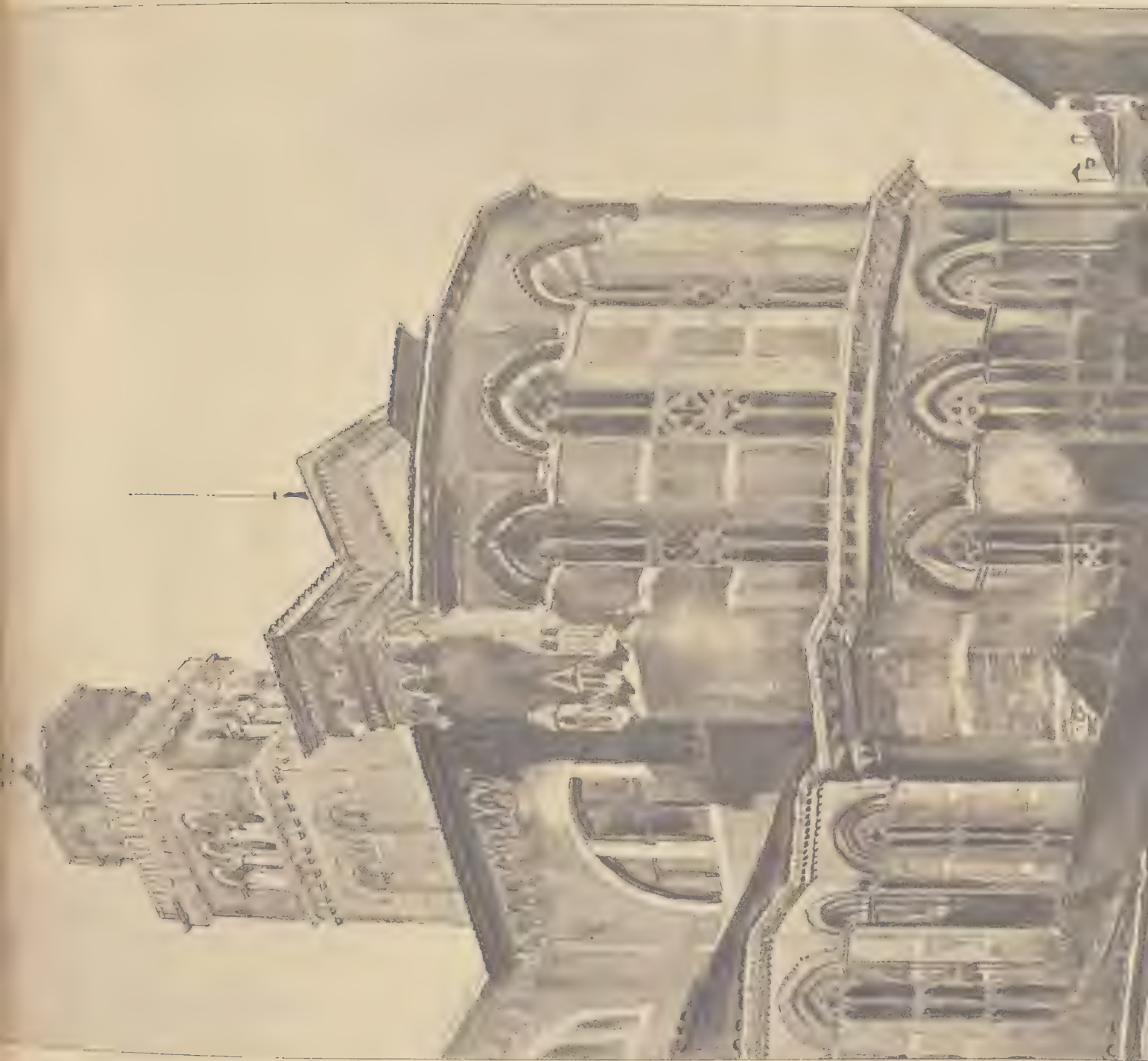
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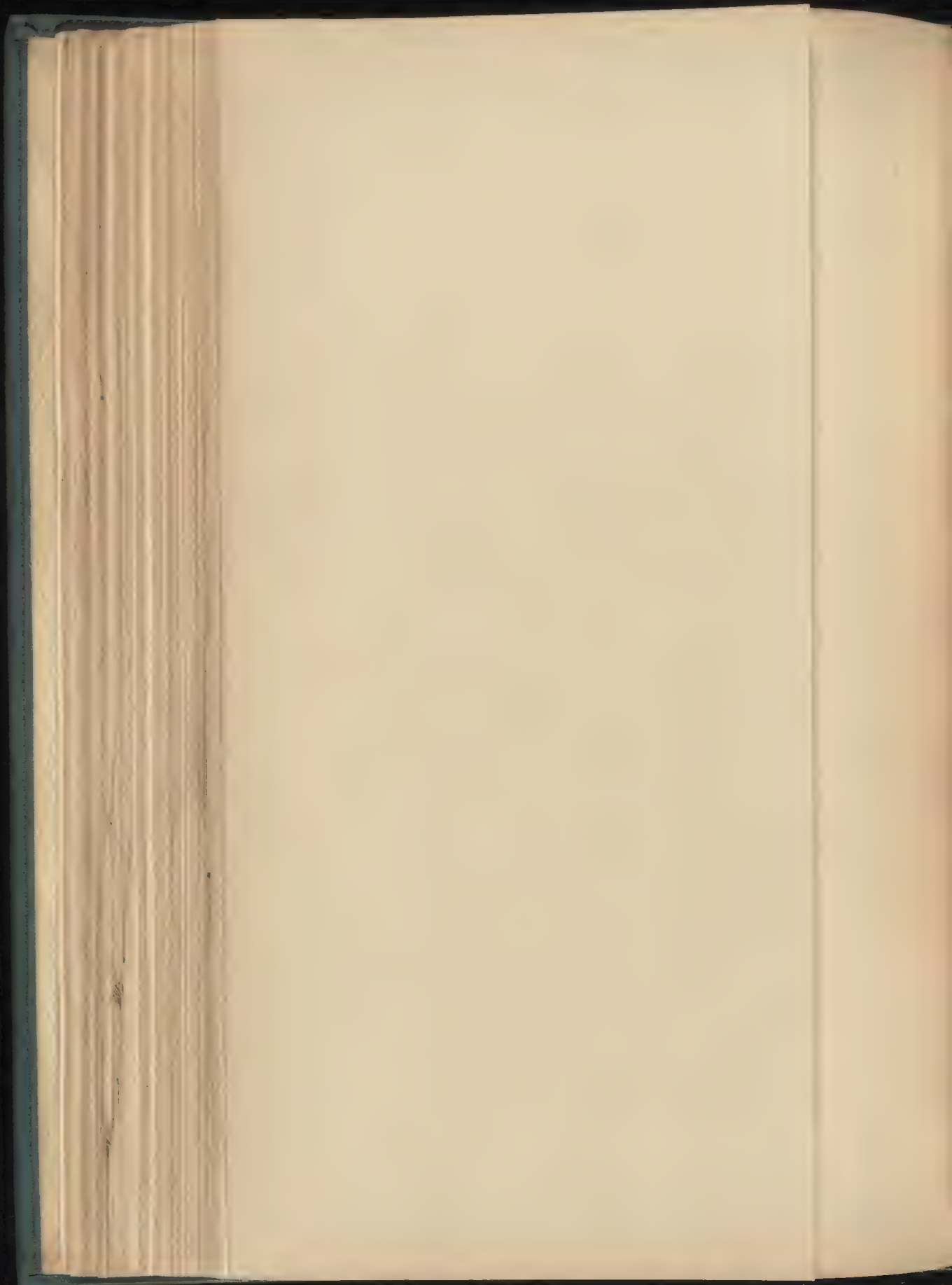
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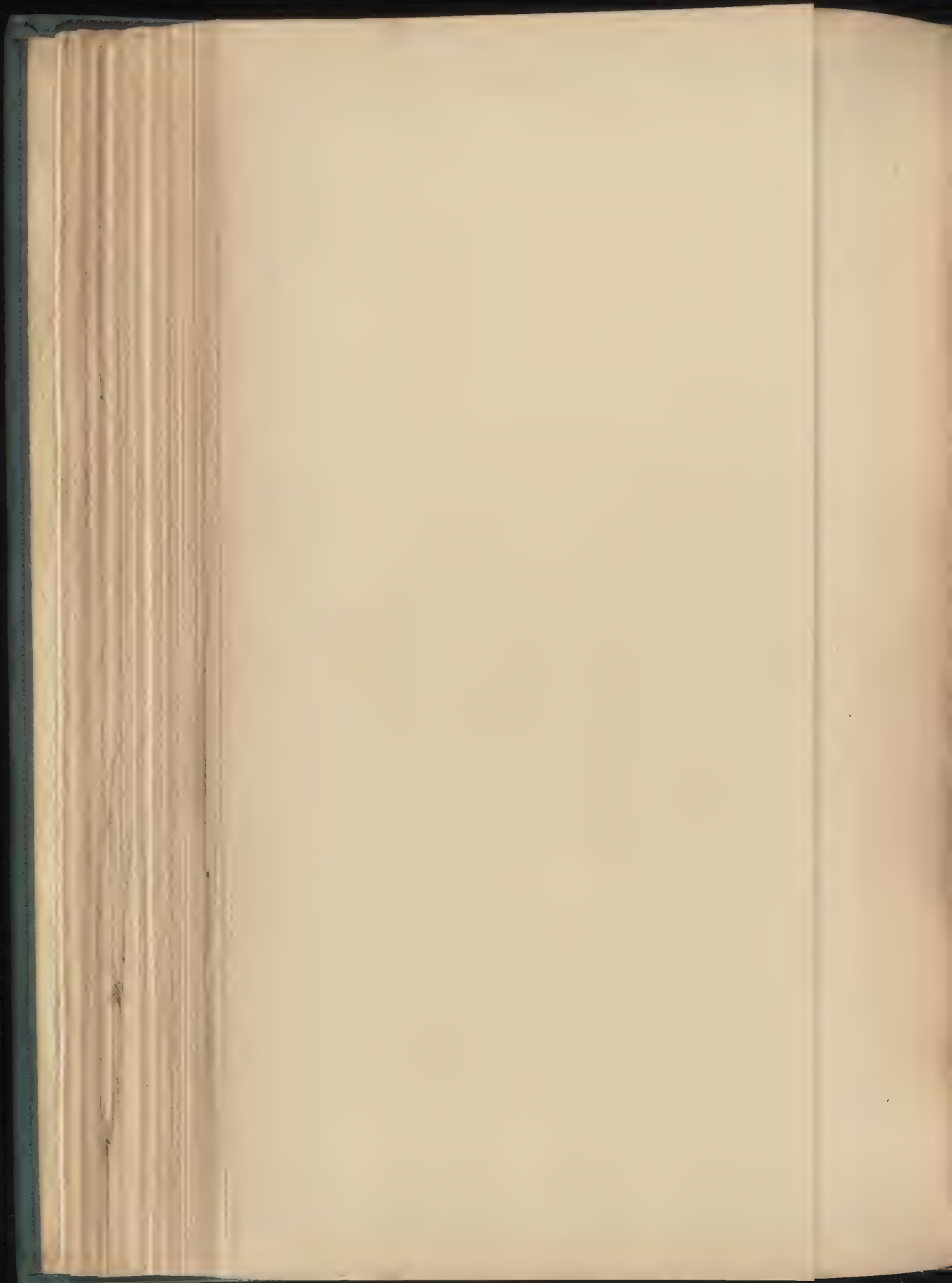






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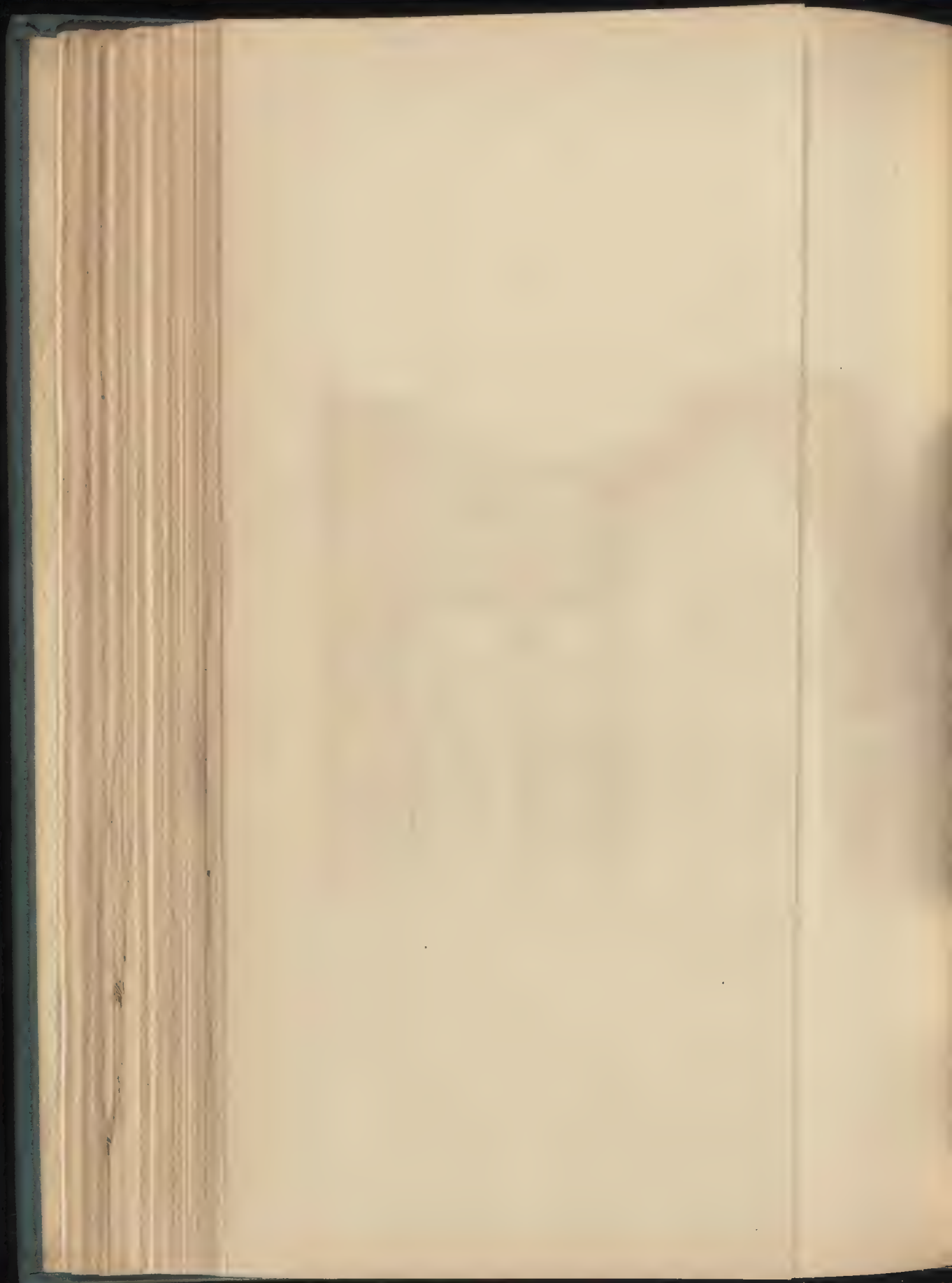
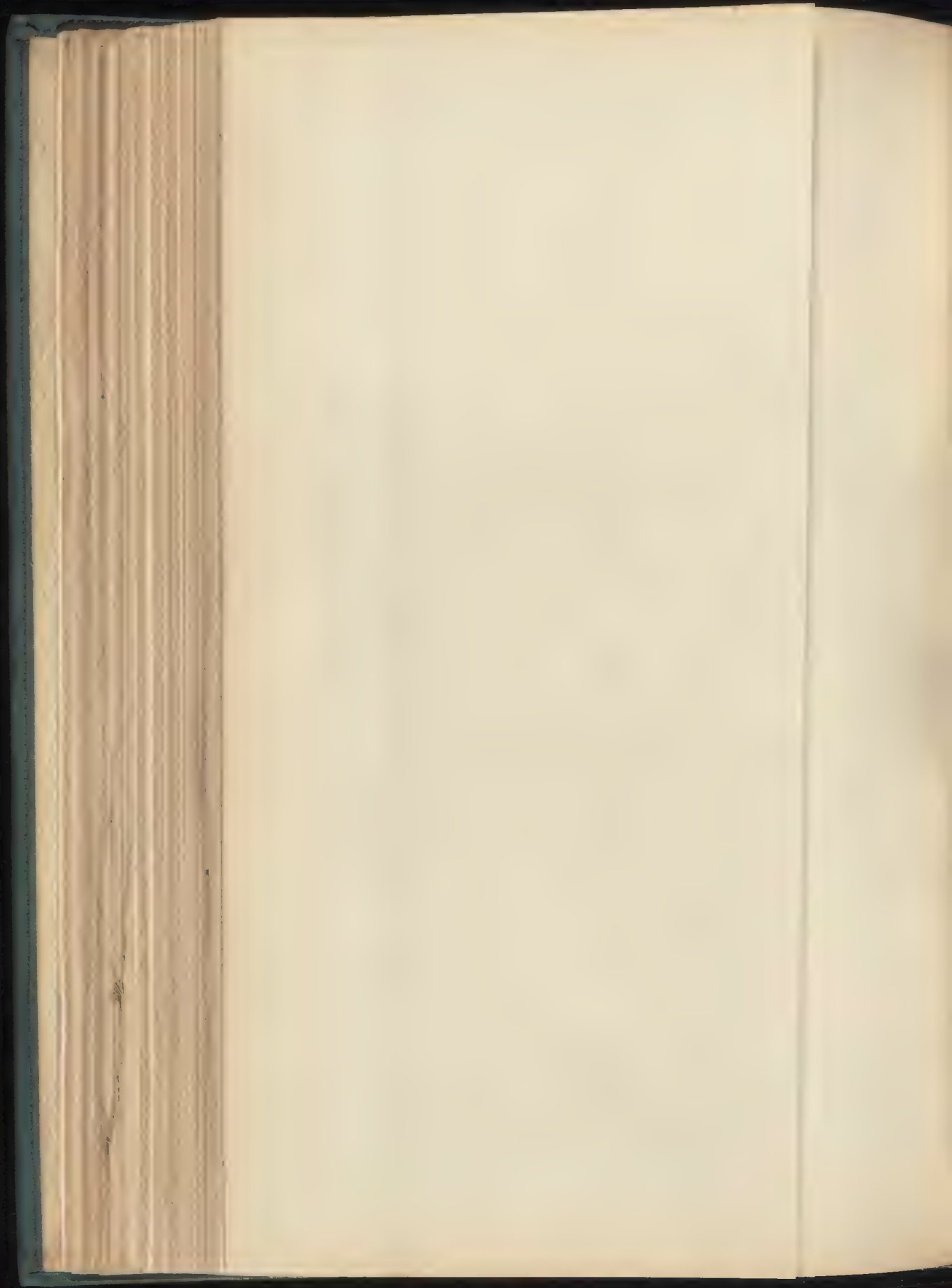




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SKETCH FOR HOUSE AT JOHANNESBURG, SOUTH AFRICA.—MR. R. A. BRIGGS, F.R.I.B.A., ARCHITECT.





# The Builder.

VOL. LXXXIX.—No. 3285.

SEPTEMBER 22, 1905.

## ILLUSTRATIONS.

House near Dublin: View from Garden	} Mr. W. D. Carie, F.R.I.B.A., Architect.
Ditto, ditto. View of Entrance Front	
Panelled Boom, Clifford's Inn.....	Drawn by Mr. John Barbour.
1, 2, 3—Elevations: 4—Details of Carving.	

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### The Glamour of Crooked Building.

WE have received from the Edinburgh Architectural Association a copy of the large and finely printed illustrated catalogue of Mr. Goodyear's exhibition at Edinburgh

photographs and drawings, in illustration of his opinion as to the employment of alterations from the straight vertical or horizontal line, in Mediæval and Renaissance buildings, with the view of producing refinements of architectural effect. We are glad to have the catalogue,

which is a curious and interesting document, but we fear that it will not persuade us that the exhibition renders Edinburgh for the moment a kind of Mecca to which the architectural pilgrim is bound to repair. We have in fact followed all Mr. Goodyear's illustrated publications on this subject from time to time in American magazines, and therefore know pretty well what his position is; and we can hardly think that the collection at Edinburgh will avail to convert us to a belief in what has always appeared to us to be, in the main, a laborious and fanciful twisting of facts to fit a theory which is not only improbable; and which, if accepted, would only go to prove that the architects of the Renaissance were elaborate wanderers, who made calculated distortions in their buildings on no principle which could serve no intelligible purpose. We admit that there are or

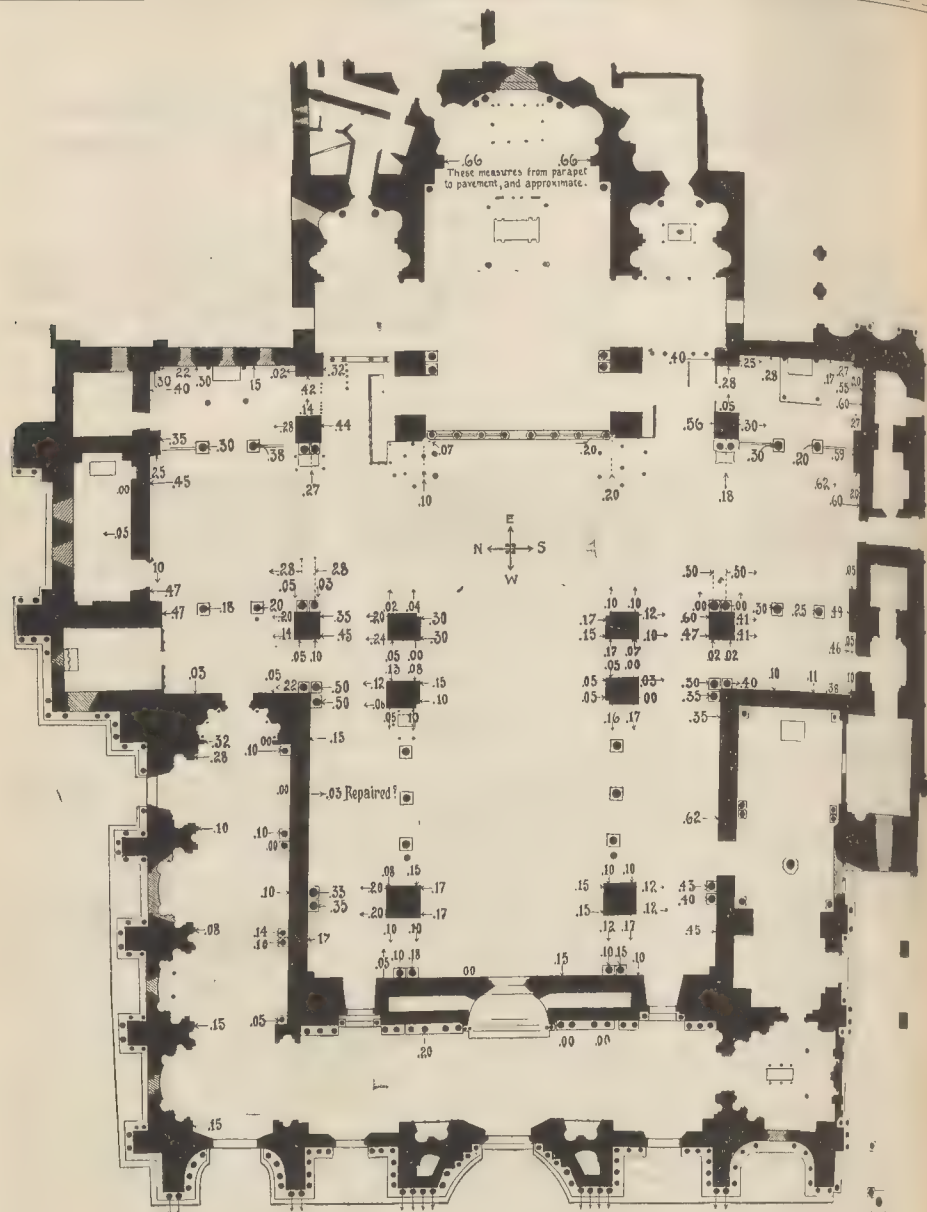
may be exceptions to this category, but that we take to be the general truth of the matter.

The catalogue itself, however, affords a basis for some comments which may serve to explain and probably, with a good many readers at all events, to justify our scepticism. And first with reference to the unquestionable and scientific refinements of Greek architecture. We heard the argument the other day:—since it is undoubted that the Greeks did employ curves and other delicate adjustments in their temples, or in some of them (the refinements of the Parthenon are by no means universal even in the examples that remain), was it not likely that this idea should have survived? Such a question shows a total forgetfulness of the facts of European history. Between the Greeks and the Mediæval period is an interregnum of absolute intellectual darkness; a gulf across which nothing could be handed down. And in the Renaissance period even space as well as time was a barrier. People travelled little; it took an artist all his time to get from one city in Italy to another, if he did not get knocked on the head *en route*; and there is no evidence, and no probability, that the Italian architects of the Renaissance knew anything of the monuments of genuine Greek architecture on Greek soil. From the middle of the XVth century Greece was an obscure country, the spoil of the Turks; a very unsafe and undesirable place for respectable people to go to. The unearthing of Vitruvius, a little later, might have taught them something as to some

of the refinements practised by the Greeks, as transmitted not very accurately through the mind of Vitruvius; but this particular chapter of the expoundings of Vitruvius does not seem to have attracted much attention, or to have been adopted in the columnar Orders of the Renaissance architects.

Not only therefore is there no historical connexion between the refinements of the Greeks and those which Mr. Goodyear claims for the Mediæval and Renaissance architects, but there is absolute contrast in their method; or rather, in the method of the former and the want of method of the latter. In the Parthenon the meaning and object of the principal corrections of line is quite evident; they point in one direction; they are part of a consistent system. We say advisedly the "principal corrections," viz.: the curves of steps, columns and cornice; the leaning inward of the axes of the columns; the slight enlargement of the angle columns, etc. Some minor details, such as the slight differences in the width of the metope openings, which Penrose measured and figured, we have always declined to believe in as intentional or of set purpose, because they display no guiding motive or principle and serve no intelligible purpose; we can only think that Penrose, logical and clear-headed as he was, suffered to some extent from the weakness incident even to able men who give themselves up to the study of a special subject, of a tendency to see that particular thing everywhere. But apart from these minor and doubtful details, the Greek system is





Ground Plan of St. Mark's, Venice: Reduced from Plan in Mr. Goodyear's Catalogue.

consistent and intelligible. But what is there consistent or intelligible in the medley of distortions of all kinds which Mr. Goodyear brings before us and asks us to accept as architectural refinements? There is no principle whatever in them. Looking through Mr. Goodyear's catalogue and his comments, it seems that any deviation from the straight line anywhere, whether inward or outward, is to be taken as evidence of artistic purpose; any bad setting out of a plan, or any freak of irregularity in a plan, possibly due to some local difficulty in the site, is to be regarded as an instance of the adjustment of lines for architectural

effect. Whether the lines go in or out does not seem to matter the least. In one place we are told of buttress finials and gables which overhang to the extent of so many inches, obviously to avoid the foreshortening effect of perspective; to which we may reply at once, if in certain places, why not in all? On another page we are shown in a drawing how the upper portion of the pilasters in the nave of St. Mark's falls back from the vertical line. If features are set forward to avoid perspective distortion, why are they set backward here? O, we are told, that is to give a greater look of space to the upper portion of the

church! Its real effect, of course, would be to diminish the apparent perspective height. A worse feature in architectural treatment could hardly be seen, and if we could believe that the builders did this on purpose, the natural comment would be, then the greater fools they. The tendency of long horizontal or vertical lines in architecture is to look hollow; hence the entasis in the Greek columns and the curve upward in the Parthenon steps; hence also the slight convex horizontal curve which Pennethorne said he had discovered in some of the long Egyptian cornices, and which would have been a logical refinement: and

is surprised not to have found it in the Parthenon, considering the extraordinary care bestowed on the lines of that wonderful building; but we cannot find that Perrose noticed or measured the correction. Hence also the frequent employment of entasis in the spiral of the column, of which there are many examples in this country; that was an obvious and common-sense correction, needed for which must have been early based upon the eye of the Medæval architect by the study of his own building after completion. But Mr. Goodyear shows us triumphantly the fact that the facade of St. Mark's, generally taken as flat, has a horizontal curve inward of 1 in. Suppose it has, what the better is for that? It is simply making a general optical defect worse. Similarly, to have a view along the cloister of the piers, Bologna, with a tape stretched to show that the line is slightly concave. The same criticism applies; the worse, not the better, for being concave, and in our opinion it is merely a case of careless setting out. Again, we are given the elevation of a row of arcades in the cathedral of Troja, showing the widths between the pilasters actually given in feet and decimals—1.702, 7.44, etc.; and this is called "Symmetrical Scheme in Arcades." It is a scheme at all; there is no rule or reason in it; if the spacing was wider in the middle and narrower at the ends, to reverse, there would be something in it, but the differences are quite irregular, without any system at all, and we are convinced that they are simply carelessness, or a conviction that it was not worth while to divide them equally. It itself, no doubt, may be called in a sense a principle; it may be argued that the irregularity is better in a repeating series than strict regularity; but we do not think there is much in that. To our mind, if a repeating series is used in architecture, it should be one thing or other: either be set out correctly, or the widths should be obviously varied with reason. A series which looks regular is found, on measuring, not to be so, only conveys the impression of clumsy or careless workmanship. The singular thing is that Mr. Goodyear does not seem to perceive the distinction between a definite and obvious statement with a view to a perspective effect and the vagaries of plan which he sets before us and to which he seeks to attribute a scientific object. He quotes Ferguson as the first modern architect who noted an intended perspective illusion in a Medæval church, the cathedral of Poitiers. But what is Mr. Ferguson referring to? He gives a plan of the cathedral in question, which is a perfectly symmetrical plan, and so as to grow narrower from west to east, and Ferguson notes that the effect also sinks towards that end, so that the perspective effect is produced; and (quite rightly) condemns it, and says that the Northern architects were "guilty in rejecting all these devices." But this is an instance of an open and honest attempt, which everyone can see for himself at once, at the production of a very commonplace form of illusion.

The symmetrical narrowing of a building to produce an effect of added perspective is a poor and trumpery architectural trick, totally unworthy of anyone but a theatrical scene-setter; but it is a definite and recognisable project, totally different from the vagaries in plan which are included in Mr. Goodyear's illustrations as having some special architectural intention.

As an illustration of this point, and as supplying a further basis in our argument, we give a reduced reproduction of the plan of St. Mark's, Venice, attached to the catalogue, and which is the result of Mr. Goodyear's painstaking and careful measurements. We give it as large as our page admits, on a scale on which the irregularities of the plan can be pretty well realised, though not in so much detail as in the large folding plan in the catalogue. This plan, which we may assume to be accurate, is a valuable contribution to our knowledge of St. Mark's, and the architectural world should feel indebted to Mr. Goodyear for it. But it is, in our judgment, an almost fatal commentary on his general theory. No one who looks at that plan can pretend, we think, to discern any guiding motive for the irregularity of the directions of the walls; nor, as far as we understand him, does Mr. Goodyear venture on any such suggestion in regard to it. It is manifestly a case of careless and indifferent setting out on the ground; and in this respect it exactly corresponds with the description we had the other day of the plans of Byzantine churches from an architect who has spent some months in measuring them. There was not, he said, a right angle or two parallel walls to be found in them; and this plan of St. Mark's answers to the same description. And now for the reason we have drawn attention to this. The figures all over Mr. Goodyear's plan represent in decimals of feet the vertical leanings of walls or piers over those points; all which he maintains to be intentional and for optical purposes. Now just consider the contrast between this assumption and the character of the plan. When we look at the plan of a columnar Greek temple we see a perfectly symmetrical plan laid out and spaced with the most accurate care, and we need not feel surprised that in a building thus carefully laid out there are very careful refinements also in the elevation and the details. But is it credible—is it even common-sense—to suppose that builders who were so careless in setting out a plan as they are shown to have been here, should in erecting it have gone into delicate refinements of setting back and setting forward for the sake of optical effect; that while setting out a plan with an almost wild disregard of rule or regularity, they should at the same time have carefully made an inward curve of 10 in. in the line of the facade? As we have shown, even if they had done so it was a mistake in regard to effect; but in regard to the character of the rest of the plan, is it credible that they even thought of this? St. Mark's is a church tumbling about every way from bad foundations, and we are asked to believe that all this is the result of forethought and contrivance. Everything is pressed into service by Mr.

Goodyear's theory; he sees curves everywhere. Illustration No. 174, for instance, showing the front of the north gallery of the nave of St. Mark's from a photograph, is labelled "Curve in Elevation." There is no such thing as a curve to be seen; the balustrade of the gallery was intended to be level—obviously is practically level for five-sixths of its length, and at one end a panel has dropped slightly. There is no evidence of intention, and if there were, there is not the slightest advantage in it; it would in that case be a deliberate blemish with no reason or excuse whatever. In short, our conclusion is that in his theory of the imaginary corrections in St. Mark's Mr. Goodyear has discovered the greatest architectural mare's nest since Street made his extraordinary discovery that the floor was laid in waves on purpose—which every one now laughs at.

We observe that Mr. Goodyear lays much stress, in several instances, on the fact that where pilasters or piers are found leaning outwards the arch between them has not parted, as he says it ought to have done if the movement had been due to settlement. It seems as if one ought to expect that, but we doubt if the argument is as strong as one as Mr. Goodyear thinks. With a very slow and gradual settlement it is quite possible that an arch may accommodate itself to the movement to an extent which would, on first consideration, hardly be expected. And we can name one notable instance of it; that of the portico of Peterborough. Those who saw it before the repairs may remember that, in spite of the moving out of the front arcade, the contemporary vault between it and the main building showed no large or noticeable rupture—nothing in the least comparable to the extent of divergence of the arcade from the perpendicular. But we forget that Mr. Goodyear has not yet turned his attention to English architectural monuments. Whenever he does, we have no doubt he will discover that the west front of Peterborough was deliberately built leaning outwards, for considerations of architectural effect.

#### SMOKE ABATEMENT.

**T**HE Medical Officer of Health for the City of London (Dr. Collingridge) in his last annual report said that, "a misleading suggestion having been offered in the public Press that smoke may have some disinfectant properties and is therefore harmless, I cannot too strongly emphasise the danger to public health from the loss of light, vitiation of the atmosphere, and the dirt, suffocation, and depression due to the pall of smoke suspended over London, especially in the colder season of the year, arising not only from factory chimneys but from every domestic fire. A widespread recognition of this evil is the first step towards its abatement."

We heartily agree with Dr. Collingridge in his emphatic and unqualified condemnation of smoke, but we believe that recognition of its evil effects has for a long time been widespread, and that the question upon which there is divergence of opinion is not whether smoke is a nuisance, but with what degree of stringency laws against smoke can be



enforced without unduly hampering the various industries in which coal is necessarily used as fuel. So far as domestic fires are concerned, every householder would be delighted if his neighbours were forbidden to allow smoke to issue from their chimneys, but would keenly resent any interference with his own liberty of action in regard to smoke emission. The righteous indignation of householders fined for allowing dirty chimneys to catch fire is sufficient evidence of this.

For several centuries the people of London have been protesting against the emission of smoke from their neighbours' chimneys, and spasmodic efforts have from time to time been made to restrict it. During the XIXth century much progress was effected in the direction of burning coal without the simultaneous production of smoke, and in enacting laws to enable the local authorities to put a stop to the persistent emission of black smoke from the factory chimneys in their respective districts. Unfortunately, however, many local authorities have up to the present time neglected to take any steps towards enforcing such laws as have been enacted, and in consequence the atmosphere of many districts continues to be befouled to an unnecessary extent.

Probably the most energetic body ever formed with the object of preventing, so far as is possible, the pollution of the atmosphere with coal smoke is that known as the "Coal Smoke Abatement Society." Although founded so recently as the year 1898, it has already succeeded in obtaining an abatement of smoke nuisance in many hundreds of cases, and has acted as an indefatigable remembrancer to supine local authorities.

Those whose memories enable them to compare the London winters of the early eighties of the last century with those of the last six or seven years cannot doubt that, generally speaking, the fogs are already less dense and less dirty than formerly.

A welcome indication of the increasing attention which is being given to the smoke problem is afforded by the publication of a book devoted solely to this subject by Mr. William Nicholson, Chief Smoke Inspector to the Sheffield Corporation.\* We cordially commend this book not only to those to whom it is specially addressed, but to all who are interested in the movement to prevent unnecessary pollution of the atmosphere with smoke. Like many other officials of controlling authorities, Mr. Nicholson is rather inclined to urge the enactment of laws which would place all who use coal completely at the mercy of the local authorities. If corporations and borough councils were composed only of responsible business men we should have little objection to this, but in certain districts so many hysterical faddists and irresponsible ignoramus now find seats on the local council that unjust persecution might result if these councillors were allowed to ride their hobbies uncurbed. We hasten to say that we have no particle

of sympathy with either manufacturers or private householders who permit any unnecessary smoke to be emitted from chimneys under their control, and we are always pleased when remissness in this matter is followed by a heavy penalty. But it is only fair to add that history shows that local authorities when they own steamboats or electricity generating stations are apt to pollute the atmosphere with black smoke quite as badly as are private coal consumers.

So long as raw coal continued to be practically the only available fuel the smoke problem remained one of the most difficult and perplexing with which local authorities were called upon to deal, but, during recent years a new factor which is likely to prove more conducive to smoke abatement than any Act of Parliament has appeared. In thousands of instances it has been found that gaseous fuel is more economical than coal, and a general displacement of steam boilers and engines by gas engines has been taking place.

Mr. Nicholson urges that the chimney of a private dwelling-house should no longer be exempt from the law prohibiting the emission of unnecessary smoke, and wishes to compel the owners of houses to put in smoke-preventing grates and stoves and to make the occupiers responsible if these are so carelessly used that they emit unnecessary smoke. In enforcing laws of this nature much would depend upon the spirit in which the controlling authorities and their officers carried out their duties. If they regarded themselves as policemen whose efficiency could be gauged only by the number of convictions they obtained, then the position of owners and tenants would be likely to become intolerable; but if they were content to assist householders by freely giving helpful advice as to the best methods of consuming coal, and to prosecute only those who were wilfully negligent, then much good might result from the making of such laws as those recommended by Mr. Nicholson.

Fortunately in the case of private dwellings, as well as in the case of factories, gaseous fuel is doing much to abate the smoke nuisance. The Chairman of the Great Eastern Railway Company (Lord Claude Hamilton) told the shareholders at the last general meeting that of the 22,000 houses in Norwich 16,000 are fitted with gas stoves. He estimated that each house would consume an average of three tons of coal per annum if gas stoves were not used, and that the householders of Norwich therefore consume 48,000 tons of coal per annum less than they would in the absence of gaseous fuel. These figures were advanced to partially account for the great decrease in the quantity of coal carried into Norwich by rail. The coal required for gas manufacture is, we understand, mostly conveyed to Norwich by water.

We do not know whether Lord Hamilton's estimate is even approximately accurate, but it is quite certain that gaseous fuel has already displaced a vast quantity of raw coal not only in the private houses of Norwich, but in those of all the large towns of England. Since this is a material step towards ridding the kingdom of smoke, it is matter for national congratulation; and

everything points to a very rapid extension of the use of gas, the form of gas-generated fuel. Coal gas at 3s. or 2s. 6d. per 1,000 cubic feet is, of course, a very cheap fuel in many cases, but there is already a general movement throughout the country towards the supply of a cheaper lower-grade gas suitable alike for lighting and for incandescent lighting.

With regard to the use of the smokeless solid fuels, anthracite and coke, it can only be said that, although these fuels have much to recommend them, they do not find much favour with the general public as domestic fuels. Repeated attempts have been made to bring them into general use in London, but their sale for household purposes is still comparatively limited, although they are very largely used by manufacturers. Ten years ago coke had a very extensive sale among the poorer classes of London, but that business has been considerably reduced by the general introduction into workmen's dwellings and tenements of the penny-in-the-slot gas meter, and the same thing has doubtless occurred in many other towns. Coke was formerly unpopular with the servants of the wealthier classes because it was sold in large masses which were troublesome to break, but now that it can readily be obtained broken to a size suitable for use it might with advantage be added in suitable proportion, as a smoke-reducer, to the much cherished flame-and-smoke-producing coal.

The war against smoke is especially worthy of the support of readers of *The Builder*, for not only does soot exert a destructive influence upon the surface of all limestones and dolomites by converting the carbonates into soluble sulphates, but it tends to give a depressing funereal appearance to all descriptions of buildings, and speedily obliterates all the finer details of sculpture exposed to it. Removal of all trace of smoke from the atmosphere of London would lead to a marked change in the appearance of its buildings. Encouragement would be given to the employment of external decorative stonework; trees, shrubs, and flowers would flourish in a manner at present impossible, and would retain their natural beauty of colour for a longer time; and the resulting extension of the daily periods of sunshine would probably be followed by a marked decrease in the prevalence of tuberculosis and such other diseases as are propagated by germs which succumb when exposed to sunlight.

#### NOTES.

The Bois de Boulogne threatened.

THE Paris public health authorities recently, with a view to the preservation of the Bois de Boulogne, have decided to disallow any building which will be shared by all visitors to Paris, of a permanent nature, on an appropriate part of the Bois de Boulogne, between the Porte d'Antoin and the Porte Maillot, for a building to be carried out as soon as the fortifications are demolished, and which is to comprise the erection of business houses (*maisons de rapport*) on a site at present occupied by barracks and stables. The question is the more serious since this is believed to be only a preliminary to a scheme for surrounding the Bois de Boulogne with a belt of buildings.

\* "Smoke Abatement: a Manual for the Use of Manufacturers, Inspectors, Medical Officers of Health, Engineers, and Others." By William Nicholson, Chief Smoke Inspector to the Sheffield Corporation. With fifty-nine illustrations. London: Charles Griffin & Co., Ltd. 1905.



of Paris with a circle of large buildings of similar type to those now proposed, as soon as the whole extent of the fortifications has been dismantled. On the formation of the *Figaro*, a "Comité de Défense du Bois de Boulogne" has been formed, with M. Frantz Jourdain, the architect, as chairman, and is preparing a petition to the authorities on the subject, demanding that the scheme should be abandoned without bringing it up even for discussion in Parliament. It is hoped that this protest will have its effect, especially as the Municipal Council will bring forward, in their next session, a counter proposal which will necessitate a considerable pecuniary sacrifice to the Municipality, but will be for the public benefit. This proposal is to create, with the financial assistance of the Municipality, an avenue 200 metres wide all round Paris, on the site of what used to be known as the "zone militaire," with spacious squares at intervals. Whether or not this fine scheme is carried out, the public feeling aroused by the proposal to take any part of the Bois for building land has been so strongly and decisively manifested as to convince the Government that, whether from the aesthetic or the hygienic point of view, the scheme is publicly regarded as a piece of vandalism, not to be countenanced on any commercial pretext.

**REPORT MADE BY SUB-COMMITTEE A OF THE JOINT COMMITTEE FORMED FOR THE PURPOSE OF FRAMING REGULATIONS MORE SATISFACTORY TO WATER CONSUMERS AND MORE EFFICIENT FROM THE STANDPOINT OF WATER AUTHORITIES THAN THOSE IN EFFECT.** It is clear that good progress is being made in this useful work. With regard to the standardisation of fittings we may mention that the Committee have made no attempt to deal with pipes, tubes, and threads which have already been taken in hand by the Engineering Standards Committee. Other fittings, however, have been suitably considered, and there is reason for thinking that the results will be generally appreciated by water engineers and plumbers. Whether, however, the talked-of standardisation of fittings, if carried out, would be entirely a benefit to the public, may be a question. It means sometimes the refusal to accept a perfectly sound fitting because it does not come into a catalogue drawn up on doctrinaire principles. We mention one case in which an officer of the New River Co. demanded the removal and replacement of a tap which had been in use for seven years without any repair, and was as tight as the day it was put in, because it was on Lord Kelvin's principle, and the Company did not like the Kelvin tap. No reason for the "dislike" was given: the owner refused to obey the absurd order, and the official thought better not to touch it.

Extracts from a pamphlet of extracts which has been sent to us, called "Judgments of the Dutch Experts on the location of the Peace Palace" (translated into very eccentric English), it seems that the proposed site at Zorgvliet is regarded as most unsatisfactory. It

is said that the site, to begin with, is too small, and that it is situated close to land which is liable to be let to speculating builders, and will probably be covered with small houses. If this is true, it is certainly not very promising for the architectural success of the enterprise. A Peace Palace, to be worthy of such a lofty title, ought to be not only a great building, but a building with spacious and stately surroundings; if it has not these it will be a failure.

**Polluted Water Supplies.** We may have to wait a long time before a central authority is created for the control and protection of sources of water supply. In the meantime, however, the technical officials of the Local Government Board ought to be able to prevent the establishment of sewage conduits and farms in places where they involve danger to the public health. The case of Crickhowell proves that the Board cannot invariably be relied upon in this respect, for it is reported that all the wells in the Clydach Valley are so polluted by sewage percolating through the limestone from the Brynmawr carrier that the inhabitants are rarely free from typhoid. In this instance lack of geological knowledge more than anything else seems to have been the cause of the trouble.

**Scientific Research in the United States.** We referred last week to the important investigation commenced by the United States Government into the properties of building materials. Of course, this represents a very small proportion of the public research work undertaken in America. Lord Mountmorres, who has just returned from that country, is much impressed with the scope of the various departments occupied in different branches of applied science. The bureau of standards is one of the most important establishments, corresponding generally with our National Physical Laboratory, but founded and equipped on a far larger scale. The Department of Agriculture comprises sections dealing with biological chemistry, bacteriology, and other subjects of practical value. Other departments devote attention to botany, soil investigation, forestry, and chemistry, the last having no fewer than twelve separate sections. Altogether there are forty-one scientific departments in connexion with the Government, in addition to the semi-official Smithsonian Institute. It is a great pity that our own Government is too poor to support institutions of similar character.

**Steel Railway Carriages.** A WELCOME sign of coming improvement in railway rolling-stock is given by the decision of the District Railway and the Great Northern and City Railway to make use of steel-bodied carriages on their lines. Vehicles of the kind have been adopted by other companies in the past, but not to any considerable extent. The most striking advantage of the innovation is the additional safety offered to passengers in time of accident. Injuries by splintered woodwork and by the distressing fires which almost always break out after serious accidents will be entirely obviated. At the same time

the companies will derive benefit from the reduction of weight and consequent saving of power.

**Motors and the Roads.** We fear the Royal Commission about to inquire into the working of the Motor Car Acts may not have powers to inquire into the treatment of the roads, yet this subject urgently calls for investigation. In Kent experiments are being made on various sections of the high roads, but some of the material used is far too hard for horses' feet, whilst in other places a soft kind of asphalt is used which not only greatly increases the draught of carriages, but which in the winter, when rain is followed by frost, will simply be converted into skating rinks. The experiments seem conducted with a view to diminishing dust alone without due regard to other considerations, and especially the varying conditions of climate.

**Ayr "Auld Brig."** SEVERAL reports have been received by the Ayr Town Council in response to the invitation mentioned in our recent "Note." Among the reports is one from Mr. Francis Fox, who, while appearing to favour the entire reconstruction of the bridge, expresses the opinion that it could be saved at a moderate cost by grouting the superstructure under pressure, afterwards paying attention to the foundations. The present condition of the bridge is chiefly due to the perishing of the mortar, which has occurred to such an extent that many of the arch stones are merely held in place by friction, some of the stones are damaged, and the interior masonry of the piers is loose in such parts as have been examined. We have no doubt whatever that by the injection of cement grout and by the execution of some minor but important repairs recommended the superstructure could be rendered perfectly safe and in all probability stronger than it was when first built. At the same time it must be borne in mind that the foundations are in a somewhat perilous condition owing to scour of the river bed. Consequently it is necessary that steps should be taken at the earliest possible moment to stop the undermining action and to prevent its recurrence in the future. This presents no difficulty, and the tentative proposals made by Mr. Fox are judicious as well as perfectly feasible.

**Highland Cottages.** THE Scotch in their practical way have certainly found a means by which to cheapen part at any rate of the cost of cottages, though it is singularly unattractive; for every month galvanised iron sheeting is coming more and more into use, and it would seem as though it would in the Highlands soon supersede every other roofing material. It is met with alike in remote glens, in secluded bays, in thriving villages. The low, single-storied, white-walled cottage, with its heavy-looking roof of reeds, has given place to one with the trim and ugly galvanised sheeting. In villages, porches and out-houses of all kinds are covered with this kind of roofing. Where "the laird" is the proprietor the roof is often painted a dark red, and the roofs of new kirks will



sometimes be noted of this same material and colour. Like the motor, which is found all over the Highlands, in the most unexpected places, the new roofing has come to stay, as has the barbed wire fence, which has taken the place of the agreeable timber boundary. In fact, the Highlands are covered with miles of wire fencing.

Marble Hill,  
Twickenham.

SOME repairs, decorations, and other minor works are about to be carried out at the house which, together with the Peel estate of about 67 acres, was acquired two years ago as a river-side park by the London County Council. Marble Hill was originally built for Henrietta Howard, Countess of Suffolk, the "Chloe" of Pope, and Mistress of the Robes to Queen Caroline of Anspach, after designs by, reputedly, the Earl of Burlington and the Earl of Pembroke and Montgomery, King George II. contributing from 10,000*l.* to 12,000*l.* towards the cost. Cobbett's "Memorials of Twickenham" records that Pope laid out the gardens and that Swift stocked the cellar. The house passed to the Countess's brother, Sir John Hobart, afterwards Earl of Buckinghamshire, and subsequently to another royal favourite, Mrs. Fitzherbert, Richard Marquis of Wellesley, General Peel, the famous sportsman, and his widow, Lady Alicia Peel. The house forms an interesting example of the earlier XVIIIth century period; the first-floor rooms are much more lofty than those on the ground and second floors, and Honduras mahogany was largely used in the interior, the floors of some of the rooms and the staircase being made of that wood. The property was offered for sale, but withdrawn after a bid of 52,000*l.*, in June, 1888, when there was some danger that it would share the common fate and suffer the presage of Dean Swift's "Dialogue between Richmond Lodge and Marble Hill." The building operations begun in July, 1901, were, however, averted, and the view from Richmond Hill preserved, at an outlay of 72,000*l.*, towards which several public bodies subscribed.

The Cheap  
Cottages  
Conference.

At the Conference held at Letchworth on Saturday last to consider the subject of cheap cottages, we observe that Alderman Thompson (Chairman of the National Housing Reform Association) admitted that the 150*l.* price attached to many of these cottages was a delusion. Many of the visitors, he said, had put the pertinent question to exhibitors—"Would you repeat this cottage for me at such and such a place for the stated cost?" and that the answer was "No; the figures had been used as illustrations (!) rather than as hard and fast statements of what such a house will cost." This admission exactly confirms what we said at the outset in our first review of the exhibition. The speaker added, however, that they knew that half the houses on the ground had been *bona fide* built there for the stated cost. Building materials, it was stated, are exceedingly cheap in the Letchworth district; that may account for some of the low prices stated; in some other cases, we believe, the builders used materials in stock manu-

factured by themselves, which might well afford an opportunity for using up a surplus of stock for which there was no other demand. But it is obvious that the exhibition has not really produced the desirable cottage residence at 150*l.* which was asked for; nor did we expect that it would. Alderman Thompson, however, we are glad to see, is not one of those featherheaded people who are for making an onslaught on all rural building by-laws as an unnecessary incubus, for the resolution which he moved included the following very moderately-worded recommendation:

"The need for the thorough improvement and development of the building by-laws for each district, in order to render absolutely secure the vital improvements of the past in regard to sanitation and health, whilst giving full opportunity for an encouragement to the adoption of new methods of building, new materials, etc.—wherever these can be shown to be of real value and service to the community."

No one can complain of that.

#### SUN-DIALS FOR A TROPICAL LATITUDE.

A CORRESPONDENT in East Africa writes:—"Would you or any of your readers kindly tell me how to lay out a sun-dial under the following conditions?"

This place is about twelve miles south of the equator, and as the sun passes overhead twice a year it is obvious that the ordinary arrangement of style or gnomon will not apply.

I have looked up the subject in two textbooks, but the systems given in them appear to refer to places outside the tropics of Cancer and Capricorn: within these latitudes entirely different conditions seem to prevail."

As far as his letter shows, the writer does not seem to realise that the gnomon, in whatever latitude, represents the earth's axis, and is parallel to it. If a dial were set up at the north pole, the gnomon would be vertical; if set up at the equator, the gnomon would be horizontal. The difference is not in

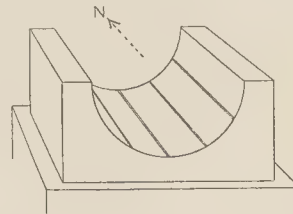


Fig. 1.

principle, but in arranging the plane on which to get the shadow of the gnomon. The setting out of dials in books written in the north naturally proceeds on the assumption that the sun is always to the south of the dial, more or less. The altered condition in the tropics is not only that the sun is much more vertical, but that it will be sometimes north and sometimes south of the dial, therefore a sun-dial on a vertical wall is out of the

question, as there will not be continuous sunlight on it. But a dial with a horizontal table presents no difficulty, always remembering that the gnomon also must be horizontal.

I would suggest that a very simple equatorial dial may be made without any gnomon at all. Take a block of marble or stone, and cut a true semicircle out of it, as shown in perspective in Fig. 1. Place it on a column or stand with the axis of the semicircle due north and south, and rule six lines on it, running north and south, at equal distances of 30 deg. of the semicircle. From sunrise to midday the eastern edge of the semicircle would act as the gnomon. At noon there would be no shadow, and from noon to sunset the western edge of the semicircle would become the gnomon, the shadow showing the hours before noon in one direction, and those after noon in the opposite direction. This is illustrated in Fig. 2, showing

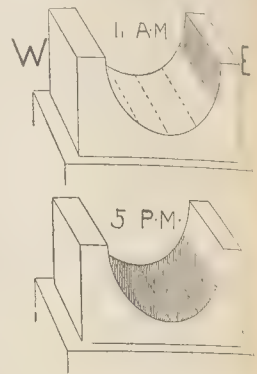


Fig. 2.

the shadow as it would be at 11 a.m. and at 5 p.m. respectively. The elevation of the sun, of course, corresponds to 15 deg. for each hour; but as the gnomon is at the circumference and not at the centre of the semicircle, the travel of the shadow is doubled, and each hour represents 30 deg. on the surface of the semicircular dial table.

The only drawback to this is that as the sun gets nearly vertical the shadow, on the portion of the semicircle which becomes nearly vertical, would rather want sharpening of definition, and the precise moment of noon would be difficult to fix. This latter point could be got over by having a wire stretched north and south along the central axis of the semicircle.

A modified form of this dial, with a horizontal metal gnomon, could be made by having the recording surface more extended laterally and taking the form of a lesser segment of a circle, with a gnomon pointing north and south across the centre and at a level with the rising ends of the segment, as shown in section on Fig. 3. By drawing the dotted semicircle with the section of the gnomon as the centre, dividing this semicircle up into spaces of 15 deg., and producing lines from the centre through these points till they cut the surface of the curved recording table, the hour lines on the latter will be given.

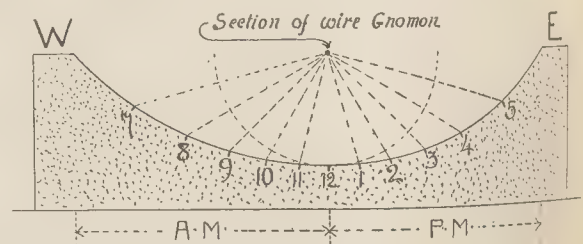


Fig. 3.





an owner of villas belongs to the year 153 B.C., when M. Iunius Brutus is spoken of as possessing estates at Privernum, Tibur, and in the Alban territory.\* The name of Albanum soon became stereotyped as signifying a villa in the Alban district, and from it came the name of the modern Albano. With regard to the villas of the last century of the Republic, very interesting and valuable details are given us in the voluminous correspondence of Cicero. What is known about Cicero's own villas has been well put together by Schmidt in the work I have already cited. He possessed at one time and another no less than seven, and it will be interesting, perhaps, to deal with them one by one. The oldest of his possessions was no doubt the villa near Arpinum, in the valley of the Liris, which, with the estate of which it formed the centre, he inherited from his father and grandfather,† and in which he was born. The site of it must be sought on the delta of the Fibernus, near the church of St. Domenico, which lies on the road between Isola del Liri and Sora, though a good deal nearer to the former (Schmidt, *op. cit.*, p. 9 sqq.). No remains of it are extant, but Schmidt reconstructs it mentally from the interesting description given by Cicero to his brother Quintus, then in camp with Caesar in Gaul, of a visit to his (Quintus's) properties in the same district (*Ep. Ad Quintum Fratrem*, III., 1). The great charm of the villa was the shade and the rich flow of water; streams surrounded the villa on all sides, for it lay between two arms of the Liris. We learn from Cicero's correspondence with Atticus that he constructed a building called *Amalthaeum* after the model of one in Atticus's villa in Epirus—apparently a kind of conservatory or nymphæum, decorated with paintings of trees and foliage—very likely of the same style as the frescoes in the Villa of Livia at Prima Porta. Cicero's next acquisition was a villa at Formia, which he had already owned for some while in 67 B.C. (*Ad Att.* I., 3, 2), and near which he was murdered. Both the villa and the tomb of Cicero are still shown at Formia, but there is no certain basis for the identification in either case.‡

The third of Cicero's villas was his villa at Tusculum, which he bought in 68 B.C. from a certain Vettius; it had previously been in the possession of Sulla and of Q. Lutatius Catulus, the builder of the Porticus Catuli on the Palatine, and of the Tabularium also. The site of it has been sought either close under the city of Tusculum, where there is a large villa, known nowadays as the Villa of Tiberius (Lanciani, *Bull. Com.*, 1884, 174), or a good deal lower down, close to the Abbey of Grottaferrata—or even in the very villa, upon the immense substructions of which this abbey is built. The determinant factor in the controversy is the statement that the villa received water from the Aqua Crabra.§ We know from Frontinus's commentaries on the aqueducts of ancient Rome that the springs of the Aqua Crabra were so placed that they could at will be turned into the aqueduct of the Aqua Iulia, and that this was sometimes fraudulently done—fraudulently because (1) the water was inferior to that of the Iulia; (2) it was supposed to be reserved for the use of the villas at Tusculum. Now the springs of the Aqua Iulia are to be sought close to the Ponte degli Squarciarelli, where the roads from Frascati, Grottaferrata, Marino, and Rocca di Papa meet; and so it seems most probable that the source of the Aqua Crabra is to be found higher up the same

valley. The springs of the Aqua Crabra are still in use for the villas and the town of Frascati, and the water that feeds the stream known as the Marrana Mariana (familiar to those who have explored the aqueducts near Capannelle) is the Aqua Iulia—though in the early Middle Ages the water of the Crabra was also mingled with it.\* It does not seem possible that the water of the Aqua Crabra can ever have been taken up to the hill of Tusculum, for its level is too low, and the identification of the Aqua Crabra with the otherwise unknown Aqua Augusta (for which cf. De Rossi, *Ann. Inst.*, 1873, 170 sqq.; Lanciani, *Op. cit.*, p. 327) is very doubtful, though Schmidt seems slightly inclined towards it.

But there are two other arguments in favour of the older view, that Cicero's villa was to be sought on the hill of Tusculum. One is a passage in a scholiast on Horace, *Epod.* 1, 29:—"Neque ut superni villa candens Tusculi Circeae tangat moenia," upon which the commentary, as cited by Cruiquius, is: "Tusculi superni, hoc est in monte siti, ad cuius latera superiora Cicero suam villam habebat Tusculanum." The statement is, however, rather vague, and the precise meaning of "latera superiora" may be no more than "upper slopes," as distinguished from the plain. The other is the discovery of a brick bearing the stamp M.T.VII in archaic letters in the villa now known as the villa of Tiberius above the villa Rufinella (*C. I. L.*, XV., 2277). But, as Mommsen remarks, at the time of Cicero double consonants were in use, and one would expect to find the cognomen added in the case of a man of senatorial rank; so that, although the brick was apparently found *in situ*, and not lying about loose, the value of this argument also is somewhat doubtful.

Schmidt's return to the older identification must therefore be dismissed (p. 30 sqq.). It is, however, impossible to say which of several villas round Grottaferrata is to be identified with that of Cicero.

At Antium Cicero seems to have possessed a house in the town,† since 60 B.C., at least. He had sold it in 45 to Lepidus,‡ and had (apparently instead of it) bought a villa on the promontory (in Cicero's days probably an island)§ of Astura, 10½ kilometres E. of Nettuno. Here he retired after the death of his daughter, Tullia, in February of 45 B.C., in search of solitude.¶ The place still retains its name, and on the promontory are remains of a large villa, now invaded by the sea, and a solitary tower, in which Conrad of Swabia was confined, inhabited by one or two Customs' officers, who probably have little enough to do.

The remains of the villa are considerable (it was large enough to have a small harbour of its own), and the plan could easily be recovered. If this is the villa of Cicero (as is probable) it has, as we might expect, been reconstructed in later days. In 60 B.C. Cicero also owned a villa at Pompeii, the site of which cannot be certainly fixed (Mau-Kelsey, *Pompeii*, 16), though Schmidt again makes an attempt to do so (p. 53 sqq.). After his return from exile Cicero seems to have acquired, in 56 B.C., a villa at Cumae, now buried under the Monte Nuovo;¶ and, in 45 B.C., he bought a villa at Puteoli, with large and extensive gardens, which had belonged to his friend Cluvius, and out of which he hoped to make cent. per cent. on his capital outlay.\*

It thus appears that Cicero possessed in the latter period of his life no less than seven villas in different parts of the country—all between Rome and Naples, and on the western side of the Apennines—the fact to be borne in mind in connexion with what was said previously with regard to the Roman ideas of beauty in nature.

The only other writer who has left us a really detailed description of his villas is Pliny the younger, who fully describes those which he possessed near Tifernum Tiberinum

(Città di Castello),\* and near Laurentum, in two well-known letters (V. 6, II., 17). His villas on the Lake of Como are only briefly mentioned in his extant correspondence, and no remains of them seem to exist. The first of the two is, however, not completely dealt with. Pliny only speaks of the rooms which served for his personal use—of the dining and sleeping rooms—which were fitted for each time of day and each season of the year. The villa seems to have been built on the south side of a hill, and from the foot upwards in terraces, upon which were gardens and several independent buildings, or groups of rooms, reached by porticoes or *cryptoporticus*,—i.e., galleries above or below ground—the latter being in use for coolness in summer. The whole was arranged with a view to make the best use of the contours of the ground, so that each room might have a cool view. There might be plenty of choice for the different seasons of the year. Winkler (*Jahrbuch des Archäol. Instituts*, 1905, 203 sqq.) gives an imaginary plan of the villa which indicates this well.

The villa on the sea coast, seventeen miles from Rome, and close to the *Vicus Laurentanus* (separated from it by only a small villa) was of quite a different character, being much smaller, and having been built on a property attached to it. It was, however, in plan, more regular and more like a town house, and, as it lay on the flat seaboard, the site offered no difficulties. An *atrium* formed the entrance-hall, and with a semi-circular court, followed by a *peristyle* or *peristyle*, and a *trichinium* (the last projecting on to the sea, of which it commanded a view on three sides), formed the main axis of the house, which must have faced south-west on to the sea, the coast running straight for miles hereabouts, from the mouth of the Tiber to Anzio. To the south-east of the *trichinium* was a group of small rooms reserved for Pliny's own use; the rest of this wing seems to have served for his servants, and in part also for guests, while on the north-west were two fine rooms, behind which, on the north-west side of the *peristyle*, lay the bath and its *apodyterium*, and beyond it a view-tower.

Behind the main building, and different, oriented from it, lay a smaller building, divided into two parts connected by a *cryptoporticus*, on each side of which was a garden, and also provided with a view-tower.

We may now, in the light of the evidence afforded by our literary sources, proceed to examine the remains of villas which are at present extant.

Two kinds of villas were distinguished by the Romans—the *villa rustica*, or farm-house, and the *villa pseudo-urbana*, or country seat. It cannot be perhaps truly said "that examples of the former type are extremely rare,"† except in the sense that those which must undoubtedly exist have not been properly observed or planned, especially in the Campagna Romana—where, indeed, there are not so very many buildings (proportionately speaking) that are susceptible of being stand of being accurately planned (with the single exception of water reservoirs which are of exceptional solidity of construction), though with excavation it would often be extremely easy (see also below, p. 320). For this reason the *villa rustica* extant in 1895-4 near Boscoreale is of very great importance, as its plan is perfect and its internal arrangements could be certainly determined. A full description is given in Mau-Kelsey, *Op. cit.*, pp. 361 sqq., and pl. 4. There was a wide entrance for carts into a central courtyard, with a colonnade round three sides of it. The most important room of the house was the kitchen, with the hearth in the middle, which had, of course, an opening in the roof over it to give exit to the smoke (B' on plan). And here we see the *atrium* in its original form, for "atrium" simply means "black room," from the natural accumulation of soot. But in the town houses it was modified; the hearth was taken away and transferred to the kitchen, though the *atrium* remained the principal room in the house, and the opening in the roof remained as a light hole (for cases where

\* Cicero, *Pro. Cluent.*, 51, 121. Cf., *De Oratore*, II., 65, 224.

† His father had enlarged it, as we learn from *De Leg.*, II., 3: "Hanc vides villam, ut nunc quidem est, laetius edificatam patris nostri studio sed hoc ipso in loco, cum avos viveret et antiquo more parva esset villa, ut illa Curiana in Sabinis, me scito esse natum."

‡ Cicero says (*Ad Att.*, II., 14, 2) that C. Arrius was his next neighbour, and the inscription, *C. I. L.*, X., 6201, if its original position were known, might help in the search for Cicero's villa, as it is in honour of a certain Arrius Salenus, who may have been a descendant of Cicero's friend. But the inscription was, when first known, built into the wall of the garden opposite the villa Rubino (the traditional villa of Cicero), and whence it came is not to be ascertained.

§ *De leg. agr.*, III., 9.

¶ *De aquis*, I., 9.

\* Lanciani, in *Atti dei Lincol.*, ser. III., vol. IV., pp. 321 sqq. Cf., De Rossi, *Ann. Inst.*, 1873, 208 sqq.

† *Ad Att.*, IV., 8a, 1.

‡ *Ad Att.*, XIII., 47b, 1.

§ *Nibby Analist*, I., 269.

¶ *Ad Att.*, XII., 47 (40), 3.

\* Beloch, *Campanien*, 175; Schmidt, *Op. cit.*, 44.

\*\* *Ad Att.*, XIV., 11, 2; Schmidt, p. 50 sqq.

\* *Ep. vi.*, I., 4.

† Mau-Kelsey, *Op. cit.*, p. 37.



was completely covered by a roof (very rare). This had not been its original use; at first it had been merely a place to let out the smoke, light being obtained from windows in the *alae* (wings), two peristyles in the side of the atrium. But in the houses, where light could not be obtained from the sides, the *alae* lost their original use, and were a mere survival. The *alae* became larger, and below it was placed a basin, the *impluvium*, to take the water which it admitted.

In the Boscoreale villa we find grouped round the courtyard, on the north (besides the kitchen), the bath, sleeping-rooms, and the smaller rooms, including a bakery and a room in the north-east corner, which could be approached through the kitchen. On the east was a room with two wine-presses, and on the south a courtyard full of earthenware jars (large dolia) for the fermentation of wine, and rooms containing an oil-press, a olive-crusher, and a handmill; besides small sleeping-rooms—for slaves perhaps—the proprietor living probably in the west story, and having his bath on the

same villa have been found in the same point, but in the Roman Campagna we find no record of them, though it is probable that many of the smaller buildings of which remains are still to be seen, belong to this class. Not by any means all the remains of villas in this district display wealth of marble decoration, and some seem to have a simple plan, and show signs of a comparatively early date, such as construction in masonry of large rectangular blocks of stone. Press beds of oil-presses and remains of handmills are often found among them, but the exploration of such buildings has never been properly undertaken.

The Lugari excavations, at the fourth mile from the Via Appia, furnish an exception, but even the main building was a villa of the more luxurious kind (see below), the farm buildings being smaller. There is, however, another villa much older than this, belonging to the 1st century A.D., which has been completely excavated, the plan of which, when recovered in its entirety, is most instructive.

Wassfeld remarks (*Jahrb.*, 1891, 201), "Cicero gives us surprisingly little information as to the arrangements of Roman country houses of the more luxurious sort, but mentioning them briefly (VI. 8) in connection with the variations from the type of the town house which should be introduced—into the country, he says, should not be near the entrance as in a town house, but first should be a peristyle, and then the atrium, with porticoes around it with a view on to the palaestra and the garden walks. To such a building was merely a town house removed to the country, with the advantage of the absence of neighbouring buildings belonging to other owners. We have, as a fact, as far as we can tell, a regular plan, this depending on the personal taste of the owner and his architectural peculiarities of the site selected, this very clearly in the villa of Boscoreale, where the buildings are most symmetrically disposed, and the grouping of rooms round a peristyle seems to be carefully avoided (I.B., p. 202).

It is, it is true, owing to its exceptional character an extreme case, and, as a rule, the site permits of it, a peristyle, or of peristyles, forms the core of a

addition in larger villas, and in the imperial villas, was the stadium. It is in Hadrian's villa, near Tivoli, that we find (very likely another of Hadrian's villas, certainly dating in the main from the time of the Quintilii, and of the Gordiani at Tor dei Schiavi, and so forth. There is also a rather smaller villa in the large villa, the remains of which have been laid bare by the Lugari excavations beyond the fort on the Via Appia. Of this villa, as it has been completely excavated, and is easily accessible, it may be well to speak for a moment. (*Not. Scav.*, 1887, 277).

from the Via Appia by the

to S. Urbano, which was planted upon it. The road leads straight up to the vestibule, which has not the form of an atrium, but is just an ordinary room, on the south-east side of the peristyle, which forms the centre of the house; on the right are the baths and living rooms; on the left the entrance to the stadium; and on the opposite side of the peristyle to the entrance are other rooms, one of which contains several dolia *in situ*, and must have served as a store-room.

So far, villas on the plain have mainly been dealt with; but we also have to discuss those which are built upon hillsides or hilltops, and therefore upon artificial terraces, and have not, consequently, so much room for the development of their plan from back to front, though their lateral extension is more elastic. These are to be found more especially in the Alban Hills and at Tivoli. Here we sometimes find the peristyle more or less suppressed: the successive long, narrow terraces rising one above the other have detached buildings upon them, but were mainly intended for gardens, the palace generally occupying the highest terrace of all, and often having but one frontage of any importance. The so-called villa of Ventidius Bassus, at Tivoli, has three such terraces, nearly 200 paces long, but with a combined width of only 150 paces fronting west. At the north-west corner is thrown out a distinct rectangular building, at quite a different orientation, rising on arched substructures to a considerable height, which, no doubt, served for the enjoyment of the view.\*

Rather a different type is represented by the villa of Quintilius Varus, where the site is not a steep hillside, but the top of a projecting mountain spur, and there is more than one available frontage. Here, by means of large substructures supported by arches, in which are enclosed *cryptoporchus*, a very large rectangular area, some 200 yds. by 70 yds., has been secured, upon which, no doubt, the main palace stood. Upon the lower terraces were gardens with fountain basins, statues, and so forth.† But villas of these two kinds, which are very common in the hill country, are not often preserved to such an extent that their plan can be determined—or, perhaps, one should say that they have never been systematically examined with that object.

Considering the number of villas of which remains are to be seen in the neighbourhood of Rome, it is quite astounding that so little should be known about their internal arrangements. Most of the larger ones have been ransacked in the search for works of art. The work was carried on with especial activity in the latter half of the XVIIIth century—very largely by Englishmen and Scotchmen, the Scottish painter, Gavin Hamilton, being the most successful of all the treasure seekers. But, while the museums of Europe have been enriched by the results of their excavations, the scientific spirit was entirely absent.

We have at most scanty information as to the sites on which their discoveries were made and lists of the statues found in each case, but there are not, as a rule, details of the less important objects found, and in no case, I think, have we a plan of the buildings among which they worked. The case has been the same in more recent times—so much so that a German archaeologist, in an attempt to illustrate a group of Pompeian landscapes by the actual remains of the country houses they represented, could only point to two examples of Roman villas in the neighbourhood of Rome itself of which the plan was accurately known—the villa of Hadrian near Tivoli, and the villa of Voconius Pollio, the former of which is far too large to be considered as typical of its class, while the remains of the latter have been almost entirely obliterated by cultivation during the last few years.‡ There are one or two other cases besides those he

\* See *Papers of the British School at Rome*, III. (in the Press).

† The site of the villa of Voconius Pollio, excavated in 1884, presents somewhat similar characteristics. The plan of the original part of the villa was recovered. It is interesting, and rather more in conformity with that of the town house than usual. We can recognise all the parts of the regular plan. On the right, however, was later added a parallel wing, almost entirely occupied by baths and servants' rooms and store-rooms. (*Bull. Com.*, 1884, 141 sqq.)

‡ *Jahrbuch des Instituts*, 1904, 3.

mentions; both the villa of the Quintilii, on the Via Appia, and the villa known as Settebasi, on the Via Latina, have been planned by Canina in his *Edificii*, but his drawings are reproduced upon a very small scale, and are not up to modern standards of accuracy; they contain, besides, a certain amount of conjectural restoration.

As I pointed out in the *Classical Review* for February of the present year, the rapid spread of cultivation offers an opportunity to the Italian Department of Antiquities, of which it has so far not availed itself. It would be comparatively easy, when a piece of pasture or waste land is being converted into corn land, garden, or vineyard, to so direct or supervise the operations of agriculture that the plan, at any rate, of the buildings discovered might be recovered. The transformation once completed, the cost of excavation becomes prohibitive—if, indeed, the buildings have not entirely perished in the process, as is too often the case, without any protest coming from or even any notice being taken by the responsible authorities. It is true that it is the cultivator's business to give them notice of any discoveries he may make; but it is by no means to his interest to do so, as the authorities themselves acknowledge.

The destruction is probably greater in the low-lying districts than in the hills, though here the flat surfaces presented by the immense terraces upon which the villas stood have served for centuries for the vine, corn, or olive growers' use, and the buildings which stood upon them have probably been in large measure obliterated, though the massive retaining walls still resist the ravages of time. They are most picturesque objects in themselves, and are very interesting to the student of Roman construction.

In the district of Tivoli especially he may observe many examples of the survival of polygonal or Cyclopean masonry in the platforms of villas. The idea that such work is of necessity prehistoric is now being given up; attempts to date it according to its roughness of style or the reverse are met with the rejoinder that at Norba careful examination of the city walls has disclosed the fact that the parts best constructed are precisely those which are indispensable for defensive purposes, while excavation has revealed the existence of undoubtedly Roman objects beneath the foundations (*Not. Scav.*, 1901, 548 sqq.; 1903, 259).

Again, at Circei the style of the inner and outer side of the same piece of wall varies infinitely.\* Further, a great deal of such work is found in Roman high roads, and when finally we get it (it is true, in rather a perfect form), as at Grotte Torri, in the Sabine territory, not far from Cures, where, in the platform of a very large villa, some 90 yds. square, it serves on one side as the outer facing of a 4-ft. wall, on the inner side of which (faced with *opus incertum*) is a *cryptoporchus*, the wall being pierced by windows to light the gallery, we are compelled to admit its persistence into Roman times.†

The origin of the style seems to depend on the material at hand and the skill of those who had to work it.‡

The first man who built a wall undoubtedly heaped up loosely the first stones that he came to. After a little experience, he discovered that by a little careful fitting he could get the base of the wall to take less room and the wall itself to stand more easily, especially if it were standing free and not merely a terrace wall.

Then he would begin to smooth the inner edges to secure closer contact, and if the wall was for defensive purposes the outer also, so that it might be less easily scaled. If the material he had to use was hard, he would not attempt to square the blocks, but would leave them polygonal, or roughly rectangular, if (as often) the stratification led to their fracturing in that way. If, on the other hand, it were softer or more tractable, he would find that it was easier and better to use rectangular blocks; for even in the walls of Circei, which are of well-built polygonal work, it is necessary in

\* *Mémoires de l'Ecole Française*, 1905 (an article by the present writer now in the Press).

† *Papers of the British School at Rome*, III.

‡ *Darm.*, *Baukunst der Etrusker und Römer*, 15, but cf. Noack, *Röm. Myth.*, 1891, 183.



order to give them stability that the thickness should decrease considerably from base to top, whereas with walls of rectangular blocks this disadvantage does not occur.

But for terrace walls "Cyclopean" work might (and did) persist—as frequently in the Tivoli district (in limestone) and in a few isolated cases in the Alban Hills (in selce)—where tufa and peperino are plentiful, and where therefore we generally get concrete with a facing of *Opus reticulatum* or *incertum*—and a great many round Terracina, Fondi, and Formia (in limestone). And it is still in use for terraces for cultivation in many lands—I have even seen it used by Swiss railway engineers as recently as last year. It seems somewhat far-fetched to trace such a natural development to foreign influence, and its native character may be indicated by the fact of its late persistence. It is probable, further, that from it, by the stones gradually becoming smaller, *Opus incertum* was developed, and by their regularisation *Opus reticulatum*—a style of facing which must have been so troublesome and laborious that one is otherwise rather at a loss to explain it.\*

A few words, in conclusion, as to the main groups of villas round Rome. We find them in the lower Campagna on all sides of the city, but especially in the direction of Tivoli, Palestrina, and the Alban Hills—and more than ever along the Via Appia; and then there are the hill groups themselves.

The character of the different groups has already been illustrated. At Tivoli we find more frequently (not exclusively) terraces on steep hill-sides facing on to the Campagna, protected thus at the back from cold winds and commanding fine views; in the Alban Hills, where the outlines are more rounded, we find great platforms occupying hill-tops or gentler slopes. For some reason, antiquarian interest began earlier in the Tivoli district, and ever since the XVIth century nearly every villa has had its traditional name. An exhaustive examination has shown that in not more than two or three cases is such a name trustworthy or even probably accurate; it generally rests upon a misinterpretation of some passage in a classical author, or the distortion or misapplication of a local name, or reliance upon an inscription which is either a forgery or, if genuine, affords no evidence as to the name of the proprietor of the villa in or near which it was found. The testimony of inscriptions on water-pipes is of the greatest value, but very few of them have been discovered in the Tivoli district, whereas in the Alban Hills (where traditional nomenclature had not sprung up to such an extent) they are of great service.

A reference must be made to the water supply of these villas. It was the object of the greatest care; if one of the great aqueducts could not be tapped, a private aqueduct would be constructed, or, failing the presence of springs, huge rain-water tanks would be built. The reservoirs are among the most conspicuous remains in the Campagna.

Owing to their great solidity, they resist far better than other remains the wear and tear of time. Where a regular supply was available, they are, as a rule, closed chambers, of varying size, the larger being, as a rule, in part or entirely subterranean. One of the latter, which I discovered some years ago on the northern slopes of the Alban Hills—a wild fig-tree in the middle of an open down, which proved to be growing out of a hole in the roof, led me to the spot—has eight arches in one direction and five in the other, each with a span of 10 ft., supported by pillars  $3\frac{1}{2}$  ft. square.

Another, further up among the hills, consists of two chambers, each 137 English ft. in length by 11 ft. in width and 164 ft. in height, and divided by a partition wall 3 ft. thick, which is pierced by eleven arches, each 74 ft. in height and span (*Papers, cit., i., 253, n. 1*).

\*On the other hand, it must be recognised that in certain cases (such as the city walls of Fondi) there is an intentional avoidance of horizontal and vertical joints, and a striving after polygonal work. It is for this class of structures that the term "polygonal" should be reserved, "Cyclopean" being applied to the rest. I have discussed the question more fully in *Mélanges, cit.* Round Tivoli, again, there are cases in which it is obvious, from the careful rustication of the blocks, that the Cyclopean style has been intentionally kept up (*Papers, i., 150*).

The smaller reservoirs, on the other hand are often above ground—sometimes raised upon lofty substructures, so as to give a higher pressure to the water. They are sometimes single, sometimes divided into two or three chambers, which, when without intercommunication, may be conjectured to have served for the supply of different proprietors.

Where rain-water had to be relied upon, on the other hand, open reservoirs, often circular in shape, were in frequent use. Many specimens of them may be met with in the neighbourhood of Montecelio and S. Angelo—the two small villages which, clustering upon their conical hills, form a prominent feature in the landscape to the north-west of Tivoli. One which I have planned is in the form, not of a true ellipse, but of a rectangle with apsidal ends; its extreme length is 109 ft., its extreme width  $5\frac{1}{2}$  ft., and its depth about 9 ft.

Both classes of reservoirs are lined with *Opus signinum*, a kind of cement of special strength in which small fragments of brick are freely used, and the angles are almost invariably filled with a quarter-round beading of the same material. The floors are, as a rule, of considerable thickness (1 ft. or more), and often have a layer of herring-bone brickwork below them.

These notes may, I hope, be some slight assistance in the mental reconstruction of the Campagna as it was. Professor Lanciani has drawn a picture of this huge garden all round the city in Chapter X. of his *Ancient Rome*. Until lately desolation reigned supreme over the Roman Campagna, but now cultivation is spreading fast, safeguards against the malaria of summer have been successfully adopted, and perhaps the new law of the Bonifica,\* if operative, may restore it to its pristine condition. If this is to be so, now is the archaeologist's last opportunity. Cultivation is to be welcomed on every ground, except that it leads to simultaneous discovery and destruction, and restricts the field of free and unquestioned ramblings.

THOMAS ASHBY, JUN.

#### THE MITCHELL LIBRARY COMPETITION, GLASGOW.

BEFORE the beneficence of Mr. Carnegie induced Glasgow to adopt the Libraries Act, her chief collection was one that had as a nucleus the books left by a citizen, Mr. Mitchell. It has been, and will remain, a reference library, and now grown till it consists of some 80,000 volumes, and housed in transformed premises that are insufficient, the proposed removal westwards to a site adjoining the St. Andrew's Halls—municipal property—has been the occasion of a recent competition. The plans were sent in in March, the decision was made in July, only now are they exhibited; but the delay is about the only ground of complaint in a well-organised competition. The drawings asked were few, of a fixed size of sheet—and that a small one: perspectives were prohibited. The assessors appointed were Mr. McDonald, the City Engineer, and Mr. John Keppie, F.R.I.B.A., President of the Glasgow Institute of Architects, who prepared and issued the conditions timeously, and, further, sent out full replies to the particularly long list of queries addressed to them. Seventy-six sets were sent in, and a local architect has won, and had the work given him to do.

The site is almost a rectangle, about 192 ft. by 106 ft., open on all sides, with frontages to three streets; the fourth face is towards St. Andrew's Halls, some 50 ft. away, and this space will be available for future extension; but competitors, rather strangely, were not asked to show how this was to be utilised. The site is fairly level, falling some 4 ft. from the north-east corner. The main requirements were:—A reading-room, with a floor area of 5,400 sq. ft., to hold 300 readers of books; students' and ladies' rooms for fifty readers in each, all on ground floor, to be served from 100 ft. length of counter space; and a book stack holding 30,000 volumes in ordinary use; storage for an additional 300,000 being found above and below. On an upper floor the magazine-

\*This is a measure recently passed, intended to bring about the substitution of cultivation for pasturage in the immediate neighbourhood of Rome. It offers advantages to those proprietors who adopt its provisions, and proposes to apply compulsion to those who refuse.

room, to hold 200, with an area of 5,000 ft., and the Jeffrey collection of books requiring also 3,000 ft. Smaller rooms were required for Glasgow and Burns collections.

The conditions gave 40,000, as a reasonable cost. The entrance was asked for near the north-east corner, a rather unfortunate position, as it is now proved that a central entrance in the east front is a better place. At the same time the competitors offered as suggestions only, and were invited to present their own.

The types of arrangement illustrated are (1) the reading-room placed centrally, the entrance then may be on the axis of the facade; (2) the reading-room to the rear front with a high ceiling, or (3) with apartments overhead; (4) reading-room placed along the narrower front, north or south. In nearly all these cases, the book stack is toward the back (west face), but in a fewceptions it is to the front for one or two floors. The selected first floor plan shows each a central reading-room, and a main entrance of two is placed in the centre of the east frontage, and one, obviously to meet the promoters' suggestion, places it to one side to the detriment both of entrance and appearance.

The accepted design is by Mr. Wm. B. Whittie; it has this side entrance, in the centre is a staircase, and the positions might with advantage be transposed. The reading-room is entered at one side, but a screen is now wanting that would at once protect the readers from the traffic and ensure that on leaving, the counter would be passed to hand in books. Access to students' and ladies' rooms is direct, but they, too, may be left without passing their counters. The book stack arrangement is compact, but the circular iron stairs are objectionable. In the basement, rather oddly, the part of the area taken for books is the centre rather than round the fronts, where better light would be had. This basement floor averages about 5 ft. below the pavement, favourably comparing with others needlessly excavated.

On the first floor the Jeffrey collection and magazine-room balance each other, and, as with all the plans that adopt a large central hall for reading-room, the larger cubical contents given the book reader there contrasts with that allowed the magazine reader. The variation from true rectangularity of the site is carried into the reading-room, and where the coved roof rises the triangle would be manifest. It is hardly conceivable that the architect seriously proposes to build it as shown, especially when the inequalities could be thrown into the corridors for staff service adjoining. The elevations to the two shorter fronts are alike, and of dignified Renaissance treatment; an upper order of three corner columns, containing two stories of square windows, over a rusticated basement; cornice and balustrade give an unbroken skyline without tower or extraneous feature. The facade to the longer face is unsatisfactory from the number and irregularity of the window openings. No doubt the reading-room for quietness' sake is kept away from the outer wall it is not easy to suggest its presence, but this in other designs has been done, and certainly expression in the elevation could have been given to the rooms next in importance, the Jeffrey and magazine departments; their presence is not suggested, and the three fronts might as well suit a block of offices. It is a great pity the adjudicators have had so gross a conception of their opportunity. Their judgment is in accordance with the programme of the competition, and the result will be a comfortable and suitable building, but entirely lacking in distinction or architectural interest either to the visitor or to the passer-by. The cost as revised slightly over the stipulated sum.

The first premium of 100l. is gained by Mr. John Arthur, also a local architect. Access to the Glasgow and the Burns' collections is only through the central reading-room. The entrance is placed to the side, as suggested, but it is hardly important enough. The book stack is shown enclosed, and so is the staircase, with some service stairs, both good features. The basement area is very largely made up of for book storage; there, too, are located the staff work and mess rooms. The dining-room in comparison with the

room is small. The elevations of this design are better than of the accepted one, especially the front; the style is Renaissance of a freer and lighter character than Mr. Rhind's.

The second premium of 75*l.* is awarded to Mr. R. K. Greenslade, of London. This set is perhaps the most beautiful plan in the collection. A fine central reading-room is separated from the street by a shallow vestibule; the entrance is on the axis of the main front, and enclosed passages on each side of reading-room lead to the counter and to the students' rooms without any crossing. Filled, unbound periodicals that were stored on ground floor are placed in the basement, but any inconvenience is much more than compensated for by other excellences. It is most unfortunate that the elevations are unfinished, the longitudinal little more than begun; but in the cross view sufficient indication is given of refined and careful design. The elevations are not very well presented; lead-lines in window must stand for metal grilles, and only confirm it is a pity that the author has not time his conception justice in its delineation and this for lay critics puts it at a disadvantage; but architects' assessors should be able to appreciate its merits, and these quite entitle it to first place among the submitted sets, if not of all those submitted.

The third premium of 50*l.* is awarded to Mr. J. R. Rhind, who in recent competitions has won some half-dozen of the small district prizes. The utilitarian necessities have been better met than by the first two, but the architectural treatment within is pinched and commonplace; externally two towers are a concession to esthetic claims. The doorway is in the centre, with staircases on either hand to magazine-room and to Jeffrey collection; side passages give access to the counter and to students' and ladies' rooms, but there is still a little crossing, and these last have no privacy that is desirable. On paper the surveillance by the counter attendants over readers appears more effective than it would be in reality. This notion of surveillance

seem to have given it an exaggerated value, for plans otherwise excellent are set aside because of columns or wall screening readers. Even if past or anticipated delinquencies justified a detective-like oversight, observation from the counter at the far end of a large room is quite ineffectual to prevent a book's maltreatment. The cost of Mr. Rhind's design is put at 48,000*l.*

If the unfinished state of Mr. Greenslade's drawings rendered it ineligible for first place, then No. 63 or No. 33 (Messrs. Thomson & Sandilands')—only some of the sets have names affixed—might fairly take the position. The former has the ground floor occupied with public-rooms, so subordinate parts suffer, and it is a blemish that two streams traverse the great reading-room to reach the counter; all the same, it is a monumental plan. The elevations are expressive and imposing, rather florid on the sides perhaps, and four cupolas seem excessive. No. 33 has a fine central domed reading-room, with side passages; access and exits there and in students' and ladies' rooms are particularly good, without any crossings, and readers must pass counters when leaving. By contrast the magazine-room suffers, because of apartments over; it is low in ceiling and only side lit. The main elevation to the east front is good, and though a vestibule interposes, the central hall behind is well expressed in the façade, but the side elevations are inferior. No. 60 is an excellent plan, with side counters to the reading-room that suits the public convenience, if it causes more walking for the attendants. No. 15 has counters for the passing in of books after use, an arrangement that has much to commend it, and as here employed ensures good surveillance; the elevations are very simple and restrained. Several designs that have the entrance to one side emphasise it by a tower, thus No. 2 and No. 13; the former has a well-considered plan and effective composition. Not a few of the reading-rooms have but 25-ft. high ceilings, with an apartment overhead; this occasions considerable staircase travel, but the disparity in bulk between the rooms for

books and for magazines noticeable in other arrangements is obviated. Of this type No. 19 is a good example; the upper wall is recessed, with architectural advantage, but it occasions pillars to support it in the reading-room, and so incurs the prejudice of the assessors. No. 23, on similar lines, has a couple of small towers that very happily tell in the design.

Designs with domes are—No. 3, where it overpowers; No. 1, where it competes with Corinthian porticoes themselves sufficient to magnitude and richness. No. 9 is of moderate size, part of a design that is one of the best and finely illustrated; the scale drawing, however, is superfluous, while the back elevation is good, but needlessly expensive for its position.

No. 10 is the most grandiose of all; a fine design, but quite beyond the expenditure proposed. Half a dozen or so adopt a Greek treatment, carrying out the lines of the adjoining hall, that is also the property of the town; but all the others, with three exceptions, are studies in Roman classic or Renaissance—there is not one example of "new art." The exceptions are No. 71, in Romanesque manner; No. 66, a picturesque treatment of late Gothic; and No. 48, apparently by the same hand, has a touch of Byzantine feeling, both clever, but hardly serious enough.

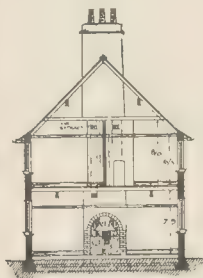
# PRIZE COTTAGE: CHEAP COTTAGES EXHIBITION.

THE illustration shows the house, No. 14 in the catalogue, to which the prize of 100*l.* has been awarded in Class I., for 150*l.* cottages. It is one of the best exhibits, both in a practical and picturesque sense; and the jurors say "We have satisfied ourselves that it has been built for 150*l.*" Has been, perhaps; but will it be elsewhere? This is what we said of it in reviewing the exhibition:

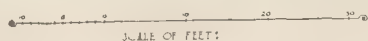
"Messrs. Green Brothers exhibit a cottage (14) designed by Mr. Houlton, of Chesterfield, which has a great deal to recommend it. The walls are of



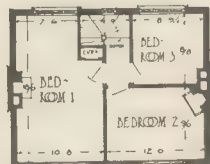
GARDEN.



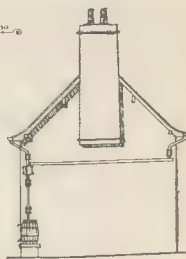
SECTION A-D.



SCALE OF FEET:



BEDROOM PLAN:



END ELEVATION:

COMPETITION 150 COTTAGE:  
PLAN OF COTTAGE ERRECTED AT LETCHWORTH  
FOR THE EXHIBITION BY MESSRS GREEN BROS &  
WHITTINGTON NEAR CHESTERFIELD PERCY B. HOULTON  
ARCHT. CHESTERFIELD



9-in. brickwork, covered by white cement rough-cast, with green-painted woodwork; the interior fittings are simple and solid (the circular window on the staircase ought to be made to open), and the whole in good taste. This is stated to have been built here for 150l.; but then comes the note "can be duplicated" (built somewhere else) "for 175l.; including profit, architects' fees, and men's travelling expenses"; so that this cannot be regarded as a 150l. cottage.

However, it is a highly creditable exhibit, and we are glad to congratulate the architect concerned on his success.

#### THE JOINT COMMITTEE ON WATER REGULATIONS.

THE Joint Committee on Water Regulations, which comprises representatives of the majority of the chief water undertakings of the kingdom, the Royal Institute of British Architects, the British Association of Waterworks Engineers, and the Plumbers' Company, met recently at the Guildhall, London, to consider the Report of the Sub-Committee appointed to deal with the codification of the existing water regulations and the preparation of a Draft Code of Model Regulations, with schedules of details of fittings, materials, and workmanship, prepared by separate sub-committees, designed to secure more uniform regulations and prevent the present avoidable waste of water.

Dr. Robert Crawford (Glasgow) presided, and among those present were Mr. Searles Wood, representing the Royal Institute of British Architects, and Mr. Charles Hudson, representing the Plumbers' Company.

The Report, in reviewing the general position of the public administration of the supply of water for domestic and trade purposes, called attention to an analysis of the practice of fifty-four of the principal water undertakings of the United Kingdom, supplying an aggregate population of upwards of twenty millions, showing that the regulations drawn under the various enactments when seen together presented almost endless variety and absence of plan, causing grave inconveniences to consumers. It was pointed out that the information furnished for the use of the Committee also showed extreme variations in the rate of consumption of water in different places and estimates of preventable waste amounting to upwards of one-third of the whole supply.

It was stated that at an early stage of the Committee's deliberations a general meeting of manufacturers of water fittings of the kingdom was called, whereat the advantages of standardisation, from the manufacturers' point of view, were considered, and representatives of the principal firms were elected to assist the Committee in the discussion of technical details. The value of standardisation was recognised by the Committee, not only for its bearing on economy in the cost of manufacture and efficiency of working, but on account of the convenience of uniformity to consumers. With that object the Committee had standardised the simpler types of fittings in common use which were found to cause the principal waste of water and inconvenience to consumers, and recommended that the standardisation of other fittings should be dealt with by a permanent Standards Committee, which might by its investigations and reports exercise a useful influence upon the practical development and improvement of water fittings. It was pointed out that much waste and inconvenience was caused by incompetent men being employed, and there was a want of a recognised standard of qualification for plumbers and for the quality of their work in connexion with water supply.

Alderman Gainsford (Sheffield), in moving the adoption of the Report, said that the Local Government Board's model set of regulations were antiquated, so that various local authorities and water companies were not able to look to them for guidance. Consequently, those authorities and companies were forced to draw up their own regulations, with the result that they took a certain form in one place and quite a different form in another. It was hoped that the Committee's draft code would be adopted by the Local Government Board, in which case they would have provided the company with a model set of regulations suitable for present-day requirements. Of course, it would always be open to different authorities to make small modifications needed for local purposes.

Mr. Searles Wood (Royal Institute of British Architects) seconded the motion, and said that architects welcomed the opportunity of taking a part in the framing of regulations more equitable to the consumer and more efficient from the point of view of the water authorities.

The Report was adopted, and a draft model code of regulations to be observed by consumers, with schedules of technical details for the guidance of plumbers and others carrying out work was approved, and it was resolved to submit it to the Local Government Board with a request that the Board would consider it with a view to its general adoption.

Committees were appointed for the further standardisation of fittings and materials used in the distribution of water, and for the publications of the reports and findings of the Committee, finance, and general purposes.

### Fifty Years Ago.

#### SUGGESTIONS FOR LONDON.

I TAKE the liberty of offering to your notice a few suggestions.

I would propose first, a scheme which might be called "A Small Public Thoroughfare and Minor Improvement Scheme," for the purpose of relieving the principal streets of much of the traffic which is continually blocking them up, by simply converting many of the existing courts and alleys into small streets or thoroughfares. We want small outlets to take away the light traffic, such as cabs, carts, etc. For example, Ludgate-hill would be eased a good deal by throwing open the Broadway, Water-lane, Little Bridge-street, etc. Drury-lane and Covent-garden theatres would also be materially benefited by converting what is now called Vinegar-yard and Marquis-court into a small street, which could be done by merely pulling down a few houses.

Again, there are many good streets existing which are quite disfigured, because a few houses are suffered to remain projecting a great way before the adjoining ones, such as St. John-street, Smithfield, Cursitor-street, Hanway-street, Rathbone-place, Sutton-street, Great Wild-street, and many others all over London.

While discussing the desirability of throwing back houses, I wish to ask whether the Act which compels all shops in the leading streets to be thrown back, does not apply equally to streets of every kind? There are many streets, particularly in the outskirts, built as private houses, with two or three feet of ground in front (in some cases called a

garden), afterwards converted into shops, and the shops built right over the front bit of ground, instead of being carried back with the brickwork (the

such neighbourhoods very much improved. All these evils might be remedied by a general inspection of London, without any surveying, and if undertaken by the Metropolitan Improvement Committee, and nuisances as Middle-row, Holborn, and longer remain.

I think, likewise, the backs of houses to come under a general inspection, and persons should not be allowed to choke up every bit of ground they have with workshops, etc. In my opinion, every house should have a space of ground equal to its own front area unbuild upon, and every block of buildings should have a right of way or footpath carried through a back lane.

Under the head of dirty property, I would advise a general clearance of all back streets such as the purlieus of Gray's Inn-lane, etc., allowing but a bare compensation for the same, and the tenants of such narrow streets should go to the outskirts of London for a lodging.

I will now propose a scheme (a novel in its way) which, if carried out, would be a great boon to a large portion of the public who seem to be forgotten altogether, I mean the children, and that is nothing more nor less than the establishment all over London of small public playgrounds. An excellent opportunity offers itself in the closing of all metropolitan graveyards, and some of these might be fitted up with every kind of gymnastics suitable for both boys and girls. I am sure it would be hailed with joy by a large portion of the inhabitants of London, if street music of every kind were restricted to these playgrounds.

A. B. C.  
—The Builder, September 22, 1885.

### Illustrations.

#### HOUSE NEAR DUBLIN.



HIS house is being erected at Poyrock, near Dublin, for Sir Horace Plunkett, from the designs of Mr. W. D. Caroe.

The materials are local granite and rough cast, with oak windows, and the roof will be covered with Freestone slates. The builder is Mr. Kiernan, of Dublin.

The drawing of the garden front was exhibited at the Royal Academy. In consequence of Mr. Caroe's absence abroad we are unable to give fuller particulars of the work.



House near Dublin. Plans.



SKETCHING AND DETAILS FROM  
HOUSE IN CLIFFORD'S INN.

These illustrations of woodwork formerly in the house which was No. 3, Clifford's Inn, are from a set of drawings made by Mr. Barbour, which form a complete illustration of a very fine piece of XVth-century panelling. The sheets showing the remainder of the details will be given in our next issue. The following is Mr. Barbour's comment on the work:—

"The room from which the panelling was originally taken was situated in the south-east corner of Clifford's Inn, and formerly known as No. 3. There is no record giving the exact date of the panelling, but it is stated that it was erected when the chamber was rebuilt in 1686 by one John Pennington, who, in recognition of the interest he had taken and the money he had spent in the rebuilding of his chamber, was allowed

to reoccupy the chamber again in 1688 until his death in 1716. The panelling is in oak, and the carved decoration is partly in cedar. The carving is very much undercut in some parts, and it has been attributed to Gibbons or his pupils. The scrolls at the top of the architrave on the two doors (next windows) and the cupids' heads on the other two doors are very fine pieces of work. The carved natural foliage round the chimney-piece panel is also exceptionally good. Some months ago the panelling was erected in the South Kensington Museum, with little or no alteration from the original arrangement."

OLD HOUSE, EVESHAM CHURCH-YARD.

THIS sketch of a picturesque old house, beneath which is one of the entries to the churchyard at Evesham, is by Mr. Sydney R.

Jones, of Birmingham, the author of the fine interior view of Mr. Bidlake's church of St. Agatha, Birmingham, which was published as one of the plates in our issue of August 12. We call attention to that, as we omitted to mention his name at the time.

THE ARCHITECTURAL ASSOCIATION  
WEEK-END VISIT TO CAMBRIDGE.

A PARTY of about twenty members of the Architectural Association met at King's Cross Station on Friday evening last week and left by the five o'clock train for Cambridge, to take part in the week-end visit to that town, and, after a rapid run, arrived at Cambridge in time for dinner at the headquarters (the Bull Hotel).

Mr. W. M. Fawcett had kindly consented to show the party the various buildings of interest in the town, and had taken a great



Sketch in Evesham Church-yard. By Mr. Sydney R. Jones.



deal of trouble to get together information regarding them, as well as obtaining permission for the party to visit the buildings and the necessary permits to photograph and sketch.

On Saturday morning Mr. Fawcett met the party at Peterhouse College at 9.30. It had previously been arranged to commence with the Fitzwilliam Museum, but that part of the programme had to be omitted on account of the small amount of time at the disposal of the party. Peterhouse made an ideal starting-place, as it is situated at the end of Downing-street, and is the end one of a long line of colleges and halls, and is also the oldest foundation, having been begun in 1286 and continued into the XVth century. The library was built in 1590, the chapel in 1632, the windows in the latter being glazed with Munich glass. The frescoes in the dining-hall were by G. G. Scott, junr., in 1868, who also restored and repainted the fellows' or combination room. The adjoining church (St. Mary-the-Less), formerly the college chapel, was next visited; it contains some good glass in the east window. Pembroke College was next visited, the chapel of which was built by Sir Christopher Wren in 1666, and lengthened by G. G. Scott, junr., in a most satisfactory manner, quite retaining all the original feeling. The dining-hall and combination-room, by Waterhouse, were also noticed.

At Queens' College the hall, decorated by Mr. Bodley, with the combination-room in its original position in the rear, were seen, as was also the quaint old cloister, the one on the north side having above it a large overhanging gallery made to connect the original quarters of the master with those added later on the other side of this courtyard.

Some new buildings designed by Mr. Fawcett were also visited, and after the new bridge of oak erected over the river last year to replace the old one had been duly inspected, the party proceeded to King's College, passing on the way both Corpus Christi and St. Catharine's, to which, however, time would not permit of any attention being paid. King's Chapel, no doubt the most beautiful college chapel in the country, was first visited, and here the party spent a considerable time inspecting the splendid choir-stalls and organ-case, also the whole series of pictures in stained glass, as well as the wonderful fan vaulting, and afterwards proceeded to the roof, which was re-covered with the original lead, re-cast and re-laid about four years ago, and from which a splendid view of the town and colleges may be obtained. The chapel was commenced in 1446, the stonework completed in 1515, and the woodwork in 1536. The party noticed also the Fellows' building, erected in 1724, the hall and library by Wilkins, in 1824, and (more recent) the admirably-planned block of buildings by Mr. Bodley, passing through the much-abused and also much-admired screen to the new Sedgwick Geological Museum, by Mr. T. G. Jackson, pausing a moment to look at the church of St. Benedict's, with its Saxon tower, and also the new Medical School, by Mr. Prior, and the other modern buildings in Downing-street.

At the Sedgwick Museum the principal (Professor Hughes) conducted the members round the building; and after lunch both the University library, by Wright, and the Senate House, by Gibbs, were passed, and the first stop was made at Clare College, rebuilt in 1638. Here the chapel hall and library were visited, in the latter of which hangs a set of measured drawings of the college, submitted some years ago for the R.I.B.A. medal. Caius College, with the modern additions by Waterhouse, and that still more recently by Sir Aston Webb, were also inspected, and a move was then made for Trinity.

Passing through the gate into the great court, with its stone fountain in the centre, the chapel was visited; but the dining-hall was, unfortunately, closed, which, with its minstrels' gallery, splendidly carved, and its open roof and lantern, would have been worth seeing. Passing through the Neville Court and under Wren's library, which was also closed, the party crossed the river and entered St. John's, which extends on both sides of the river, being connected by the

so-called Bridge of Sighs. The chapel, designed by Sir G. Scott (1863-9), and erected at a cost of 53,000l., was viewed with admiration; and retracing their steps along Trinity-street, a move was made for Jesus College, founded in 1495 by Alcock, Bishop of Ely, upon the site of a nunnery, and the beautiful Early English chapel (very well restored by Pugin), with the original woodwork in its former position, was the chief point of interest. In the waning light All Saints' Church, by Mr. Bodley (1864), was entered, and a hasty visit was paid to Sidney Sussex, Christ's, and Emmanuel Colleges, where there was but little time to do more than take a hasty glance round at these most interesting buildings. A hearty vote of thanks was then recorded to Mr. Fawcett for his great kindness in conducting the members round and pointing out the various objects of interest.

On Sunday the members employed themselves in sketching or photographing the various portions of the interesting building seen the day previously, and in the afternoon, upon the kind invitation of Mr. Fawcett, a visit was paid to the Botanic Gardens, which came as a welcome change from Saturday's round of events.

An early train was caught to town on Monday morning, and a most enjoyable and thoroughly interesting visit thus terminated.

#### COMPETITION.

**SCHOOL, REDDISH.**—In the competition for a new school at Reddish, for the Stockport Education Committee, the assessor, Mr. J. W. Simpson, F.R.I.B.A., has awarded the premiums as follows:—1st, Messrs. Cheers & Smith, Blackburn; 2nd, Messrs. Winder & Taylor, Oldham; 3rd, Messrs. Adshead & Holt, Manchester.

#### Books.

**Pennell's Reference Guide for Home and Office.** (London: The Granville Press. 1905. 6s. 6d.)

This thick volume contains really a wonderful amount of information in comparison with its cost. The heads of the contents include—(1) An English Dictionary; (2) Aids to the Study of English; (3) A Dictionary of General Information; (4) A Medical Dictionary; (5) A Guide to Education and the Professions; (6) A Social Guide; (7) The World and the Empire; (8) A Legal Guide; and (9) A Commercial Guide.

Of the merits of sections 4 and 8 we cannot of course profess to speak. The English Dictionary is naturally a very concise one, and as such was perhaps hardly worth inserting, as fuller dictionaries than this are numerous and cheap, and few people are without one; and while some words are omitted which we should have expected to find, some are inserted which one would not have expected: "Hôtel-Dieu," for instance, is hardly an English word. Section 2 includes a useful list of the derivation of English words, and lists of authors, characters in fiction, familiar quotations with their provenance, etc.; also "common errors of speech" and their correction, most of which, however, can hardly be common except among very common people. "General Information" is a very full and useful section; its varied character may be inferred from quoting the heads in one column taken at random—"Pola," "Poland," "Polar Expeditions," "Polder," "Polecat," and "Pole Star"; and there is sufficient general information on each of these. "Social Guides" (Section 6) are generally rather amusing, and this is no exception; but the advice under some of the headings, e.g., "Public Speaking" and "Duties of a Chairman" is really useful and full of sound sense. Section 7 contains a great deal of information on important subjects. Taken as a whole this is a reference book which may be of great service where immediate information is required.

**Roofs and Floors of New Buildings: Their Structure and Stability.** By ERNEST H. ESSEX, A.M. Inst. C.E. (London: The St. Bride's Press, Ltd.)

Owing to the variations existing in the requirements of the by-laws of urban authorities with respect to the construction of roofs and

floors, a set of model by-laws was issued some time ago by the Local Government Board. Unfortunately, the local authorities consulted from which these regulations were prepared is by no means clear, and the object of the author in writing this book is to assist surveyors and architects in a decision as to how far the model by-laws should be accepted, and to what extent they should be modified. Accordingly, tables have been prepared in which the proportions recommended by the Local Government Board and those computed by the author are presented for comparison. The basis of calculation adopted is the same as that suggested in the general rules of the model by-laws, but the results show that the proportions recommended in the by-laws for rafters, purlins, beams, and joists are not too slight, and in others unnecessarily large. Comparison of the tables shows further that the dimensions of timber joists set forth in the clauses of the by-laws are not based on any definite calculation, and the dimensions worded in such a manner as to render calculations easy. Mr. Essex points out that attention is directed in the by-laws to the strength of iron and steel beams, which is quite inappreciable. The calculated tables, and an amended clause suggested for the dimensions of timber joists ought to be of considerable value to architects, engineers and surveyors, and to local authorities generally.

**Hydraulic Power Engineering.** By J. D. MARKS, A.M. Inst. C.E. M.A. F.C.I.P.A. Second Edition. (London: Crosby Lockwood & Son.)

This is the second edition of a treatise which was published about five years ago, and the present volume has been somewhat enlarged so as to permit the inclusion of descriptions and illustrations of recent developments in hydraulic pressing and lifting machinery, as well as illustrations of typical valves. The treatise covers the subject of hydraulic engineering in an excellent manner, although for information on some special branches of applied hydraulics the reader may have to refer to other treatises where fuller details are given. The author has performed his task in a most able manner, and his book is one that can be recommended to all desiring reliable information relative to hydraulic power machinery.

**Engineers' Turning in Principle and Practice.** By JOSEPH HORNER, A.M. Inst. C.E. (London: Crosby Lockwood & Son, 1895.)

In taking up the discussion of a subject about which a good deal has been written in a general way, the author has devoted himself to the production of a manual more particularly intended to meet the requirements of working engineers and technical students. The operations that can be performed in a lathe include the machining of plane and cylindrical surfaces, the lathe both internally and externally. In the workshop of the amateur, and in many places where repair or jobbing work predominates, the lathe is employed as a kind of universal tool. This is by no means the case in a large engineering establishment, where lathes are rarely used for work other than turning, facing, boring, and screw-cutting, and, further, a large proportion of such work is performed in special machine tools. Ordinary lathe work comprises that done between centres, face and chuck work, and screw-cutting. Each of these classes is dealt with very fully by Mr. Horner; the various tools, chucks, and other adjuncts of the lathe are fully described and illustrated; and screw-cutting, which necessitates greater practical experience than operations performed in the lathe, as well as a certain amount of mathematical knowledge, is treated in a thoroughly practical manner. A considerable amount of useful information is to be found in the last chapter on the subject of high-speed steels. The volume is admirably illustrated, and should be widely appreciated by those to whom it is especially addressed.

**Locks and Builders' Hardware: A Handbook for Architects.** By HENRY R. TOWNE. (New York: John Wiley & Sons, London: Chapman & Hall, 1904.)

Mr. Towne is the President of the Yale and Towne Manufacturing Company, and the



before us bears evidence of the fact of association with that company, but it is not the book, although it is marked with a trade catalogue, and is a treatise which contains a good deal of valuable and interesting information both practical and historical. It includes articles by various authors on different subjects, the most important being a series of "The Schools of Ornament," by W. W. Foster; architect; this occupies nearly 400 pages, and contains hundreds of examples of ornament in stone, wood, and metal. The principal part of the book illustrates in detail the construction of locks of different kinds, and describes the various fittings required for doors, doors, partitions, etc. Among the miscellaneous information we note details of French and German casement windows, the weight of glazed sashes, and hints on the polishing of hardwood floors. The book contains about 1,200 pages, and is profusely illustrated, and well bound.

underneath by the fillets and boarding giving way. On opening up the floor I found all the joists enclosed within the concrete more or less attacked by dry rot. It was worst at the ends, where the joists butted against one another over girders and reached down to the fillet. Along the top edges of the joists it averaged 1½ in. or 2 in. deep. The most severely damaged joists were renewed, and I have advised my clients that the present floor will not last more than four or five years, and during that time must not be loaded beyond a specified maximum.

The building was erected within the last twenty years, but I have been unable to ascertain whether the concrete was original or a subsequent alteration. Generally it is a soundly-built structure with the above exception, which I consider a grave error.

JOHN SULMAN.

Sydney, August 1.

# ROCHESTER TECHNICAL INSTITUTE COMPETITION.

SIR,—In your interesting review of the 131 sets of designs submitted in the competition for the proposed Technical Institute at Rochester, you condemn several designs in which the rooms are shown smaller than, apparently, in the successful competitor's plans.

Several competitors, after reading the instructions, saw at once that it would be impossible to carry out the building with the rooms the sizes originally required within the limit of cost; therefore the question was asked of the promoters whether the rooms could be reduced in size, and the reply was that they could. Hence it was no doubt that several of the competitors indicated smaller rooms in designs that were made with the honest intention of endeavouring to keep within the limit of cost.

This point the professional assessor appears to have ignored, for it was only by means of taking advantage of the levels and compressing the building generally that it would be possible to carry it out for 8,000l. It will be interesting to see the result of the contractors' estimates for the accepted design.

A COMPETITOR.

# TRADE CATALOGUES.

THE Simplex Steel Conduit Company send us a Price Sheet, giving in a condensed form most of the prices in their 1905 Catalogue. It contains a series of small diagrams of the various portions of their conduit system, with prices of the different sizes opposite, and is intended as a sheet which can be hung in the office or put in the pocket.

Messrs. Fenlon & Son have sent us two leaflets showing their "Tudor" and "Fleet" geysers. The former is an automatic geyser, working under a pressure of water, and so arranged that the opening of any tap connected to the geyser turns up the gas and allows the water to be heated in passing through the geyser. The "Fleet" is of the open-chamber type, the water passing through it being in contact with the fumes from the burning gas.

We have received from Messrs. Twyford (Hanley) a small catalogue containing illustrations of their "Centaur" siphon water-closet basin. No section of the basin is given in the catalogue, although to the architect a drawing of this kind is much more important than a general view. The basin is made with the outlet either in the back or the bottom, the latter being contrary to the London County Council regulations. A section of the basin with back outlet has been kindly sent us by Messrs. Twyford in answer to our request, and we note that the pan itself is like an ordinary wash-down basin reversed, that is to say, with the outlet of the trap towards the front of the pedestal; there is a lip at the outlet of the trap, so that the water has a clear drop into a nearly vertical tube (formed in the pottery) which connects at right angles with a horizontal tube (also formed in the pottery) running under the trap to the back of the basin. By means of a weir near the final outlet, a certain amount of water is retained in the horizontal tube. We have not seen the basin in operation, but the catalogue states that it will work satisfactorily with a 2-gallon flush.

Messrs. English Brothers (Wisebech) have sent us an interesting little catalogue of their timber buildings and sheds, gates, fencing, etc. The illustrations are well done, many of them being reproduced from photographs, and the designs are simple and appropriate. Among the illustrations are two showing the firm's crescenting tank. The specifications give the scantlings of the timbers, which is certainly a point in favour of the firm.

A pamphlet entitled "Some Simple Facts About Rock Asphalt" (sic) has been sent us by the French Asphalte Company. It contains a good deal of interesting information about asphalt and its uses in buildings, and for roads and footways, and describes the methods of laying the material for different purposes. The specifications on pages 15 and 16 will be useful to architects and surveyors.

Messrs. John Knight & Sons have issued a new catalogue entitled "Non-Detachable Fastenings for Inspection Covers, etc." The non-detachable fastenings are of gun-metal, and are applied to inspection covers for man-holes, gullies, pipes, and traps. A special feature of the catalogue is the series of illustrations of closed cast-iron inspection pipes and traps for the bottoms of manholes. Sealed waste-gullies grouped in brick chambers are also shown, with side inlets for ventilation above the standing water. All the gullies, traps, and inspection chambers are of cast-iron.

Messrs. Abbott & Co. (Lancaster) have sent us a well-produced catalogue containing thirty full-page plates (some in colours) illustrating their stained-glass windows, leaded lights, brasses, metal casements, and fittings, lead rain-water heads and pipes, etc. Some of the designs are of good character.

Messrs. Falk, Stadelmann, & Co., Ltd., have sent us their catalogue of acetylene fittings and accessories. This is the most comprehensive list of acetylene appliances which has yet come under our notice, and includes illustrations of a great variety of pendants, brackets, standards, and glass shades. A notable feature of the catalogue is the number of forms of acetylene burner shown, almost every conceivable form for either lighting or heating being included. Their "Franklin" purifier for acetylene is too well known to call for special description. Acetylene table lamps, carriage lamps, hand lamps, and street lamps are also figured.

Messrs. Robert W. Blackwell & Co. send us a booklet containing particulars of the "Flexite" metal preservative paints made by the Standard Paint Co., of New York. These paints are produced in four shades—black, red, olive, and green—the pigment in each having been selected as the most inert material obtainable to represent the desired colour. The vehicle consists of pure linseed oil, blended with a refractory substance, the nature of which is not revealed. A most important condition in connexion with paints for this purpose is that the pigment shall be incapable of further combination with oxygen, for chemical action of the kind speedily changes the character of the medium, and renders the paint pulverulent and brittle. This condition appears to be complied with in the case of the flexite paints, which should be found a durable and satisfactory material for protecting metal surfaces.

Messrs. Wallach Brothers send us their 1905 Novelty List, which contains particulars and prices of some very handy tools and appliances. Among them we select the following for special notice:—Portable electric drills, limewashing machines, gasoline forges of various patterns, torch lights, blast heaters, and sand-blast machines. This catalogue is of direct interest to building and engineering contractors.

Messrs. W. H. Smith & Son send us three illustrated catalogues, or rather illustrative specimens of their work in three branches—half-tone printing; types used by them; and decorative headings for commercial stationery. One of the half-tone prints from photographs, the first, is a little spotty; the reproduction of a photograph, a wood in winter, is as good as it could be; and the colour prints included are also good. For the other two portfolios we have nothing but praise. The examples of type and printing are excellent both in the style of lettering and in clearness of impression; and the headings for commercial paper are artistic and refined in design. When one considers what artistic monstrosities one constantly sees in these kind of headings, which represent too often

# Correspondence.

## PROPOSAL FOR HOLIDAYS IN THE BUILDING TRADES.

SIR,—Will you permit us, through the medium of your paper, to ventilate a subject which will of special importance to two of the large trades, is also of public interest. It has been suggested that an Association be formed for promoting an annual holiday "time" applied to the building, painting, plumbing, and allied trades. There are many difficulties in the way of success to such a scheme, and it would be the business of an association to overcome them, but it would be useless even to form an Association unless the trades interested were very generally in favour of the movement, and we shall be pleased if any of your readers will communicate to us their views on the subject.

The suggestions which have already been made as to time vary from five to fourteen days, although each includes August Bank Holiday.

Those who advocate the fourteen days say that at Christmas, Whitsuntide, and the Bank holidays alone should be taken, and that by this course there would be a saving at those times of five to seven days, and already there is a loss in August Holiday week of two to three days—so ten days—so that a fortnight might be a much extra loss.

Whatever the difficulties in the way of such a scheme, the disadvantages of the present system of holidays are obvious.

A holiday loses half its value if, at its close, a colleague's work has to be taken over in addition to one's own.

In an office where there is a large staff organisation is spread over a period of months in every year.

Many a man in these trades (especially a without a partner) feels that he cannot carry his business for several consecutive days under present conditions.

However, we hope you will help us to obtain some information as to the general opinion on this very important question.

S. BOULTON,  
Director, John Hall & Sons (Bristol and London), Ltd.

The subject is a very important one, and we shall be glad to hear other opinions on the proposal.—Ed.

## CONCRETE PUGGING FOR FLOORS.

SIR,—In your issue of June 17, just to hand, I received a letter by Messrs. Holman & Goodenham on the above subject. Having recently seen the use of concrete pugging on the floor joists of a house in this city, I send you a sketch and a statement thereof, which, though they will not be of service.

The floor in question is covered with Seyssel concrete. The concrete is cement concrete (our usual for that purpose), the timber is of oak. Signs of failure showed themselves on the top surface of the asphalt by depressions along the lines of joists and in one or two places





what can only be called "writing-master's art," we may wish that more firms would avail themselves of Messrs. W. H. Smith's capacity for putting artistic spirit into this class of work.

## The Student's Column.

### STEAM BOILERS AND PIPES.—XII. CHIMNEYS.

**N**O part of a boiler installation is more important than the chimney, which furnishes the motive power serving to draw through the furnace the air necessary for combustion, and to carry away the gaseous products. As a general rule these products have to be discharged at such a height that they shall not constitute a source of annoyance to the occupants of surrounding premises. Hence the height of the chimney is very often governed by the regulations of local authorities, rather than by the mechanical principles which are discussed in the present and succeeding articles.

**Head, or Draught Power.**—The movement of air through a chimney, or a furnace, may be produced by any of the means enumerated below, separately or in combination:—

(1) *Natural draught*, due to the unbalanced pressure of a column of cold external air against a lighter column of heated gases inside a chimney.

(2) *Forced draught*, from a steam-blower or a fan.

(3) *Induced draught*, from a fan placed between the boiler and the chimney.

In the following notes we shall consider only natural draught, due to the difference of weight of two columns of air or gas, the unbalanced pressure being the motive power that forces the heated gases up the chimney.

As draught power is not affected by the area of the chimney, the area of the two columns can be taken at the unit measurement of 1 sq. ft.

Therefore, for a chimney of any given height, we have on one hand a column  $x$  ft. high by 1 sq. ft. area, consisting of heated gases in the chimney, and on the other hand a column of equal dimensions consisting of external air, the temperature of which is usually taken at the average of 62 deg. F.

The head, corresponding with the unbalanced pressure, can be expressed in feet of cold air, in pounds per square foot or per square inch, in ounces per square inch, or in inches of water.

Of these modes of expression the first and last are usually employed for the purposes of calculation, but in daily practice the inch of water is almost invariably taken as the unit of measurement.

Formula (1), p. 280, shows that the volume of air bears a direct proportion to the absolute temperature of 461 deg. below zero F.

Consequently the weight of air per cubic foot is inversely proportional to the volume, and bears an inverse proportion to the absolute temperature.

Hence

$$d = D \frac{(461 + T)}{(461 + t)} \dots (6)$$

where  $D$  = the weight per cubic foot of air at the temperature  $T$ ; and  $d$  = the weight per cubic foot of air at the temperature  $t$ .

At 62 deg. F. the weight of dry air per cubic foot is 0.0761 lb., and this is a convenient basis for calculations, because 62 deg. is the standard to which chimney temperatures are usually referred.

Using the temperature of 62 deg. F. as a constant, formula (6) reduces to

$$d = \frac{0.0761 \times (461 + 62)}{(461 + t)} \dots (6a)$$

For ordinary practice the equation may be further simplified by using the factor 40 in place of 39.8.

Thus

$$d = 40 \div (461 + t) \dots (6b)$$

The rule then gives results that are a little too high, but this does not matter, as the error is on the safe side. Moreover, it must be remembered that the temperature prevailing in a chimney varies from day to day, and even from hour to hour, and that in the case of a new chimney it is impossible to make more than a rough estimate of the temperature that will be maintained.

Therefore the weights computed by formula (6b) are sufficiently accurate for all practical purposes.

**TABLE XVIII.—VOLUME AND WEIGHT OF DRY AIR AT DIFFERENT TEMPERATURES UNDER THE ATMOSPHERIC PRESSURE OF 29.92 IN. OF MERCURY. THE VOLUME AT 32 DEG. F. BEING 1.000.**

Temp.	Weight of a Cubic Foot.	Temp.	Volume.	Weight of a Cubic Foot.
deg. F.	lb.	deg. F.	lb.	
32	1.0000	0.08073	625	2.0000 0.04006
42	1.0201	0.07914	550	2.0504 0.03939
52	1.0405	0.07758	575	2.1012 0.03872
62	1.0608	0.07610	600	2.1519 0.03751
72	1.1810	0.07467	625	2.1923 0.03685
82	1.1013	0.07330	650	2.2507 0.03582
92	1.1212	0.07197	675	2.3040 0.03503
102	1.1418	0.07069	700	2.3554 0.03428
112	1.1621	0.06946	725	2.4080 0.03355
122	1.1824	0.06827	750	2.4567 0.03286
132	1.2027	0.06712	775	2.5075 0.03220
142	1.2230	0.06600	800	2.5580 0.03156
152	1.2432	0.06492	850	2.6600 0.03035
162	1.2635	0.06388	900	2.7610 0.02924
172	1.2839	0.06287	950	2.8625 0.02821
182	1.3040	0.06190	1,000	2.9640 0.02734
192	1.3244	0.06096	1,100	3.1670 0.02549
202	1.3445	0.06003	1,200	3.3698 0.02396
212	1.3650	0.05913	1,300	3.5730 0.02269
222	1.3850	0.05827	1,400	3.7755 0.02138
232	1.4055	0.05743	1,500	3.9800 0.02029
242	1.4265	0.05662	1,600	4.1929 0.01931
252	1.4460	0.05581	1,700	4.3950 0.01841
262	1.4663	0.05505	1,800	4.5993 0.01760
272	1.4865	0.05430	1,900	4.8030 0.01685
282	1.5070	0.05358	2,000	5.0060 0.01617
292	1.5272	0.05285	2,100	5.2080 0.01554
300	1.5434	0.05230	2,200	5.4125 0.01495
325	1.5942	0.05042	2,300	5.6160 0.01441
350	1.6450	0.04907	2,400	5.8200 0.01391
375	1.6955	0.04781	2,500	6.0230 0.01344
400	1.7463	0.04632	2,600	6.2250 0.01300
425	1.7970	0.04492	2,700	6.4300 0.01259
450	1.8475	0.04369	2,800	6.6330 0.01220
475	1.8985	0.04252	2,900	6.8365 0.01184
500	1.9490	0.04141	3,000	7.0400 0.01150

Table XVIII. contains the volume and weight of air at different temperatures calculated in accordance with formula (1) and (6).

Although these formulae do not apply with strict accuracy to air containing water vapour and other gases, nor to gases such as the products of combustion, the volumes and weights thereby obtained can be taken, without causing material error, to represent those of chimney gases.

Expressed in feet of cold air, the head ( $h$ ) for a chimney of the height ( $H$ ) is

$$h = H \left( \frac{D - d}{D} \right) \dots (7)$$

where  $D$  = weight per cubic foot of cold air and  $d$  = weight per cubic foot of hot gases in the chimney.

Expressed in pounds per square foot, the head for a similar chimney is

$$h_1 = H (D - d) \dots (8)$$

Expressed in inches of water, the head for a similar chimney, by a modification of formula (7), is

$$h_2 = H \left( \frac{D - d}{D} \right) 0.01466 \dots (9)$$

or by a modification of formula (8)

$$h_2 = H (D - d) 0.1926 \dots (10)$$

The factor for converting the head from feet of air to inches of water is [0.0761 (12 ÷ 62.3)] in one case, and (12 ÷ 62.3) in the other.

The height of the chimney in feet ( $H$ ) must always be measured from the level of the boiler fire-grate to the top of the chimney.

In the following example we have adopted such temperatures for the external air and internal gases that  $\left( \frac{D - d}{D} \right) = 0.5$ . This proportion is approximately observed in general practice, except where economiser plants are employed, and, with the object of simplifying calculations, we have employed the same ratio in subsequent examples, wherever suitable.

**Example (3).—**Required the head for a chimney 100 ft. high, in which the temperature of the gases is 585 deg. F., the temperature of the external air being 62 deg. F.

The weight ( $D$ ) of a cubic foot of air at 62 deg. = 0.0761 lb., and the weight ( $d$ ) of a cubic foot of the chimney gases at 585 deg. by formula (6) is

$$d = 0.0761 \frac{461 + 62}{461 + 585} = 0.03805 \text{ lb.}$$

Then by formula 9

$$h_2 = 100 \left( \frac{0.0761 - 0.03805}{0.0761} \right) 0.01466$$

$$= 100 \times 0.5 \times 0.01466$$

A similar result can be obtained by formula (10).

Thus

$$h_2 = 100 (0.0761 - 0.03805) 0.1926$$

By inversions of formula (9) and (10) can calculate the height of a chimney to give a head equal to any required measurement, for any specified external and internal temperatures.

Thus

$$H = \frac{h}{\left( \frac{D - d}{D} \right) 0.01466} \dots (11)$$

or

$$H = \frac{h_2}{(D - d) 0.1926} \dots (12)$$

**Example (4).—**Required the height of a chimney to give the head of 0.5 in. of water, the temperature of the outer air as 585 deg. respectively, as before.

Substituting the values of  $D$  and  $d$ , already found, in formula (11), we have

$$H = \frac{0.5}{0.5 \times 0.01466} = 68.2 \text{ ft.}$$

Using formula (12) we have

$$H = \frac{0.5}{(0.0761 - 0.03805) \times 0.1926} = 68.2 \text{ ft.}$$

**Example (5).—**Required the height of a chimney to give the head of 0.5 in. of water, as in example (4), but with the temperature of the outer air and of the chimney gases at 62 deg. and 350 deg. respectively.

By Table XVIII., the corresponding densities are 0.0761 and 0.04907—say, 0.049.

Then by formula (12) we obtain

$$H = \frac{0.5}{(0.0761 - 0.04907) 0.1926} = 96.1 \text{ ft.}$$

According to the well-known theory of Morin, the best draught is secured when the absolute temperatures of the hot gases in the chimney and of the external air are in the ratio of 2.1:1—that is, when the density of the heated gases is rather less than half that of the external air. Hence the opinion is very generally expressed that the efficiency of a chimney is greatest when the volume of the fuel gases is about double that of the external air.

The theory which establishes this temperature limit is open to question so far as concerns efficiency, and it certainly cannot apply to draught power, because the head increases proportionately to the increase of the temperature of the chimney gases. Practical experience, however, proves that no advantage is to be gained by increasing the temperature of the chimney gases beyond 600 deg., the reasons being that the velocity does not increase so rapidly as the head, and that the theoretical increase is largely discounted by increased friction.

### METROPOLITAN ASYLUM BOARD

The managers of the Metropolitan Asylum district met at the offices of the Board, Victoria Embankment, on Saturday last.

**Joyce Green Hospital.**—On the recommendation of the Hospitals Committee the action of this Committee in providing a water supply for three cottages at this hospital was approved. The cost, as estimated by the engineer-in-chief, was 150l.

**North-Western Hospital.**—On the recommendation of the same Committee it was agreed to provide a vitreous enamelled cast-iron bath at the bathroom of each of the four "valley" wards of this hospital, and also to fit radiators in the bathrooms of each of the ten temporary wards, with a supply of steam for heating purposes. The total cost is estimated at 220l., and the matter was referred to the Works Committee.

**St. Mawgan, St. Columb, Cornwall.**—A new light stained-glass memorial window has just been erected in this church. It consists of the figures of the Virgin and Child in the centre light, with St. Anne and St. Joseph in the lights on each side. The window was executed by Messrs. Percy Bacon & Brothers, of London.



MILION CHAPEL, PLYMOUTH.—A new chapel

SECONDARY SCHOOL, HELSTON, CORNWALL  
The Earl of Mount Edgcumbe recently opened

**BRANCH DISPENSARY, HYSON GREEN, NOTTINGHAM.**—The new building constituting the Hyson Green branch of the Nottingham General Dispensary will shortly be opened. The architect is Mr. J. W. Sutton; it is the architect for the work, his design has been accepted in principle. The dispensary is a single-story structure, with a pointed roof and a central entrance, which is in the center and is approached by steps. The total length of the dispensary is 48 ft., and the breadth 33 ft. Adjoining is the surgeon's house. Both buildings are faced with red sandstone blocks, the windows are dressed in ashlar, and the walls are finished with white wash. Internally the walls are lined with wood except in the operating room. The internal angles are avoided by the use of curved tiles, the floors are covered with marble, and the ceilings are of metallic plates.

SECONDARY SCHOOL, HELSTON, CORNWALL.--  
The Earl of Mount Edgemore recently opened the



The building throughout is heated by a low pressure, hot-water system, through radiators, and lighted by means of electricity. The surgeon's house is a three-story building, having two sitting-rooms and kitchen upon the ground floor, and five bedrooms. Both buildings, including equipment, are expected to cost nearly 3,000l.

**BRENTFORD MARKET EXTENSION.**—Mr. Leopold Rothschild laid the memorial-stone of the extension of the Wholesale Markets at Brentford on the 18th inst. The scheme, prepared by Mr. Nowell Parr, engineer and surveyor, is to cost, by contract, 43,000l. The markets will be divided into three covered ways or avenues. The central avenue is to be devoted to wagon stands—twenty-three double and thirty-six single—and the two side avenues will have corresponding spaces for the display of merchandise. Along the main walls, on the north and south sides of the markets, thirty-three shops with 15 ft. frontages are to be constructed.

**PUBLIC LIBRARY, CLITHEROE.**—The new library and reading-room at Clitheroe, which has been presented to the town by Mr. Andrew Carnegie, is now nearing completion. The plans were prepared by Messrs. Butterworth & Duncan, Rochdale, the contract being let to Messrs. J. Hargreaves & Son, Clitheroe. The building, which is of stone, consists of basement, ground floor, and first floor. The lending library and librarian's room occupy the ground floor, and on the first floor is a reading-room, there also being a room for the use of the Library Committee. The cost of the work has been about 3,000l.

**WORKHOUSE INFIRMARY, KNARESBOROUGH.**—The foundation-stone of the new Knaresborough Workhouse Infirmary was laid a short time ago. The new structure, which is to accommodate females, is situated at the rear of the workhouse, and is estimated to cost 3,000l. On the ground floor will be a ward, 49 ft. by 24 ft., with accommodation for thirty beds. There will also be the administrative block, containing on the ground floor a ward kitchen, linen-room, bathroom, patients' dayroom, 32 ft. by 14 ft., and two wards. On the first floor of the administrative block there will be a ward kitchen, a dayroom, linen-room, and bathroom. The nurses will take up their quarters on the second floor, where there will be a sitting-room, bathroom, and bedroom accommodation for six nurses. Over the ward on the ground floor will be a second ward, 49 ft. by 24 ft. The floors in the wards and corridors will be fireproof, wood blocks being used chiefly, and tiles in the sanitary annexes. In the basement provision is made for a boiler for heating apparatus, and there will be in addition a larder and coal store. The infirmary will be built of Killingham stone, with Killingham ashlar dressings. The contractors are—Bricklayers and masons, Simpson Bros., Harrogate; carpenters and joiners, Clapham & Taylor, Harrogate; plumber and glazier, George Thompson, Harrogate; slater, Joseph Shepherd, Harrogate; plasterers, Fortune & Calverley, Harrogate; painter, J. W. Simms, Harrogate. The heating apparatus will be installed by Shorland & Sons, and the architect is Mr. J. Houle, of Harrogate.

**CATTLE MART, GATESHEAD.**—A new cattle mart was opened at Gateshead on Monday last. The mart is situated in Back Tyne-road East, and has been built from the plans of Messrs. L. H. & A. L. Armour, architects, Gateshead. Accommodation is provided for 200 head of cattle, 600 sheep, and 60 calves and pigs.

**BUSINESS PREMISES, BRADFORD.**—New premises have been erected for Messrs. Gibson, Boyce, & Co., in Darley-street, Bradford. The architect for the work was Mr. C. H. Hargreaves, and the principal contractors John Moulson & Sons, Ltd., builders, and John Stow, Ltd., shop fitters.

**WESLEYAN HALL, HULL.**—The Queen's Hall in Alfred Gelder-street, Hull, has just been opened. The principal feature of the scheme is the large hall, 75 ft. 6 in. wide by 103 ft. long, with a gallery round three sides and a choir platform. There are four exits from the main floor, one at each corner of the hall; also four exits similarly placed from the gallery floor. These exits open out on to a crush hall and corridor. On the ground floor a Sunday school is arranged, 52 ft. by 57 ft., with seating accommodation for 550 people. In addition to the above rooms there are the usual classrooms, church parlour, choir, and minister's vestries. A back entrance from George-yard is arranged for carrying on work in connexion with the soup kitchen. Near this entrance a boys' clubroom is provided, which will also act as waiting-room in connexion with the soup kitchen, which it adjoins. For evening use the buildings are lighted throughout by electric light; this is also supplemented by gas in the large hall entrances, staircases, and corridors. The floors of the large hall, entrances, corridors, and staircases are fireproof, those of the entrance vestibules being paved in marble mosaic. The ventilation and warming is carried out by low-pressure hot water heating apparatus, with ventilating radiators. Fresh air is also taken from the upper part of the tower, driven into the building by an electric fan when required. The vitiated air will be exhausted by a sun-burner on the main ceiling. In addition to this, an electric

fan is fixed in the main hall. The building is designed in the late Gothic style, and the front is carried out in Ancaster and Portland stone, and the work has been executed by the following:—Brickwork, Mr. F. Beilly; plastering, Mr. R. Metcalfe; masonry, Messrs. Quibell, Son, & Greenwood; joiner's work, Messrs. R. Finch & Co.; plumbing, Mr. W. C. Padguglin; slating, Messrs. Wilde & Son; painting, Mr. G. Harbrow; electric lighting, Mr. A. Shaw; seating for hall, Mr. Henry Norris; seating for school, Mr. Henry Neal; and glazing, Messrs. Harrison & Andrews, the whole under the supervision of Messrs. Gelder & Kitchen, architects, of Hull. Mr. J. W. Cole has carried out the duties of clerk of works. The scheme has cost about 23,000l., the contract for the building alone being 19,521l.

**ST. JAMES'S HALL, LYNN.**—This building, which was totally destroyed by fire last year, is now being rebuilt. The front of the new structure is of terra-cotta brickwork, with an ornamental dormer window on either side. On entering the porch there is a pay-office on the right, and past this, on either side, ladies' and gentlemen's retiring-rooms, lavatories, etc. The main hall extends 106 ft. and is 42 ft. wide. It is estimated to be capable of seating 800 people, and the balcony has room for 120 reserved seats. The floors are all laid on coat breeze. Ventilation will be secured by three Boyle's ventilators, and the whole building will be heated by hot-water radiators. Mr. W. F. Smith is the contractor for the work, Messrs. Jarvis & Sons being the architects. Mr. William Look is responsible for the decorating and the lighting, and Messrs. Wickham & Sons fitted the heating apparatus and radiators.

### APPOINTMENT.

**TWICKENHAM.**—At the meeting of the Twickenham District Council, held at the town hall on the 14th inst., the Highways Committee reported the receipt of a letter from Mr. W. Ritchie Kemp, Assistant Surveyor, that on account of continuing ill-health he was obliged to resign. The resignation was accepted, and on the recommendation of the committee, Mr. G. R. King, who is now second assistant in the surveyor's drawing office, was appointed to the vacancy, at a commencing salary of 120l. per annum.

### FOREIGN.

**SOUTH AFRICA.**—A new Dominican convent is being built at Rondebosch, near Cape Town. It will be a three-story building of red brick, with a course of solid stone about 4 ft. high. Mr. Adrocsta Gregorowski, who was appointed to arbitrate in the dispute between the master builders of Pretoria and the carpenters, has given his award to the effect that the latter were right in insisting that their right of arbitration had not been invalidated in connexion with the recent ratification of the reduction of wages to 2s. 6d. per hour, but holds that the latter wages under the depressed conditions of the building trade are fair and reasonable, which the men must accept. The Master Builders' Association of Kimberley, as the result of a meeting called to discuss the Workmen's Compensation Act, has decided to formulate a scheme of insurance against the liability of its members under the Act, and the necessary agreement under consideration.

At Durban a Building Trades' Conciliation Board has been formed to consist of four representatives of each of the representatives of the employers and the employees. It appears that the findings of the Arbitration Court are not legally binding on either party, and there is no compulsion for either side to abide by the decision of the arbitrators. The plans of the new hospital at Lourenço Marques have been approved by the authorities at Lisbon, and construction will be commenced almost immediately. The estimated cost of the building is 65,000l.

### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Mr. Jasper J. Kelf, architect, has given up his local offices at Walthamstow and Leytonstone, and his office will henceforth be at Devonshire-chambers, 16 to 18, Bishopgate-street Without, E.C.4. Mr. E. Jenkin Williams, architect, of Cardiff, has opened a London office at 30, John-street, Bedford-row, W.C.2, and has taken into partnership Mr. H. Parry Morgan. The practice will be carried on under the style of "E. Jenkin Williams & H. Parry Morgan."—Mr. A. Vye-Parminter, architect to the English Embassy, Paris, has removed his office from 27, Rue des Arcades, to 62, Rue de Prony, Paris Monceau, Paris.—Messrs. Bengtén & Young, of 12, Camomile-street, E.C.4, are appointed sole agents for "Torgament" flooring.—Mr. Leonard B. Wood, who was for many years sole proprietor and, subsequently, senior partner of the firm of Steele & Wood (The Crystal Porcelain Tile Co.), Stoke-on-Trent, is again taking over the business. **SOCIETY OF ENGLISH PAINTERS.**—This is a new Society, consisting at present of twenty-two members, among whom are Messrs. Oliver Hall, Lee Hankey, Dudley Hardy, Bertram

Priestman, Hughes, St. John, James Wilson, and others. The objects of the Society are to hold exhibitions of cabinet work in the provinces, and abroad. Their next exhibition is to be held during the month of October at Messrs. Dowdswell's Galleries, Tottenham. The rules are:—"The Society shall be a members' society, and the approval of the Council shall be required for the election of new members, and for the re-election." The second exhibition of the Society will be held in Berlin during the month of January.

**PATENT OFFICE LIBRARY CATALOGUES.**—The following is the list of the new catalogues issued by the Patent Office, at the price of 6d. each:—"Agriculture," "Rural Economy, and Education, etc." These useful catalogues are issued by the Patent Office, at the price of 6d. each.

**SOUTH TRANSEPT WINDOW, HILTON.**—The stained glass window which was destroyed by fire in the transept of the church of St. Agatha, Hilton, in 1903, has been removed to make way for a new window, which is to be a memorial window to the late Duke of Devonshire, who died in 1903. The window is to be a memorial window to the late Duke of Devonshire, who died in 1903. The window is to be a memorial window to the late Duke of Devonshire, who died in 1903.

**POST OFFICE (NEW) BUILDINGS.**—On October 15 the King will lay the foundation-stone of the new buildings which will be erected upon the site of Christ's Hospital, between Gillingham-street and King Edward-street, taking in the west street, latterly the Blue Coat School, Gillingham-street. During the twelve months ending on March 31 last, the expenditure by the Post Office on Works and Public Buildings, including the cost of the buildings and maintenance of existing premises, was 480,183l. in Great Britain and 41,000l. in Ireland; the corresponding sum for the previous year was 473,728l. For the purchase of sites and buildings for the purpose of the new buildings, the Post Office expended out of its departmental vote, in the year 1904-5 the Post Office authorities expended 62,000l. in the year 1904-5; during the sixty-nine new offices, took over 100 offices after their alteration and enlargement and improved forty-three Crown post-offices, and began the erection or extension of 142 others.

**LIGHTING OF STREETS IN THE CITY.**—At the close of the current month the Corporation will put into practice some experiments for saving the value of high-pressure gas as contrasted with the present service of electricity. The eight electric lamps in front of Billingsgate Market are to be replaced by 1,000 c.p. lamps on the existing poles and thirty-three high-pressure incandescent lamps are to be installed in Lower Thames-street in the vicinity of the market. Foot-lamps will be provided with thirty-four incandescent lamps, in place of the twelve electric lamps, and a similar substitution of forty-five high-pressure gas lamps for twenty-seven arc lamps will be effected in Queen Victoria-street and in Queen-street, Chapside.

**HOUSES OF CELEBRITIES: LONDON AND THE SUBURBS.**—A memorial tablet has been affixed on the bay-windowed front of No. 16 (west side) Young-street, Kensington, in which, being the No. 13, Thackeray lived (1847-1853), and wrote "Vanity Fair," "Pendennis," and "The Newcomes." Similar tablets of encaustic ware, have just been used to distinguish the homes of Edward Jenner, No. 14, Hertford-street, May Fair; George Grote, No. 12, Savile-row, where the historian resided during the twenty-three years preceding his death in 1871; Robert Stephenson, No. 24, Grosvenor-square; Hyde Park; Richard Cobden, No. 11, Suffolk-street, Pall Mall East; Sydney Smith, No. 14, Doughty-street, Macclesfield-square, W.C., which was his first house in London during the period 1804-6; Leigh Hunt, No. 10, Upper Cheyne-row, Chelsea, which, being the No. 4, Hunt occupied for some while after 1834—due to the fact, we may observe, the most of the strange descriptions of Leigh Hunt's domestic life written by his neighbour Carlyle in his journal, May 24, 1834, and in a letter, June 27, 1839, to his brother Alexander Carlyle; and Mrs. Cross (George Eliot), Holly Lodge, No. 31, Wimpole Park-road, Wandsworth, occupied by her in 1859-60. We may further observe that in 1859-60, No. 56, Great Queen-street, W.C., also marked with a tablet in memory of Boswell, is the east half of the house built by Inigo Jones, or his pupil Webb, which has been inhabited by Sir Godfrey Kneller, Hudson the painter, Hoole the translator of "Aristotle," and a redoubtable John Grace. Boswell lived in No. 14, which he brought out in 1791.















## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.
Large Shelter or Concert Hall with Café	Brillington Corporation	35 guineas and 20 guineas
*BLANCH LIBRARY	Greenwich Borough Council	25l., 15l., and 10l.

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Paperhanging, etc., at Cottage Homes, Birmingham	King's Norton Union	Superintendent, Cottage Homes, Northfield, near Birmingham
New Building for Children, Hunstanton	The Committee	A. P. MacAlister, 20, St. Andrew's-street, Cambridge
Broken Granite	Tamworth E.D.C.	Council's Surveyor, 25, Church-street, Tamworth
Broken Granite and Sittings	Deal Corporation	Borough Surveyor, Deal
Making-up and Paving Private Streets	Levon U.D.C.	Council's Surveyor, Town Hall, Levon
Portland Cement	Cowes U.D.C.	Council's Engineer, Cowes, I. of W.
Supply of Materials for Twelve Months	Glasgow Corporation	Gas Engineer, 45, John-street, Glasgow
Painting Scavenging Depot, etc.	Halifax Corporation	D. Travis, Town Hall, Halifax
Supply of Cast-iron Pipes and Special Castings	Tunbridge Wells Corporation	Borough Engineer, Town Hall, Tunbridge Wells
Sinking and Boring a Well	Upton-on-Severn R.D.C.	Willcox & Balkeas, 68, Temple-row, Birmingham
*ADDITIONAL OFFICES, ETC., TO TOWN HALL	Wood Green U.D.C.	Council's Surveyor, Town Hall, Wood Green
Permanent Way for Tramways	Wentworth Tramways Committee	Borough Surveyor, Guildhall, Walsingham
Electrical Installations at Fire and Police Stations	Manchester Corporation	City Treasurer, Town Hall, Manchester
Painting and Repairing at Workhouse, Infirmary, etc.	Toxteth Park Guardians	Workhouse, Smithdown-road, Toxteth Park
Re-construction of Paving	Luddenden Foot U.D.C.	Council's Surveyor, Luddenden Foot
Making-up Ridder-road	Enfield U.D.C.	Council's Surveyor, Public Offices, Enfield
Erection of School at Myland	Colchester Education Committee	C. E. Butcher, Architect, 3, Queen-street, Colchester
Granite or Basalt Macadam	Grays Thurrock U.D.C.	Council's Surveyor, Council Offices, Grays
Pair of Semi-detached Villas, Halifax	Saltash U.D.C.	G. Buckley & Son, Architects, Tower-chambers, Halifax
Supply of Stones and Gravel	Revenocks R.D.C.	E. Collier, Architect, 4, Quay-street, Carnarvon
Remov. & Building Steel Girder Bridge over R. Eden	West Sussex Education Committee	Council's Surveyor, Edenbridge
New Classroom at North Mundham Council School	West Riding Education Committee	G. C. Vernon-Inkpen, Architect, 40, Commercial-st., Portsmouth
New School at Beckett-rd., Wheatley, nr. Doncaster	West Wales Sanatorium Committee	County Architect, County Hall, Walsfield
Sanatorium at All y Mynydd, Llanybyther	Bolington U.D.C.	Council's Surveyor, Bolington, near Birmingham
Welsh Granite Macadam	Cardiff Union	Union Offices, Queen's-chambers, Cardiff
Painting at Union Workhouse	Swanage U.D.C.	Council's Surveyor, Town Hall, Swanage
Improvement Works, Ulwell-road	do.	do.
*MAKING-UP ROADS	Rbbw Vale U.D.C.	The Town Surveyor, Rbbw Vale
Outbuildings, near Isolation Hospital, Bournemouth	Bo'ness and Carriden School Board	Smellie, Taylor, & Browne, 187, St. Vincent-street, Glasgow
New School	Lancashire and Yorkshire Railway	Mr. Duffin, Stores Department, Osborne-street, Manchester
Supply of Stores for Twelve Months	Clay Cross U.D.C.	W. R. Radford, Alton-chambers, King-street, Nottingham
Supplying & Laying Cast-iron Pipes, Filter Beds, etc.	Birmingham, Tamworth & Beas Drain Bd.	J. D. Watson, Engineer, Tyburn, near Birmingham
Sewage Disposal Works	Brighton Town Council	T. Garrett, Architect, 30, Ship-street, Brighton
*EXTENSION OF ELECTRICITY WORKS	Galedonian Railway Co.	Company's Engineer, Buchanan-street Station, Glasgow
Extension of East Roof of Glasgow Central Station	Dartford R.D.C.	W. Henson, Engineer, 8, High-street, Dartford
Stoneware Pipe Sewer, etc.	Lewisham Borough Council	Council's Surveyor, Town Hall, Ostford, S.E.
Road-Making and Paving Works	Sevenoaks U.D.C.	Council's Surveyor, Argyle-road, Sevenoaks
Guernsey Granite and Quartzite	Cowes U.D.C.	Council's Engineer, High-street, Cowes, I.W.
Cast-iron Socket Pipes, Special Castings, Valves, etc.	Selby U.D.C.	F. Griffith, Engineer, 64, Parliament-street, S.W.
Cast-iron Water Main, Valves, and Specials	do.	do.
Casting and Laying Mains	Chorlton & Man. Joint Asy. Com.	Chorlton Union Offices, All Saints', Manchester
Telephones & Elec. Bells at Lancha Epileptic Colony	Willenden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.
ROAD-MAKING AND PAVING WORKS	Commissioners H.M. Works, etc.	H. G. Nixon, H.M. Office of Works, Infirmary-street, Leeds
Enlargement of P.O. at Harrogate	Watford U.D.C.	Council's Engineer, 14, High-street, Watford
Supply of Broken Granite	do.	do.
Sewerage Works, Cassiobridge District	do.	do.
Sewerage of Rickmansworth-road and Fadden-lane	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.
*PORTER'S OFFICE, ASY. SUTTON, SURREY	Dartford U.D.C.	do.
*BOILER HSE. & CHIMNEY SHAFT, HOMERTON	Middlesex C.C.	Council's Surveyor, Council Offices, Dartford
Wood Paving Works	do.	County Engineer, Middlesex Guildhall, Westminster, S.W.
*CONSTRUCT LIGHT RAILWAY, WOOD GREEN	Sunderland Borough Council	Vaux & Mark, Architects, 66, John-street, Sunderland
Bridge Works, Road Widening, etc.	Rowley Regis U.D.C.	Council Offices, Old Hill, Staffs.
New School at Pallion	Forth Education Committee	Mr. C. Pinks, Parliament-mansions, Victoria-street, S.W.
Street-making Works	King's Norton & Northfield U.D.C.	Council's Surveyor, 23, Victoria-street, King's Norton
*NEW SCHOOL AT FLETHURST	Rastbourne Corporation	P. A. Robson, Architect, 9, Bridge-street, S.W.
Erection of Library at Northfield	Pontypridd U.D.C.	R. E. Wilson, Engineer, 66, Victoria-street, S.W.
New Fire Station	Lanark C.C.	Council's Surveyor, Borough Green, Sevenoaks
*ALTERATIONS TO EXISTING BATTERY RM.	Wrotham U.D.C.	Council's Engineer, 94, Hope-street, Glasgow
Supplying and Laying Cast-iron Pipes	Long Ashton R.D.C.	Council's Engineer, Pontypridd
Steam Rolling	Pontypridd U.D.C.	Council's Engineer, Public Offices, Southall
Addition to Administrative Block at Hospital	Southall/Norwood U.D.C.	A. E. Powles, Architect, 7, Winnington-street, Northwich
Sewerage and Sewage Disposal Works	County of Chester	do.
1,000 yds. of Stoneware Pipe Drains and Other Works	Commissioners of H.M. Works, etc.	J. Waser, H.M. Office of Works, Storey's-gate, S.W.
Galvanized Iron Fencing and Gates	Stourbridge Union	H.M. Office of Works, Storey's-gate, S.W.
New Schools, Northwich	Commissioners of H.M. Works, etc.	Clerk's Office, 12, Hagley-street, Stourbridge
*MAKING OF TWO NEW STREETS, ETC., NORTHWICH	Horsforth U.D.C.	J. Waser, H.M. Office of Works, Storey's-gate, S.W.
*NEW SORTING OFFICE AT DULWICH	do.	Council's Engineer, 10, Park-road, Leeds
*SUPERSTITION NEW P.W. STA., BLACKFES. S.E.	Wandsworth Borough Council	Council House, East Hill, Wandsworth, S.W.
Two Padded Rooms, etc., at Workhouse, Wordley	East Sussex C.C.	F. J. Wood, County Surveyor, Lewes
*LYTRO STORES, ETC., OLD SURVEY, SHAMPTON	Bucks Education Committee	Harrington, Ley, & Kelkham, 65, Bishopsgate Without, E.C.
Bore-Hole Pump	The Visiting Committee	G. A. Marcham, Guildhall-road, Northampton
*NEW POLICE OFFICES, ETC., LEBWIS	Darlington B.D.C.	Council's Surveyor, Union Offices, Darlington
*ERRECTION OF SECONDARY SCHOOL	The Trustees	H. Budgen, Architect, 95, St. Mary-street, Cardiff
*LAUNDRY, BERRY WOOD ASY., N'HAMPTON	Newport (Salub.) U.D.C.	Clerk's Office, Newport, Salop
Detached Sanitary	Swansea Town Council	Council's Engineer, Guildhall, Swansea
New Chapel and Schools, Penarth	Cumberland C.C.	G. D. Oliver, County Architect, Carlisle
Materials & Labour for Drain, Land at Sewage Works	Poyle Charley Estate	W. G. Lower, Architect, 12A, High-street, Guildford
Supply of Steel Tubes	Foresters' Homes Committee	J. S. Paul & Son, 31, Bedford-row, W.C.
Police Residences and Lock-up at Lazonby		
Retaining Wall, etc., Guildford		
*ADDITIONAL WING, BEXLEY HEATH HOME		

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be made
*TWO TEMP. ASSISTANTS (ARCHT'S DEPT.)	Glamorgan Education Committee	3l. 10s. and 1l. 10s. per week	Sept. 23
Inspector of Nuisances	Sheerness U.D.C.	180l.	Sept. 15
Surveyor and Sanitary Inspector	Wansgate U.D.C.	180l.	Sept. 10
*ARCHITECTURAL ASSISTANT	Hull Education Committee	100l.	Oct. 1

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. vii. x.

Public Appointments, vii.



Sons.....	4,520	7	6	Co. ....	3,812	0
Baldwin &				East & Hyde	3,950	0
Stanford..	4,518	1	5	S. E. Moss &		
J. Quittenton	4,499	14	8	Co. ....	3,862	10
J. Barker &						
Co. ....	4,435	0	0			



**LLANAEHLIAIRN.**—For the erection of a new schoolroom, for the Babel O.M. Committee, Llanaelhialarn. Mr. W. W. Jones, architect, Salems-place, Pwllheli—  
 W. & R. Jones .. £390 0 J. T. Jones .. £360 0  
 E. Thomas .. 378 10 Jacob & G. Wil-  
 J. Price .. 370 0 liams, Llanael-  
 W. Owen .. 370 0 hialarn .. 354 6

**LONDON.**—For alterations to engineering arrange-  
 ments, etc., in laundry at the South-Eastern Hospital,  
 New Cross, S.E., for the Metropolitan Asylums Board.  
 Mr. W. T. Hatch, Engineer-in-Chief:—  
 Moorwood, Sons, & Co., Ltd. .... £2,775  
 Death & Ellwood .. 2,500  
 Lea, Son, & Co. .... 2,380  
 T. Potter & Sons, Ltd. .... 2,175  
 South-Eastern Engineering Works .. 2,039  
 J. & F. May .. 1,910  
 J. Simpson & Co., Ltd. .... 1,828  
 Wenham & Waters, Ltd., Paragon  
 Works, Croydon .. 1,810

**PURPLEET.**—For the erection of a house, for the  
 Purified Chalk Quarries Company. Mr. C. M. Shiner,  
 architect, London and Grays:—  
 Hammond & Son .. £750 G. Brown .. £847  
 J. Brown .. 680 Dobson & Davison .. 620  
 J. S. Lawrence .. 663

**REIGATE.**—For the erection of house, etc., Pilgrim's-  
 way, for Mr. E. Poland. Mr. C. E. Salmon, architect,  
 Bell-street, Reigate:—  
 G. Martin .. £2,680 W. Bagaley & Sons £2,350  
 C. Nightingale & J. King & Son .. 2,185  
 Sons .. 2,419

**BUSTINGTON (Sussex).**—For new sun room, bay  
 windows, verandahs, lavatories, etc., to Millfield House,  
 Messrs. Rowland, Plimbe, & Harvey, architects, 18,  
 Fitzroy-square, W. Quantities by Messrs. Fowler &  
 Huggan:—

	Alterations.	Painting.
Cropley & Sons .. £3,100 0 0	£752 0	
Kirk & Randall .. 2,892 0 0	739 0	
Cropley Bros., Ltd. .... 2,873 0 0	649 0	
Lole & Co. .... 2,835 10 0	542 10	
J. Parsons & Sons .. 2,809 0 0	838 0	
J. Longley & Co. .... 2,739 0 0	849 0	
H. Kent .. 2,701 0 0	618 0	
A. F. Vigor & Co. .... 2,622 0 0	679 0	
W. A. Field & Co. .... 2,562 0 0	812 0	
Biggs & Hill, Ltd. .... 2,544 0 0	594 0	
G. Godson & Sons .. 2,522 0 0	680 0	
Peetree, Dennis & Co. .... 2,485 0 0	635 0	
W. Johnson & Co., Ltd. .... 2,485 0 0	685 0	
J. Martin .. 2,450 1 11	715 0	
F. Sandell & Sons .. 2,390 0 0	524 0	
R. Cook & Sons .. 2,318 0 0	662 0	
J. Linfield & Sons, New-road, Little- hampton .. 2,279 0 0	541 0	

**SHEFFIELD.**—For the erection of seventy dwellings,  
 Edmond-road and Cough-road. Mr. C. F. Wilks,  
 M.Inst.C.E., City Engineer, Sheffield:—  
 Excavators, Bricklayers, and Masons:  
 Wellerman Bros., Hyde .. £7,836 0 0  
 Carpenters and Joiners: T. Roper & Son,  
 Sheffield .. 2,855 5 8  
 Plumbers and Glaziers: Hull & Son,  
 Nottingham .. 698 0 0  
 Plasterers: T. Boyer & Son, Sheffield .. 770 0 0  
 Slaters: Dawber, Townsley, & Co., Ltd.,  
 Bull .. 641 16 0  
 Painter: A. Machin, Sheffield .. 202 19 9

**SHEFFIELD.**—For alterations and additions to  
 Wesley College Buildings to adapt them for use to  
 King Edward VII. School, for the Education Committee,  
 Messrs. Gibbs & Flockton, architects, 15, St. James's-  
 row, Sheffield:—  
 Arncliffe & Hodgson .. £23,640 0 0  
 D. Gill & Son .. 23,381 0 0  
 H. Brumby & Son .. 21,700 0 0  
 W. & A. Fordive .. 21,630 0 0  
 J. Ebbelby & Son .. 21,350 0 0  
 G. Carr .. 21,200 0 0  
 J. T. Wright .. 21,200 0 0  
 D. O'Neill & Son .. 21,160 0 0  
 T. Wilkinson & Son .. 20,908 0 0  
 T. Roper & Sons, Ltd. .... 20,877 0 0  
 J. Fidler, Ltd. .... 20,827 0 0  
 J. Vasey & Son .. 20,710 0 0  
 G. Longden & Son, Ltd. .... 20,551 14 11  
 J. Mastin & Son .. 20,500 0 0  
 H. Boot & Son .. 20,000 0 0  
 T. Lowe & Sons .. 19,985 0 0  
 Ash, Son, & Biggin, Ltd. .... 19,960 0 0  
 Dawson, Jones, & Co., Sheffield .. 19,298 15 0

**SOUTHAMPTON.**—For erecting artisans' cottages  
 on the Sunnall-street area, for the Corporation. Mr.  
 C. J. Hair, architect, 23, Portland-terrace, South-  
 ampton. Quantities by Mr. J. F. Crook, Cambridge-  
 road, Southampton:—  
 Brown & Sons .. £3,399 0 G. R. Long .. £3,174 15  
 H. J. Hood .. 3,238 0 J. J. Nichol, Bil-  
 Jenkins & Sons, .. 3,264 0 Southamptn, 3,099 0  
 [Recommended for acceptance by Committee.  
 [Architect's protecting tender, £3,276 6 5]

**STIFFORD.**—For the erection of a cottage at  
 Stifford Lodge, Essex, for Mr. H. E. Brooks. Mr.  
 C. M. Shiner, architect, London and Grays:—  
 G. W. Cooke .. £490 J. J. Lawrence .. £411  
 J. Brown .. 449 H. J. Carter .. 318  
 G. Brown .. 432 Dobson & Davison .. 268

**TILBURY DOCK.**—For the erection of eight cottages  
 in Malta-road. Mr. C. M. Shiner, architect, London  
 and Grays:—  
 G. W. Cooke .. £1,600

**TILBURY DOCK.**—For the erection of five shops in  
 Dock-road. Mr. C. M. Shiner, architect, London  
 and Grays:—  
 G. W. Cooke .. £1,920

**TOOTING BEC.**—For dismantling and re-erecting  
 boiler feed pumps, etc., and building work in connection  
 at Tooting Bec Asylum, for the Metropolitan Asylums  
 Board. Mr. W. T. Hatch, Engineer-in-Chief:—  
 Welch, Benham, & Co., Ltd. .... £264 18  
 T. Potter & Sons, .. 234 0  
 G. Hopkins & Sons .. 218 0  
 J. & F. May .. 215 0  
 [£5 less if armature is not defective.]

**WORKING.**—For the erection of a new school at  
 Maybury, Working, for the Surrey Education Committee.  
 Messrs. Jarvis & Richards, architects:—  
 F. Aylott .. £8,966 16 9 McC. E. Pitt .. £8,249 0 0  
 J. Barker & Co. .... 6,315 0 0 Higgs & Out-  
 Toogood & Co. .... 6,745 3 7 waite .. 6,195 0 0  
 T. Stimson .. 6,566 4 4 E. C. Hughes .. 6,158 0 0  
 G. Kemp .. 6,459 0 0 Drowley & Co. .... 6,077 6 4  
 Martin, Wells, & Co. .... 6,450 0 0 R. Ely .. 5,996 0 0  
 J. Hart .. 6,350 2 8 T. J. Hawkins .. 5,885 0 0  
 East & Hyde .. 6,329 0 0 Co. .... 5,702 0 0

**YNYSBYWL.**—For alterations and additions to Zion  
 English Baptist Chapel, for the Trustees. Messrs.  
 Morgan & Elford, architects, 1, Jeffrey-street, Mountain  
 Ash:—  
 Williams Bros., Ynyssywl, Pontypridd .. £1,600

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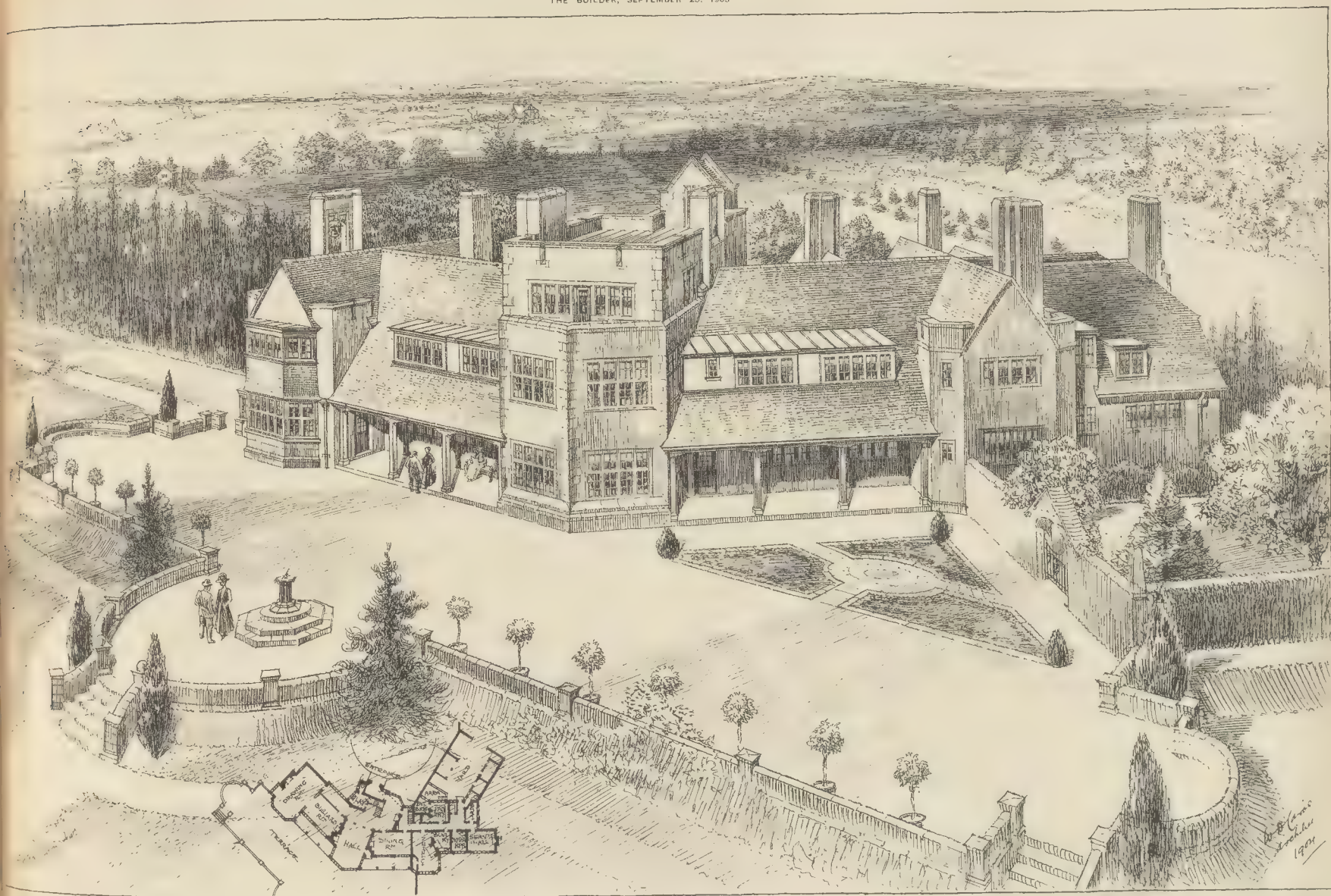


PHOTO. T. D. SPRAGUE & CO. 445 EAST HADSDON STREET PITTSBURGH, PA.

HOUSE NEAR DUBLIN MR W D CAROE, F.R.I.B.A. ARCHITECT  
VIEW OF ENTRANCE FRONT.





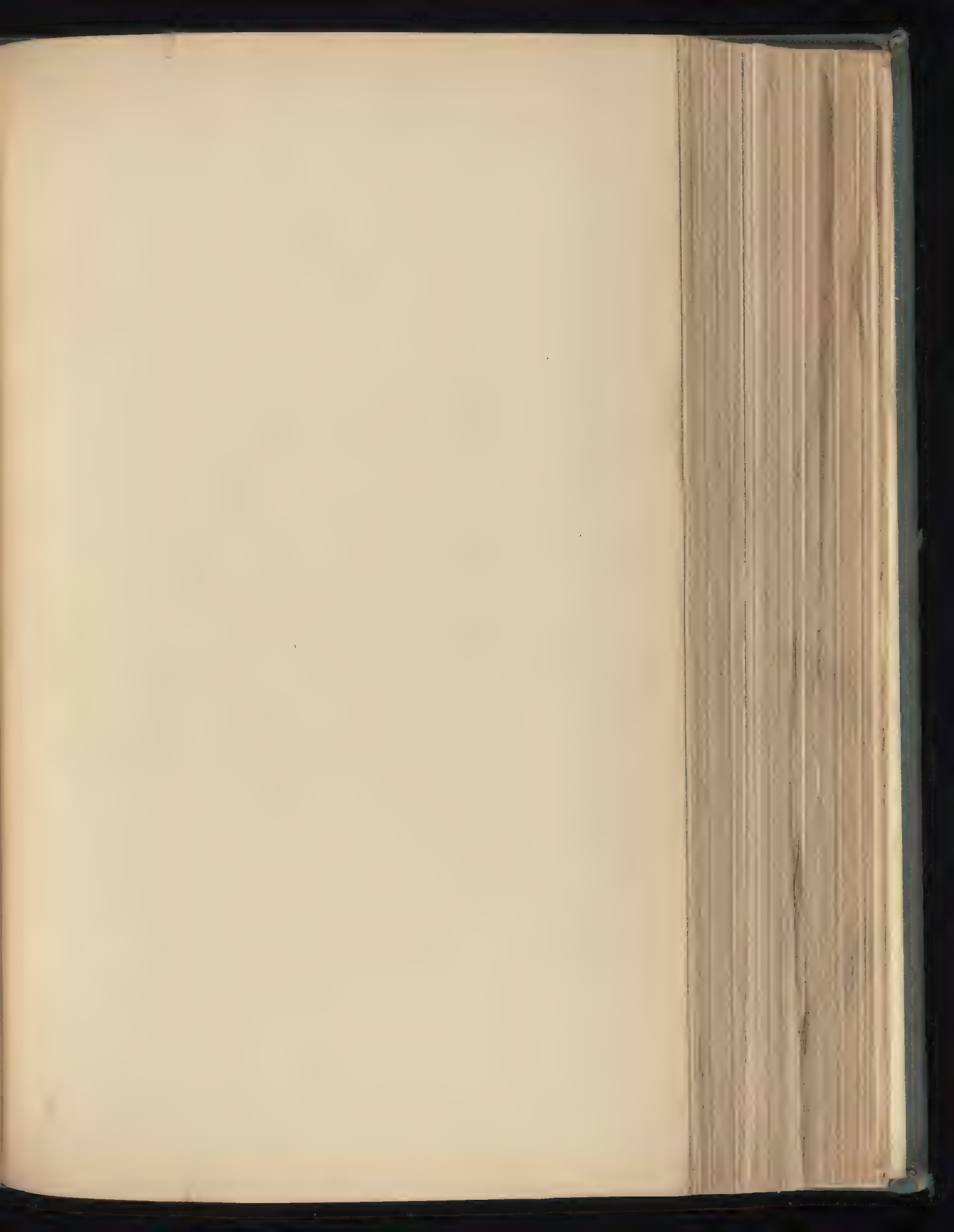


HOUSE NEAR DUBLIN.—MR W. D. CAROE, F.R.I.B.A., ARCHITECT.

VIEW FROM GARDEN.







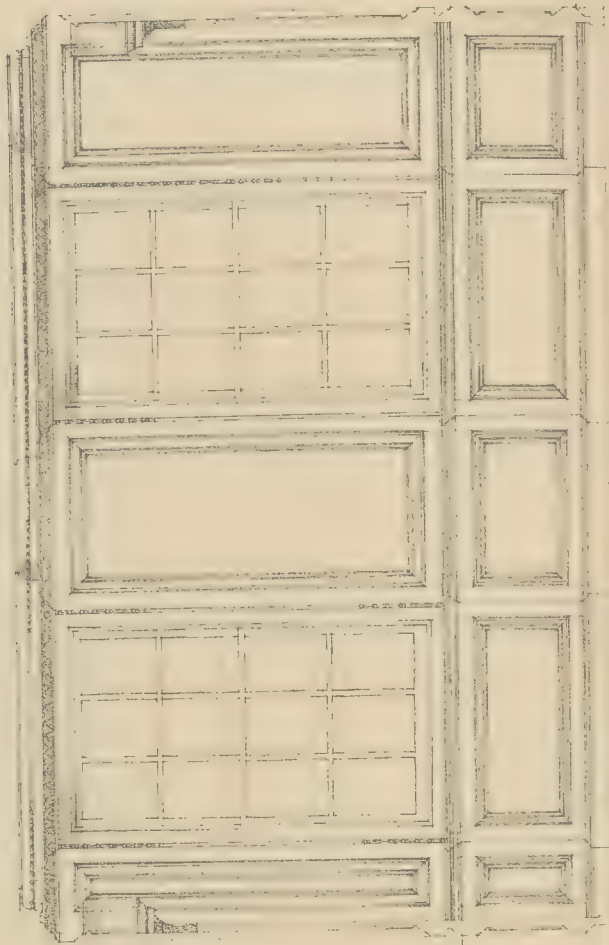


THE BUILDER, SEPTEMBER 23, 1905.

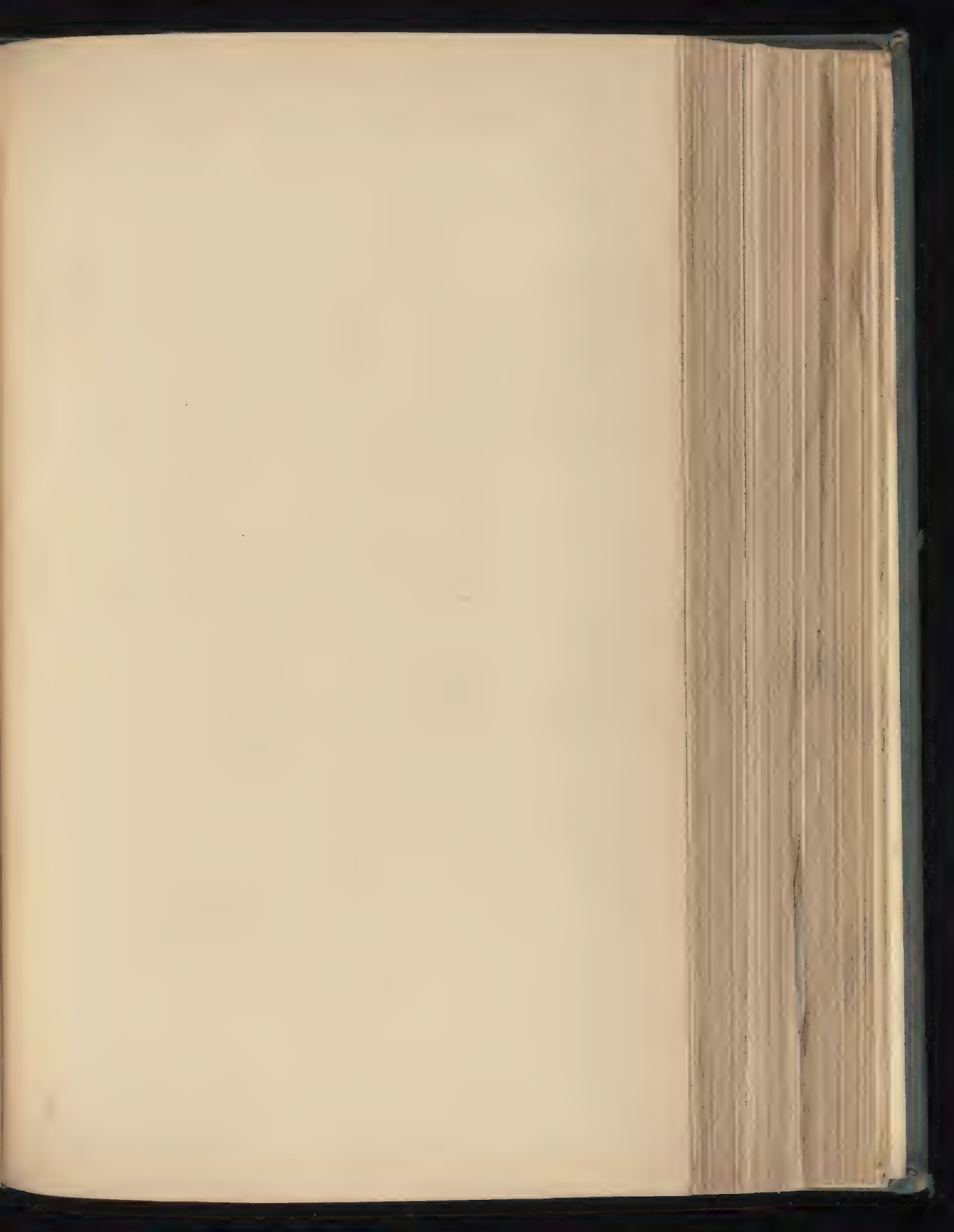
# N<sup>o</sup> 3 CLIFFORD'S INN.

SCALE DRAWINGS OF PANELLING ROOM

DRAWING N<sup>o</sup> 3.



THE BUILDER, SEPTEMBER 23, 1905.

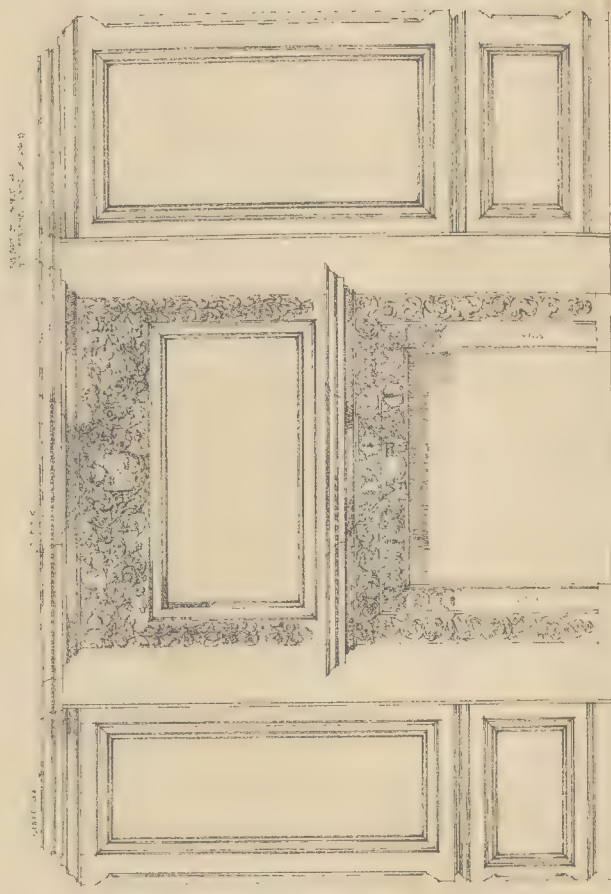




THE BUILDER, SEPTEMBER 23, 1905.

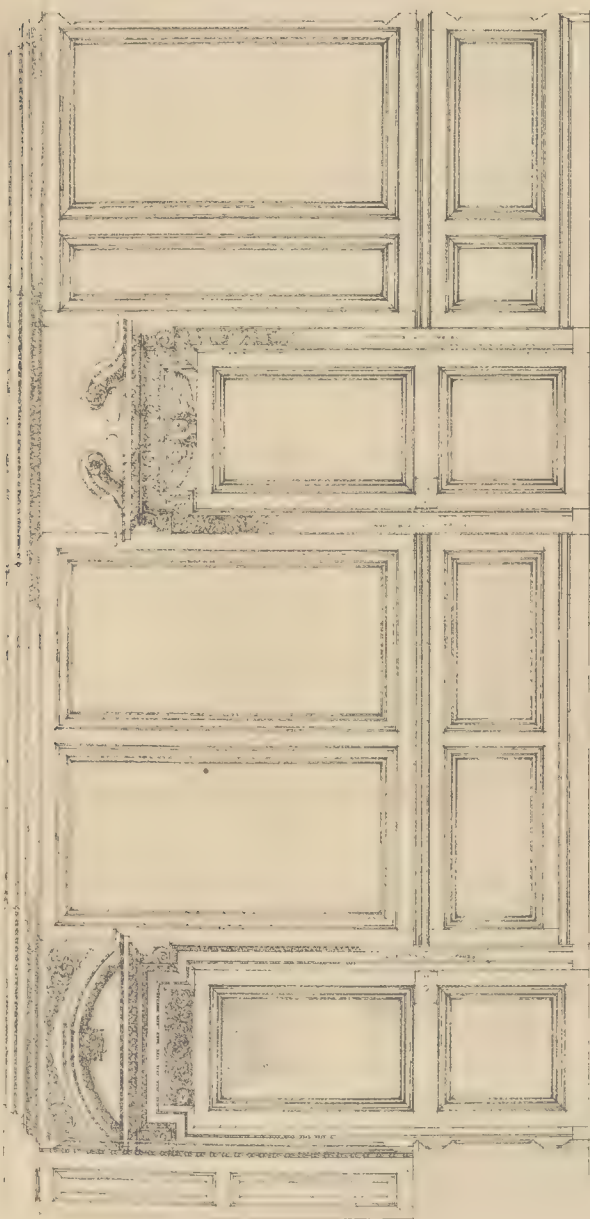
# №3 CLIFFORDS INN.

SCALE DRAWING OF PANELLED ROOM.



ELEVATION OF THE ATRIUM





NOTION OF SET-B.

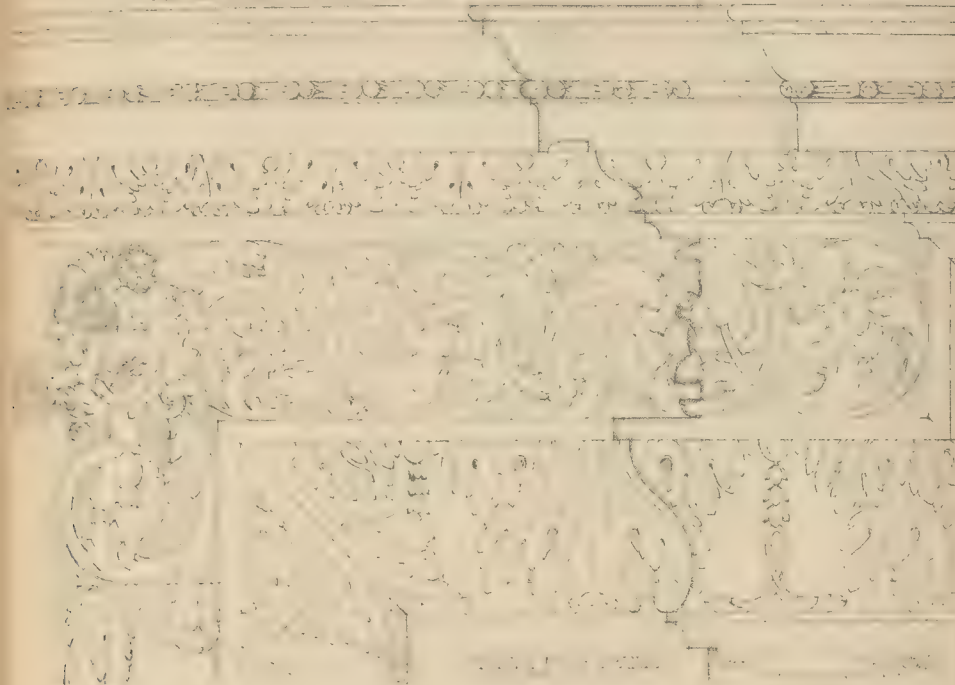
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# Nº 4 CLIFFORDS INN

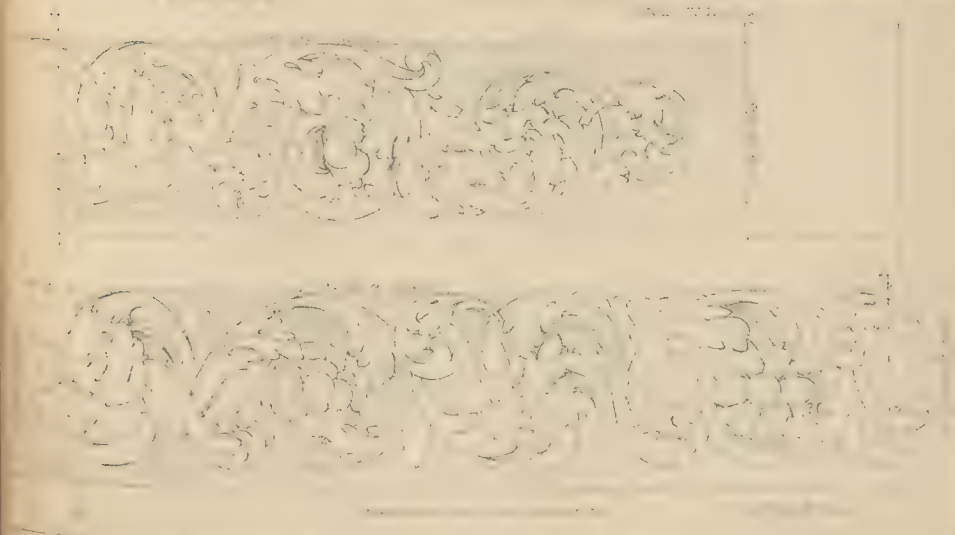
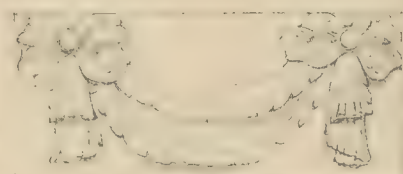
PLAN OF DETAIL OF PORCH AND ROOM



# Nº 3 CLIFFORDS INN

PLAN OF DETAIL OF PORCH AND ROOM

## CHIMNEY PIECE DETAILS







# The Builder.

VOL. LXXXIX.—No. 1260.

SEPTEMBER 30, 1905.

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House, No. 95, Sloane-street.....	Mr. Ambrose Poynter, Architect.
Details from Old House, Clifford's Inn (two sheets).....	Drawn by Mr. John Barbour.

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### What is a Garden City?

THE expression "Garden City" has been constantly in our ears for some time back. It is a kind of summary or shorthand expression which implies a great deal, but in a rather vague manner, and may be interpreted in different ways by different people. It may stand for something merely Utopian and impracticable, or for a scheme which is common-sense and practical. Whether one should encourage garden cities, either by moral support or by the more practical operation of sinking money in them, would with most people depend a good deal on whether they read into the term the Utopian or the practical signification.

In a broad sense, we take it that a Garden City means a city which is laid out with a view to securing beautiful and hygienic conditions, instead of that utilising the greatest possible amount of building land for shops, manufactories and residences, and getting the largest possible rent from it. And as it is difficult to imagine the existing cities of crowded streets being metamorphosed into garden cities, the idea seems almost necessarily to include the deliberate making of new cities on a preconceived plan, instead of allowing them to grow up by a mere process of adding house to house and street to street as the demand

The idea of planning and designing a city on a selected site, as one would plan a country house and lay out its grounds, is a fascinating one; but it was more easy of realisation in ancient times, when a city was of comparatively small dimensions and was necessarily confined within the definite limits of a wall of defence. In those days kings or conquerors founded cities for their own glory, and probably in most cases with forced labour. In the present day we have to look for people who will take shares, and to consult the probable tastes of the intended inhabitants as well as the cost of labour and materials: and when all is done, we cannot command tenants at our pleasure. And a too artificial and formal plan will be likely only to please a minority, who may approve in theory of a formally laid-out city, but not of that particular form.

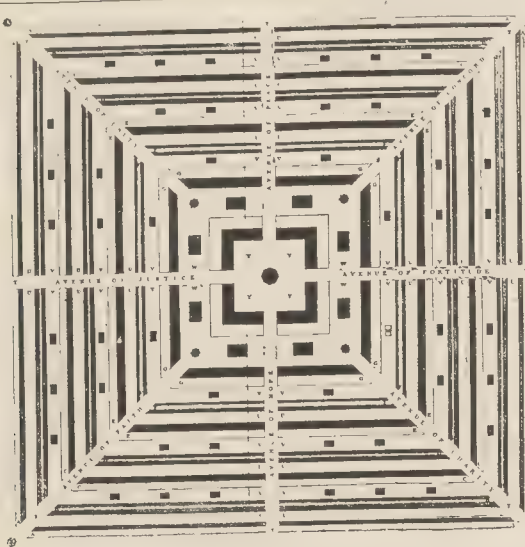
The portentous work in which Mr. A. R. Sennett, a member of the Institution of Civil Engineers, has undertaken to expound the theory and practice of garden cities,\* in two volumes each 2½ in. thick and containing together 1,385 pages, seems to be rather pervaded by this mistaken ideal. There is a great deal more, it is true, than that, for the range of the book is immense; the author seems to have aimed at nothing less than providing the maker of cities with suggestions upon every possible subject in connexion with the laying out and working of cities—

drainage; method of street alignment; section of roads; means of locomotion; social and municipal economy; industries to be encouraged and provided for, etc. The book is too wide in its scope, in fact, and would have been more likely to be read and studied if its aim had been more concentrated, and also its composition. For in many places what the writer has to say might have been said much more concisely and in much more simple language. There is far too much in it of what is mistakenly supposed to be fine writing, passages of flowery metaphor which would be out of place in a book for a practical purpose even if they had been better, but which in fact are in a very poor and tawdry literary style. It would be waste of space to give examples; but if the author had followed the advice once given to a young preacher—"Strike out every passage you think fine," his book would have been at all events more readable.

Before going into the general consideration of the subject, we may notice one of the practical suggestions made in the introductory part of the book, in regard to the formation and the cleansing of roads. Mr. Sennett is prepared to improve nearly everything in existence according to some new suggestion of his own; those connected with the section of roads are more reasonable than some of the others. He suggests that the time-honoured barrel section of a roadway, for purposes of drainage, is a mistake; that it is making two channels for carrying off rain and detritus where

\* "Garden Cities in Theory and Practice." By A. R. Sennett, M.Inst.C.E., etc. London: Bemrose & Sons, 1905.





Buckingham's Square City.

one would suffice; that the section should be the reverse way and should dip towards the centre, with a grid down the middle of the roadway; and he suggests a flushing of the roadway at intervals from continuous pipes under the curb, whence the flushing would descend naturally to the centre grid and thence to the drain, instead of requiring a drain on each side of the road. Like others of the author's suggestions, it is ingenious and perhaps worth consideration. The practical objection is that in all streets that are at all crowded there is constant necessity for vehicles to cross the centre of the road in the give-and-take of driving, and in that case the centre grid might lead to the slipping and falling of horses. The objection would be less were motor vehicles to become universal.

As has been intimated, the idea of a symmetrically laid-out city is the outcome of the author's recommendations, and to the extent to which it is carried here we believe it to be a mistake. But it is of some interest to notice that this idea of the rigidly symmetrical city was that of the man who is said by the author to have been the pioneer of the Garden City idea, J. Silk Buckingham, who in 1849 put forth the ideal plan of a square city which we have reproduced from Mr. Sennett's book, and which is at all events historically interesting. From the long description we learn that the outer row (A) on each side of the square was to contain 1,000 dwellings, 250 on each side; the next line (B) is a continuous covered gallery or arcade 100 ft. wide, one story, with a flat roof to form an open promenade; then come a series of grass lawns, "and in each of these lawns are placed the public edifices, forty-eight in all—of 100 ft. by 50 ft. each, with two stories, completely isolated from connexion with all other buildings, in order to ensure perfect ventilation, with numerous avenues of ingress and egress." We cannot go through all the description

of the various zones. The public buildings in the usual sense of the word (for those already so named are only restaurants or such other places as are not private houses), the municipal buildings, museums, churches, etc., are in the grand central square, and in the centre of all a vast octagonal tower, to contain an electric light for lighting the whole town. Mr. Buckingham thought it well to give a perspective view, which, together with the plan, rather suggests the celestial city, with all its careful measurements, described in the Book of Revelations. But celestial cities, unfortunately, are not suited for terrestrial occupation or for execution with terrestrial materials. If there were unlimited wealth at command, and one could have buildings all of the finest marble, and streets paved with costly materials, and everything else in keeping, one could imagine that this city might be a fine, even sublime, creation; but far too sublime for ordinary life, and too rigid in its conformation to be adaptable to the varying requirements of an actual population. To fill up the tale of inhabitants, it would be necessary to "compel them to come in"; to find the exact proportion of inhabitants whose means and way of living would suit respectively with each of the classes of buildings provided. It is a mere impracticable vision.

Another projector, a Mr. Howard, appears to have suggested an equally symmetrical circular city, of which also we give the plan, as the two ideas are complementary, the one representing in its extreme form the right-angled ideal, the other the circular ideal. The idea of a circularly planned city, with avenues radiating from the centre, is fascinating in a certain way; but as the author points out, the practical objections to it are very great, notably the inevitable preponderance of awkwardly shaped sites and buildings.

In taking these two plans as representing the square and the circular or

segmental elements in street alignment, the author has however something to say which is to the point. In considering the subject generally, he deprecates the employment of streets laid out in the forms of a circle in any case, but the eye cannot take in the whole, and it has a closed-in effect. He points to the Ring-Strasse at Vienna, in spite of its name, is not laid out in a curve, but as a polygon, in a series of straight lines of street making angles at the junction; and he gives a view of the Regent's Quadrant (with the old naves) by way of illustrating this in effect. Of course in such cases streets there is always the objection of the awkward shapes into which the plans of the contiguous streets fall (though this may be met to some extent by refinements in planning); and we quite agree that we should not recommend any predominance of streets laid out on a curve. But Mr. Sennett looks at the matter too entirely from an engineer's point of view, as is illustrated by his reference to York railway station, where (as he rightly says) the curve is a disadvantage because neither passengers nor officials get a complete view of a long train—on the convex of the curve at all events. But he does not seem to realise that what he calls a closed-in effect may constitute a beauty now and again, when well introduced; that perpetual vistas of straight parallel lines are apt to become somewhat monotonous. A crescent is in itself a fine piece of architectural effect, involving certain inconveniences in detail, but nevertheless quite worth introducing occasionally; and the particular instance of Regent's Quadrant is a very good example. As a matter of alignment, it forms a very effective connecting link between two straight vistas of street, and affords a far better effect than if Regent-street had been continued in one straight vista from Waterloo-place to its northern termination.

The result of Mr. Sennett's home of curves, coupled with his desire for symmetrical laying out, appears to be that his model city would be laid out on what may be called the gridiron plan; so many large parallel avenues in one direction, so many smaller cross streets at right angles with them. In the details of his scheme there are some clever ideas. The sites for each separate house and garden are divided into a system of hexagons, to avoid useless corners; and they are arranged so that, while preserving outward uniformity, the owner of a house who wants more land than his neighbour may take in a piece of the adjoining hexagon. There are some good ideas about the roads. The author is right in his contention that a very wide road, however dignified it may be in appearance, is a waste of space and of upkeep if it is wider than is necessary for the accommodation of the traffic. He proposes, while preserving a great width between the frontage lines of the gardens, that part of the space of the roadway should be given up to grass or flower-beds; and that there should be on each side of this a roadway only wide enough to take half the normal traffic, each roadway being used for progress in one direction only. There is sense in this, and it is certain that an unnecessarily wide

case of paved roadway constitutes, as it is unused, a kind of desert, and desert which requires a continual culture to keep it in condition. It is necessary, however, to allow of cross-over communication for vehicles along one side of the road—the side properly allotted to them—and having to draw up at a house on the other side; the plan is therefore not so simple as it appears at first sight; but it is an idea worth consideration. We are inclined to agree with the author, in thinking that the dwellings for the poorer class of residents should be in a quarter of their own, and not mixed with those of the richer inhabitants. It has been part of the scheme of some enthusiasts that any artificial distinction between rich and poor quarters should be avoided in an ideal Garden City. Mr. Sennett, who is not troubled by any socialistic doctrines, maintains that this would be disagreeable to the well as to the rich; that the poor as well as the latter like to have their own quarters, suited to their own way of living. We have never heard of the opinion of a member of the poorer class on this point, but we are inclined to think Mr. Sennett is right. There are other clever and suggestive schemes, which have to be arranged from a great deal of uncertainty. But when all allowances are made for these more or less suggestions, we are obliged to come to the conclusion that Mr. Sennett's plan of a city is a kind of nightmare of parallelograms. It is the "villa city" in excelsis. Who would wish to live in a city, however the gardens are considered over the buildings, mixed up into an eternal succession of plots of the same size, and parallel roads in one way crossed by parallel roads at right angles, and all at equal distances? Nothing could be more dull and monotonous.

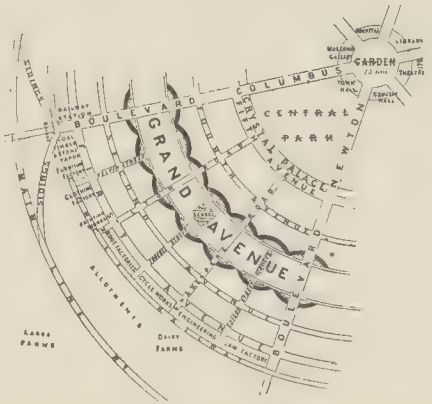
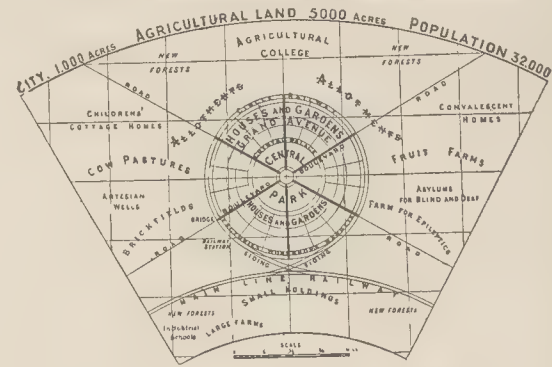
Now if the task is undertaken of laying out a city deliberately, to constitute a city which can be rightly called a "Garden City"—a city in which pleasant effect is considered as well as the mere provision of so many residences and shops, it will not be on this kind of mechanical system that it will be rendered pleasant and attractive. People do not want to live in a place cut out automatically into so many plots of the same size and shape. What is required in laying out such a town is the provision of a certain amount of dignity and formal alignment at the most important parts of the site—for dignity in city structure is impossible without axial alignment—coupled with a certain degree of freedom and variety in the subordinate portions. It is a difficult problem, it requires that those who undertake it should perceive where symmetry is required in axial laying out are required, and where this may be dropped in favour of a more artificial system. Where there are curves they should be geometrical curves; where laid out in a sinuous line to look picturesque are never a success; they are as bad as the twisting walks which are to be considered the right thing in a garden. The natural character and contour of the ground will suggest

something. So far as one can judge from the map appended to the pamphlet, "Garden City in the Making," prepared by the Secretary and issued by the Garden City Press, it would seem that this mania for mechanical symmetry has not possessed the promoters of the City at Letchworth. Only some of the humbler residences (some of which form part of the "Cheap Cottages Exhibition") are at present built, and as far as one can judge by the indications on the plan, there seems to be the intention to keep a kind of division between the humbler and the more important class of houses. In what will evidently be the richer quarter there is a general scheme indicated for a central or nearly central square or place, with a wide main avenue to south and north axial with it. The larger run of the main avenue, to the south, turns slightly in line at one place, on what the French call a *rond-point*; and there are diagonal roads running up to the south-east and south-west corners of the central square. The plan as indicated is only, we gather, a first idea, which may be subject to modification. But so far, it seems to show that the promoters have got hold of the right notion of the way to treat the site. They have provided sufficiently for a dignified centre, without showing any indication of intending to parcel out the land on a mechanical system. "It is proposed," we read, "to have considerable variety in the character of the roads, and while the actual roadway will be adapted to the probable volume of traffic, the total

width will be increased in many cases by grass margins between the roadway and footway, in which trees will be planted, or by continuous strips of grass or garden between the roadway and the houses." The photographs given of some of the charming country nooks in the neighbourhood of the site indicate that these are valued and that it is desired to keep them unspoiled. If the indications of the plan given are in the main adhered to, we may take it that the central portion of the town would be distinctly urban in character and with a certain architectural dignity, and that the more outlying portions would be left to fall into a certain degree of picturesque variety which would lead them to blend naturally with the unbuild country around. If that is the idea, it is the right one. Whether this interesting experiment will succeed financially and in other respects is yet to be seen; we are not attempting here to forecast its fate in that respect; but if successful, it seems to promise to realise what we think should be properly implied in the term "A Garden City."

RECENT PROGRESS IN THE USE OF GAS.  
By H. F. HILLS, CHEMIST TO THE COMMERCIAL GAS CO., LONDON.

SEVERAL events have of late occurred to reawaken public interest in the possibilities of gas as a source of light, heat, and power. So far as lighting is concerned the matters



Mr. Howard's Circular City.



which have evoked most comment in the popular Press are (1) the decision of the Corporation of the City of London to have the electric arcs removed from Fleet-street, Queen Victoria-street, and some other important City streets, and to erect in their place incandescent gas lamps; (2) the decision of the London County Council to remove the electric standards from Waterloo Bridge, replace the bronze standards which formerly stood on the bridge, and to furnish them with incandescent gas burners; (3) the substitution of gas for electric light at the old Victoria station of the L. B. & S. C. R. Co., and the adoption of gas in preference to electric light in the new station; and (4) the lighting of the new important London thoroughfares, Aldwych and Kingsway, with gas lamps in preference to electric arcs.

In those cases in which gas is taking the place of electricity as a source of light a substantial monetary economy is being effected, and it is stated by the various authorities responsible for the changes that the lighting will not be in any way less efficient. In the case of Victoria station the Chairman of the railway company has expressed great satisfaction both with the lighting as effected by gas and with the large decrease in the cost of the lighting.

Apparently, also, many private consumers, like the public authorities, are dissatisfied with electric lighting, for in the district of one gas company alone (the Gas Light and Coke Co.) over 1,200 electricity consumers have discarded electric light in favour of gas, and on a smaller scale similar reversion is taking place in many other districts.

While, however, the Welsbach system of lighting has given a new lease of life to gas as an illuminating agent, it has acted prejudicially against the gas companies in the matter of gas consumption. Sir George Livesey recently quoted 37 per cent. as the average decrease in gas consumption in a number of cases where a change had been made from gas lighting with luminous flames to incandescent lighting; and, although the decrease in consumption due to the change is very variable in different cases, the introduction of the incandescent burner always results in a very substantial reduction in the quantity of gas used for lighting. Taking the last published returns of the Board of Trade relating to the authorised gas undertakings of the United Kingdom, and calculating therefrom the percentage increases in the number of consumers and the percentage increases in gas consumption during the last five recorded years, it is seen that in the case of the undertakings owned by companies the rate of increase in the number of consumers has throughout this period always exceeded the rate of increase in the quantity of gas consumed. For three years the same thing is observable in the case of the gas undertakings owned by local authorities. In the year 1903, however, an increase in gas consumption of 3.5 per cent. and a decrease of 1.2 per cent. in the number of consumers are shown, and in view of the returns for the preceding four years these figures are so extraordinary that it appears as though an error must have been made in the returns.

## BRITISH GAS UNDERTAKINGS (COMPANIES)

Year.	Thousands of Cubic Feet of Gas Sold.	Number of Consumers.	Percentage Increase in Gas Sold.	Percentage Increase in Number of Consumers.
1898	80,077,717	1,670,817	—	—
1899	84,752,031	1,817,649	5.8	8.7
1900	87,637,174	1,945,826	3.4	7.0
1901	89,635,208	2,048,369	2.2	5.2
1902	91,666,824	2,197,987	2.5	7.3
1903	93,923,590	2,385,318	2.1	8.6
Increase in five years ..			16.0	36.7

## BRITISH GAS UNDERTAKINGS (LOCAL AUTHORITIES).

Year.	Thousands of Cubic Feet of Gas Consumed.	Number of Consumers.	Percentage Increase in Gas Consumed.	Percentage Increase in Number of Consumers.
1898	47,287,360	1,678,291	—	—
1899	50,969,666	1,667,908	7.7	5.6
1900	52,781,330	1,767,464	3.4	6.9
1901	54,373,318	1,872,533	3.1	6.9
1902	56,776,260	1,970,788	2.5	5.2
1903	57,764,404	1,945,777	3.5	-1.2
Increase in five years ..			20.2	21.4

## NUMBER OF BRITISH GAS UNDERTAKINGS.

Year.	Owned by Companies.	Owned by Local Authorities.
1898	480	222
1903	469	200

The fact that the number of consumers is increasing at a more rapid rate than the increase in the gas output is due partly to the substitution of incandescent burners for flat flame burners, and partly to the rapidly increasing proportion of working-class consumers, who mostly consume comparatively small quantities of gas.

Fortunately for the gas companies the volume of gas used during the hours of daylight (for cooking, etc.) has been steadily increasing for many years past; otherwise many companies which have always been able to show a slight increase in the annual output of gas would for some time past have been recording substantial decreases. Except in those districts favoured with a largely increasing population the annual sale of gas has been prevented from diminishing only by gas vendors resorting to energetic advertising and canvassing, to the extensive use of the hire and hire-purchase systems for the letting of gas-consuming appliances, and by the allowance of liberal discounts to those who use large quantities of gas for power purposes.

The Board of Trade returns also show that, contrary to the general belief, the total number of public lamps lighted by gas has continued to increase in spite of the fact that gas companies in a great number of cases have to compete with electrical undertakings owned by local authorities.

## PUBLIC LAMPS LIGHTED BY GAS.

Year.	Gas Supplied by Companies.	Gas Supplied by Local Authorities.
	Number of Lamps.	Number of Lamps.
1899	324,166	257,040
1900	326,813	278,343
1901	326,209	287,887
1902	333,308	294,828
1903	335,363	301,308

The success of gas for the lighting of important thoroughfares is largely due to the introduction of the method of supplying gas to the burners under a

higher pressure than that at which it issues from the street mains. By this method the temperature of the gas is increased (owing to a loss of heat of gas being consumed in a flame of fixed dimensions) and an efficiency of about 30-candle-power for every cubic foot of gas consumed per hour is obtained. Instead of increasing the pressure of gas flowing to the burner, the increase in flame temperature may be obtained by supplying compressed gas to the burner and using gas under ordinary supply pressures. In such case the flame temperature is increased by the adoption of the blow-pipe principle.

Except, perhaps, in a very few cases where ground space is scarce, a large number of small power plants are grouped together, as in the case of the printers in the neighbourhood of Fleet-street, gas has more than held its ground against electricity as a source of power, and gas engines are fast displacing steam boilers and engines in most of our large towns. A more formidable rival to town gas than electricity has appeared in the form of what are known as water-gas plants. Although the gas made at these plants is of extremely poor quality as compared with town gas, and is variable in its composition, it can be manufactured very cheaply where suitable fuel is available at a low price. Anthracite is the fuel most commonly recommended for use in water-gas plants, but in many manufacturing districts anthracite is comparatively costly, and in some cases the trouble attending to the generator and getting rid of the foul liquor from the washing apparatus is an objection to the installation of a suction gas plant. In some districts where coke is cheap water-gas plants have been successfully worked with this fuel, but up to the present suction gas plants do not appear, generally speaking, to have prejudicially affected the supply of town gas for power purposes to any material extent.

In the manufacturing districts in the North of England producer gas made in pressure plants (e.g., Mond gas, Dowson gas) is being extensively manufactured and used in the large factories, but in the cases the producer gas is taking the place of solid smoke-emitting fuel, and has very little influence upon the output of gas from the authorised gas undertakings of the Kingdom. The distribution of producer gas on a large scale from central stations has not yet sufficiently progressed to enable a reliable estimate to be made of the practical value of the various big schemes for the distribution of producer gas for power purposes only.

Whether the gas used is producer gas, water gas, or coal gas, those who are hoping that pollution of the atmosphere with smoke by either manufacturers or householders will soon be made illegal cannot but regard with satisfaction the great progress which has been made throughout the country in the voluntary substitution of smokeless gaseous fuel for bituminous smoke-emitting coal.

CONGREGATIONAL CHURCH, COCKES  
Congregational church is to be erected at Cockes on a site at the junction of Upper St. George's road and Western-road. The building will involve an outlay of £5,000, has been signed by Mr. W. J. Hale, architect.

## NOTES.

**A NOVEL** contention under the Workmen's Compensation Act was set up in the Camarvon County Court last week. Five years ago a workman engaged in the Dinorwic Slate Quarries met with an accident by which he lost his sight, when he was awarded full compensation, half wages, 10s. 5d. a week. The man is now seventy-three years of age, and an application was made to reduce the weekly payment on the ground that by reason of his age the man's earning power was lessened. The application was dismissed, but it was stated that there were no precedents governing the case. The case of *James v. Ocean Coal Company*, which we commented upon in our issue of May 28, 1904, is to some extent a precedent, in which it was attempted to reduce a workman's compensation on the ground that the percentages allowed in his old employment had dropped since the accident; but the Court of Appeal held that the amount of weekly payments when once determined was not subject to fluctuation. It will be remembered that the Bill to amend the Workmen's Compensation Acts contains provisions enabling men over sixty years of age to be employed under special contract at a lower rate of compensation; but it would be manifestly inequitable that a workman who, by reason of an accident, has been prevented from earning wages which would enable him to put by a provision for himself, should find the compensation paid him, and which never exceeds half earned wages, diminish by effluxion of time, at the time when he most needed support.

CONSIDERING the close connexion between Sheffield and steel it is very appropriate that the meeting of the Iron and Steel Institute, inaugurated on Tuesday, should be held in that city, the only wonder being that this should be the first occasion on which Sheffield has been selected as the place of meeting. The Sheffield University is the only institution of the kind in this country where metallurgy is recognised as a science, a development for which much credit must be given to Professor Arnold. There can be no doubt that this policy is wise, especially when it is remembered that far too many of the most important technical positions in the mining centres of British possessions are now occupied by Americans. Apart, however, from the scientific study of metallurgy, Sheffield continues to maintain the prominent position it has always occupied in the industrial practice of that science, and at the present time probably employs more men than any other city of the world in the production and working of steel. In Mr. R. A. Hadfield, the president for this year, we have a worthy member of that band of pioneers which has done so much for the development of the steel industry. In his opening address Mr. Hadfield recalled the association of Sheffield with the metallurgical products from the days of Chaucer downwards. The valuable work of Huntsman at the XVIIIth century is well known, and it is worthy of note that the practical development of the Bessemer process

was carried out by Sheffield men. The first steel rails were produced by Sir John Brown at the Atlas Works in 1861, and, as Mr. Hadfield remarked, "Sheffield might be rightly said to have taught America how to make steel rails used in those lines of communication that had entirely altered the whole face of the vast Transatlantic continent." It is right to remember also that Sheffield played an important part in the perfection of the Siemens process of steel production, and that nearly fifty years ago Dr. Sorby there initiated the microscopic examination of metals, a method to which we owe much of the knowledge that has been obtained as to the structure of steel, and which is still being applied with the most useful results.

**SINCE** the publication of Mr. Carle's letter in the *Times*, a fair share of attention has been attracted to the intolerable nuisance caused by the chimney shaft of the Metropolitan Railway Power Station. But we do not gather that the Willesden District Council have as yet made up their minds to institute vigorous measures with the object of compelling the company to consume their fuel properly, instead of distributing finely-divided carbon over the whole countryside. In a well-designed boiler plant it is perfectly easy to insure the smokeless combustion of the most bituminous coal. The question is simply one of finance. If boilers have not been provided with suitable furnaces and smoke prevention apparatus, and if coal can be procured at low cost, industrial companies often prefer to pay an occasional fine rather than to incur capital expenditure. Repeated fines and the probability of proceedings in the High Court generally lead to reform, and we have no doubt this would be the result at Neasden, if the local authorities could be persuaded to take the matter up in earnest.

**A MOVE** in the right direction has certainly been made by the Automobile Club in conducting trials intended to show the relative dust-raising powers of different types of motor-car. The dust nuisance has always been with us, although accentuated since the advent of automobilism. Consequently it is the duty of highway authorities to adopt improved methods of road construction, and of those interested in the design of mechanically-propelled road vehicles to do what they can to avoid the unnecessary raising of dust. The recent trials near Maidenhead showed that one or two cars behaved in a fairly reasonable manner, thus indicating the bearing of design upon the dust problem. Pneumatic tyres are undoubtedly responsible for a large proportion of the dust raised directly by the suction exercised upon the road surface, and indirectly by tending to limit the diameter of wheels, thereby bringing the carriage body nearer to the road and increasing the power of a second cause of suction. Higher cars with solid-tyred spring wheels should be beneficial in two ways, by reducing dust production and by making excessive speed more dangerous to those who offend in that direction.

**THE** delivery of letters, etc., by pneumatic tubes in cities has suggested to several engineers the feasibility of sending letters and parcels between towns in the country by means of miniature railways worked electrically. In France, the *Société des Chemins-de-fer Electro-Postaux* have just completed a successful series of tests on an experimental line they have constructed. The line was constructed for a speed of 150 miles an hour, and so, many difficulties had to be overcome. It is a single rail system, but there are guide rails over the motor vehicle. When the curve on the line has a radius of 500 yds. it was found that the vehicle had to be tilted to an angle of 45 deg. with the vertical to prevent excessive wearing away of the rail at the high speeds. The vehicle is about 7 yds. long and is divided into five compartments. The two end compartments contain the oiling and "braking" appliances. Those adjacent to them contain the motors, and the central compartment can carry nearly half a ton of parcels. The track runs under wooden beams fixed into the ground and forming a series of inverted V's, so that it practically runs in a tunnel. It was found that a parabolic shape to the profile of the vehicle gave the best results. Three-phase currents were used, the currents being led to the motors by means of six bow trolleys, three at one end and three at the other end of the car. It was found that it took five minutes to acquire its normal speed of 150 miles an hour, and it required an equal interval of time to slow down to rest. Experiments are being carried out to see whether it could be brought to rest more quickly by using vanes to increase the air resistance when "braking." The vanes are to be worked by a cylinder of compressed air. A full account of the tests of the experimental line, with photographs of the track and motor vehicle, is given in *L'Industrie Electrique* for August 25, 1905. It is stated that it is feasible to maintain a regular transport service at 150 miles an hour.

**FOR** the last ten years the Edinburgh Water Trustees have been engaged in the construction of a large new reservoir and other works for the purpose of increasing the water supply of the city. These important works, which have a capacity of 25 million gallons daily, have this week been brought into practical operation. The reservoir is formed by an embankment 1,300 ft. long by 90 ft. high, stretching across the Talla valley, and has a length of more than 2 miles, a water area of about 295 acres, and a storage capacity of nearly 3,000 million gallons of water. The foundation is on solid rock into which the central puddle wall of the embankment is sunk to a maximum depth of 60 ft. This wall has a thickness of 40 ft. at ground level, tapering to 14 ft. at the bottom and to 10 ft. at the top, the width of the dam being 600 ft. at the base and 20 ft. at the top. Ample provision for flood water has been made by the construction of a masonry waste weir 200 ft. long, and the total length of the aqueduct is upwards of 35 miles. To give an idea of the temporary works required in



connexion with this undertaking we may mention that a temporary tunnel 400 yds. long had to be driven through solid rock to carry away the river water during the construction of the embankment, and that the economical transport of material involved the construction of a railway 9 miles long from Broughton to the site. As the catchment area of the Talla valley covers some 10 square miles, it is tolerably certain that the new works should definitely settle the question of water supply for Edinburgh for the ensuing generation at least.

Statues  
in the  
Strand.

We recollect being surprised, at the time, at the unexpected interest which one of our most eminent sculptors displayed some months ago in regard to the alignment of the north side of the Strand, and the necessity of bringing the axis of the street central with that of the line between the two churches. It is not usual to find sculptors going out of their way to take so active a part in a purely architectural question. Perhaps the fact that Mr. Thornycroft's statue of Mr. Gladstone is shortly to be unveiled at the east end of Aldwych and in close proximity to St. Clement Danes, may afford some explanation for this anxiety on the part of the sculptor to widen the vista of the street; a wish with which we were entirely in sympathy were it not that the cost of the land to be given away for the purpose seemed disproportionate, at all events from the ratepayers' point of view, which must not be entirely despised: There is now talk of a statue of Dr. Johnson to be placed somewhere in the Strand—but where? Its most suitable position would be some little way eastward of St. Clement Danes, nearly opposite the Court in which Johnson for a long time lived; but there is the Griffin in the way. We hope however that Johnson's memory will be honoured by a monument, including an effigy of some kind; he was a greater man than Gladstone; but the nature of the monument should be carefully considered. It may be a question whether it is desirable to perpetuate in sculpture his awkward and very unsculpturesque figure. A portrait bust, with some suitable symbolical surroundings, would seem a more promising scheme from the artist's point of view. Realistic portrait sculpture of full length figures, in their habit as they lived, is not the best application of the art of sculpture. In case of either bust or figure being adopted, however, no better inscription could be found than that which Beauleck placed beneath the portrait of his distinguished friend:—"Ingenium ingens inculto sub hoc corpore latet."

Pictures  
and  
Decorative Art.

In his paper read at the meeting of the "Association of Master House-Painters and Decorators" at Plymouth, Mr. G. C. Haité complained with reason of the way in which the Royal Academy had practically ignored decorative art in their exhibitions as well as in their curriculum—they having on their teaching staff professors of painting, sculpture, architecture, anatomy, and chemistry, but no professor of decorative design; and it is only recently that even a few articles

of decorative work or jewellery have been allowed to find place in their annual exhibitions. And we know that a late eminent President of the Academy, Lord Leighton, had strong feelings on this subject himself, and used his influence as far as possible in favour of a greater attention to decorative art, even making it a special feature (with great success) at one of the winter Loan Exhibitions. So far we are quite with Mr. Haité. But when he implies that decoration is an art on the same level as the painting of pictures or the production of ideal sculpture, he goes too far. Whistler's theory that a picture was only a pattern implies a very restricted view of the art of painting. It is to be a "pattern" in the first instance, no doubt—that is to say, it must have decorative value in line and colour; but painting or sculpture of the highest class is something more than that; it appeals, or may appeal, to the intellect in a way in which no mere decorative scheme can. No one will ever persuade us that Titian's "Bacchus and Ariadne" is not something with an intellectual interest far higher than any decorative design can lay claim to. Painting is not only decoration; it is a great intellectual art; the world has long ago made up its mind on that, and is not likely to alter it.

#### NOTES AT ANTWERP.

It is said that Antwerp owes her origin to a fortified castle built on a piece of projecting land on the right bank of the Schelde at a point near the present museum of antiquities, which intersects the quays. This castle was the "Burgh." The actual date of its construction is uncertain, though it is generally supposed that it was built some time during the VIIIth century. This would make it about 200 years older than a similar edifice built by Baldwin I. at Bruges. Of the earlier history of the town little is known. Apparently the land in the vicinity of the burgh belonged to successive Dukes of Brabant. In the XIIIth century, however, documents of a more or less municipal nature, some of them so humorous as to court disbelief in their authenticity, began to be preserved, and many are now to be found in the city records. Some of these documents concerned the various agreements entered into between the dukes and the people, these latter it may be supposed, having year by year become less servile and more desirous of obtaining the rights and privileges of citizenship. From servants they became tenants, from tenants they gradually metamorphosed themselves into townfolk. And in the course of these changes there were, as might have been expected, many quarrels. The dukes, like so many of their class both before and after their time, were jealous of what they considered their rights as "lord of the manor." But such privileges as the use of certain gates, the various rights of way, and the like, were keenly contended for by the people, and the results of their wranglings are set forth with some considerable minuteness. There are, too, existing documents which show that the Burgh underwent several restorations, notably in 1415, and again in 1549, when it is interesting to note that whilst the alterations were being carried out it was stipulated that the banner of Charles V., who inherited the Netherlands before he became Emperor, and was himself a native of Ghent, should be hoisted for ever on its towers.

Near to the burgh, which no longer leaves traces of any importance, there was erected at a very early date a stone building called s' Heeren Steen (the residence of the lord). This as early as the XIIIth century was used as a prison, and still exists. For some time it was almost lost to sight in the confusion of adjacent buildings; these, however, have been demolished. It is popularly supposed that the foundations of one of the

towers of this building formed part of the original city wall, but this is open to doubt. The Emperor Charles in 1520 re-commenced two architects, Dominique de W., and Rombout Keldermans, to rebuild the steen, and under their direction there arose a curious structure, well suited, from its general irregularity and the diverse appearance of its rooms, all of which were small and ill-lighted, and bore such uninspiring names as "thieves' pit," "common room," etc., for the infamous purposes to which it was put. During the XVIIth century Antwerp was the scene of much riot, persecution, and both torturous and violent actions repeatedly took place in the streets, a road which led to the prison gates, rather rough ascent, being nothing more than a bridge composed of a few stones across the old ditches that had served as the burgh. Owing to the construction of the quays, it is rather difficult to form a correct idea of the relative position of the old steen. The building itself is now used as the museum of antiquities mentioned above. Within can be seen a weird old kitchen, the interrogatory, the chapel, and numerous cellars. From one of these latter there runs a pipe to the hall. This pipe is said to have been used by those prisoners who wished to confess, but M. Génard, in his book on the museum, thinks it far more probable that it "was put there to serve as a means of spying upon the prisoners undergoing torture." Into the various rooms there has been brought together a queer old collection of things—armour, bits of old embroidery, porcelain, drawings and cartoons, mostly of the period of the later Brabant schools, plans and sections, models of architectural innovations, fine pieces of old furniture, and so forth. Within the steen one is far away from bustling Antwerp, away in the past when men knew how to torture and religious disputes were settled in any way rather than by verbal discussions. One can still see the little slanting window-openings, through which, no doubt, recalcitrant prisoners were thrown into the river.

Included in this collection is a plaster cast of Quentin Massys' monument, which was placed at the foot of the cathedral on the left hand of the great west door. This monument is in the form of a slab fitted into one of the camouflaged niches. It was designed by Cornelius Van der Gucht, and erected in 1629. At the top of the slab is a bas-relief of the painter's head. Beneath this, side by side, are representations of the two professions which he adopted—on the right an anvil hanging chained, on the left a palette and brushes. Beneath these are two small slabs with inscriptions (that on the right consists of the words "Conubialis Amor de Mulibre fecit Apellem"), and at the bottom a skull surmounting the arms of the painter, with the words "in synen tyd grofsmid, en daernaer famous schilder" at one time a blacksmith, later a distinguished painter) written round it. Outside the lower little of this man's work is to be seen—inside he has left an indelible mark. Close to the west door of the cathedral, in a little open space called the Handschoenmarkt, is an old well. This is of grey stone, and is in the form of a low pedestal standing on two steps. It is no longer in use, but is boarded over. Above it is a somewhat elaborate iron canopy, dating from 1530 and generally attributed to Massys, though this is not certain. There are four upright posts supporting the ironwork, which is not perfectly regular in design, though exhibiting a general symmetry. At the top is a statuette in the same metal of some mythical being, supposed to be the hero Brabo, who succeeded in cutting off the hand of the giant Antigon. The figure, clad in armour, is holding out the hand, encased in a gauntlet. This iron canopy is of interest, as it may be said to illustrate the Brabant love of diagonals. Both in architecture and sculpture the Brabants have long been inclined to invest their work with a certain superfluity of ornament which at times is not in the best of taste. In itself the ornamentation may be of a picturesque nature; in combination it often succeeds in detracting from the beauty of the whole. To such an extent has this decorative scheme of things been carried that some buildings it appears as though the exterior structure had been raised only to create



no various ornaments with which it may have been adorned! And so it was only in coming with this characteristic of the Belgian artists that when the revival in sculpture took place some years ago several caryatophront statues were figured amongst carved work, and scored a marked success. Napoleon is said to have spoken of the tower of Antwerp Cathedral as resembling lace made at Malines; he might have carried his simile considerably further.

In the Museum of Painting at Antwerp there are several of Massys' paintings, and from these it is possible to form some idea of his work. A *pieta*, consisting of a centre-piece and two wings, occupies the whole side of the saloons, and stands opposite to some of the large paintings of Memling. This picture exhibits perhaps more of the northern refinement and richness of treatment than is commonly to be found in the work of Flemish painters. The face of the dead Saviour is most remarkable, the effect of the death struggle being suggested in the most potent manner. The Virgin is wonderfully human, and would by itself make a picture of great beauty. The two wings represent the martyrdom of St. John the Baptist, on the left, and that of St. John the Evangelist, on the right. A noticeable feature in the former of these two is the diaphanous drapery which adorns Salmé. The *pieta* was painted in 1508, and was formerly an altar-piece in the cathedral. Massys belongs to the second period in Belgian art, when "genre" painting had just come into existence in Holland. This period embraced the greater part of the XVIth century, Massys occasionally painted "genre," though most of his subjects were religious.

He was born in Louvain. Here in the church of St. Pierre is a "Holy Family" from his brush. This picture has an interesting history, being one of those numerous works of art which were carried off during the French Revolution and restored later. It is perhaps less Italian, and exhibits more purely Brabant tendencies than the Antwerp *pieta*. Apart from the fact that he was born in Louvain and followed for some time the honourable profession of a blacksmith, little of his earlier history is known. It is probable that he more than any other of his contemporaries raised the school of painting in Antwerp to a celebrity equal to that of Bruges, where the Van Eycks and, later, Memling had already brought the town into prominence through the excellence of their work. In connection with Massys' earlier life spent by the anvil, a curious story is cited in explanation of the change in professions. Falling in love with the daughter of an Antwerp painter, he learnt that his suit would be acceptable only on the condition that he relinquished his own profession for the loftier one practised by the girl's father. In other words, the father hoped, by setting the unwelcome suitor a task which he judged would prove impossible to a blacksmith from Louvain, to rid himself of Massys, but he was at once disappointed and astounded, for Massys proceeded to take up a palette, and straightway produced the first of a number of masterpieces. Unfortunately for its own veracity, the story goes on to give Franz de Vriendt, or Floris, as he is generally called, as the name of the father. Floris, however, was only a child at the time of Massys' death in 1531.

As far back as the XIIIth century the foundations of the Antwerp cathedral, or more correctly speaking, of the Church of Notre Dame, were laid, and in about a hundred years the edifice as originally planned was completed. This, however, was added to in 1321, when the Emperor Charles, under whose auspices so many architectural enterprises were taken up in the Netherlands, used a new choir to be built and commissioned Waghemakere to finish the tower, which had been begun by Appelmans in the preceding century. The tower is 400 ft. high, and is of open design, remarkably slender, and beautifully executed. It contains a spiral consisting of nearly a hundred bells, which in tone and power are second only to those at Bruges. The first great bell, called "Gabriel," was cast in the cathedral, where the Place Verte now stands. In 1507 another great bell, weighing 8 tons, called the "Carolus," in honour of Philip the Good, was cast. A

dial was placed on the tower in 1540. The cathedral also possesses a second, though less important, *peal*; the first, which is placed beneath the clock, belongs to the town of Antwerp, the other, under the dial, is the property of the church. A second tower was begun, but never reached more than a third of the projected height. This is not altogether a rare feature in Belgian churches, the cathedral at Malines being a case in point. A small turret is placed on this second tower, and others of a peculiarly Brabant type adorn the east end of the cathedral. Although by universal consent considered the most beautiful Gothic church in Belgium, it suffers somewhat from its cramped position, as it is practically shut in by little streets, and appears to rise out of a block of modern buildings. Lying along one side of the Place Verte, its enormous size is lost, for the view is obstructed by trees and buildings. The six aisles, an architectural departure peculiar to this church, can be seen only as penthouses, which might from the glance one gets at them well belong to the adjacent houses. The interior is simple and impressive, the numerous pillars enhancing the effect of its size. Within the numerous chapels are several masterpieces of Rubens, the most famous of which are the "Descent from the Cross," the "Elevation," and the "Assumption of the Virgin." In the choir, which is divided into a number of chapels, are the pictures, a beautiful collection altogether, and the stalls themselves are carved finely, being decorated with statuettes something after the manner of those in the church of St. Gertrude at Louvain.

As a rule, the most important secular buildings of Belgium are highly-decorated structures, generally in more than one colour. The Hôtel de Ville at Antwerp, which is close to the cathedral, and extends along one side of the Grande Place, shows fewer Flemish characteristics than almost any other town hall in the country. It is a large structure, and was built in 1560 from designs by the painter de Vriendt. It was the earliest work of importance in Antwerp built in a style other than the ogival or pointed arch style. It is a kind of Florentine palace, de Vriendt's designs being decidedly Italian. The principal facade is 250 ft. long, and rests on a rustica; it is decorated with red and black marble slabs arranged in five rows. Above are three tiers of columns, some Ionic, some Doric. There are several fine saloons in the interior, but the few pictures with which they are adorned are no more than mediocre specimens of Flemish art. In 1576 the Spanish garrison in the city mutinied owing to arrears of pay, and, on their demands not being met with, made a dash for the Hôtel de Ville as the chief secular edifice in the city. The mutineers succeeded in partly destroying it by fire before they received the money due to them. The damage was not very great, however, and in 1585 the building was restored in its present form.

At one period in its history Antwerp possessed a number of monasteries, some belonging to the Dominican order, others to the Franciscan. Many of these contained veritable treasures of art within their unpretentious walls; the best works of such masters as Rubens, de Vriendt, and Vandyck could have been found adorning their halls and chambers. As the years passed these monasteries were gradually suppressed, and their treasures confiscated by the municipal authorities. On the site of one of these ancient monasteries, which belonged to a sect known as the Minorites, stands the present Museum of Painting, a fine modern building, containing several lofty saloons well adapted to the purpose to which they have been put. It stands in the Rue des Récollets, a street parallel to the river, and near the south station. Probably in no other European town is there such a representative collection of native works of art. All the painters who were born, or lived, in Antwerp are represented by some of their most famous works, and from the several hundreds of pictures exhibited it is possible to form some idea of the development of art in the town. Rubens, whose parents were natives of Antwerp, spent most of his life and died in Antwerp; Quentin Massys lived there; Vandyck was a native of the town, and early apprenticed to Rubens; Teniers the younger

was born there—and all these masters are fully represented, as well as Jordaens, Van Veen, the two de Vos, de Velde, de Vriendt, and Bernard Van Orley. The museum itself is of grey stone, columned somewhat in the old Greek style, and at sharp variance with most of the other buildings. It lacks superfluous ornament, and stands isolated in its own grounds.

In addition to the cathedral, there are three or four other churches of interest in Antwerp. Like the cathedral, however, these suffer from their position, and it is impossible to fully appreciate the architecture from the proximity of other buildings. After Notre Dame, the church of St. Jacques comes next in importance, but it is utterly lost in its surroundings. The exterior is not of much interest, but a whole volume has been written about the interior, which probably surpasses any other church in Belgium in the richness and variety of its ornamentation. Yet here, as elsewhere, the general effect is to an extent spoiled by the admixture of too many types of ornament. That which belongs to the XVIIth century—from which the church dates—differs materially from those of later periods. Much belonging to the XVIIth century, which was a time given to a slightly decadent ornamentation, is mixed in with earlier and, on the whole, more beautiful work. The architect of the church was the elder Waghemakere. The work was continued by his son Dominique, helped by Keldermans; but in all probability the edifice was never entirely finished, although much was added in the XVIIth century. The tower should have been higher than that of Notre Dame. Inside the church there is an extraordinarily ornate altar-piece of marble, the combined work of the three artists, Kerriex, the younger Quellin, and Willemssens, the latter of whom is also responsible for a finely-carved wooden pulpit. Rubens' tomb is in this church, and the *eredos* contains one of the finest of his pictures. It is supposed to contain portraits of his family. The church of St. Paul, a little to the north of the Grande Place, formerly belonged to the Dominicans, who owned a monastery in the neighbourhood. It is of grey stone, and belongs to the latter half of the XVIth century. The tower may be taken as fairly typical of Flemish work of its period. There is a modified cupola at the top, with a light framework supporting a sphere. This latter is a common feature in Brabant churches. Eight columns support the cupola, and round the bases of these runs a low balcony. This octagonal design is repeated below on a larger scale, though the design here is a closed one. Many other towers in the vicinity lack some of the "solidity" of the St. Paul's tower, but they are generally modelled on a similar plan. There is little ornamentation or "lace-work." Such as is seen on the cathedral tower. The Jesuits' Church, which is near to the cathedral, has to a great extent been rebuilt, owing to the damage done by fire in 1718. The tower is far more imposing than the one belonging to St. Paul's Church, but less typical. The two other churches of note are the church of the Augustines (1615) and the church of St. Andrew, which dates from the early part of the XVIth century.

The appearance of Antwerp was immensely altered by the construction of the quays and docks, both of which were built at the beginning of last century by Napoléon. The quays extend from the docks on the north along the bank of the Schelde for the distance of a mile. The happy idea of establishing a raised promenade on the top of these has been carried out. At a point about half-way down the quays stands a triumphal arch, erected in honour of Charles V. On the occasion of his state visit to the city. This is of interest in being the only piece of masonry at all connected with the name of Rubens. It seems that the arch was moved into its present position from some place more towards the centre of the town. It now goes by the name of La Porte D'Eau, and stands isolated. There is an old print, however, which shows it fitted in between some small houses.

Unlike Bruges, Antwerp does not give one the impression of being a true city of the Middle Ages—the quays, the broad streets, and modern houses prevent that, but there is much to make it of more than ordinary



interest. The inhabitants appear to be three-quarters Flemish. The river is always filled with craft of every conceivable description, and there is a curiously wide ferry-steamboat which carries traffic and passengers to the small part of the town, which has but lately sprung up on the other bank. R. S.

#### NOTES ON NEW BUILDINGS IN LONDON.

##### I.—THE RITZ HOTEL BUILDING IN PICCADILLY, W.

WHAT may perhaps be considered a new departure in London street architecture is rapidly approaching completion in the Ritz Hotel building, Piccadilly, and we had hoped, from the early manifestations of restraint and dignity in the simple outlines of the structure, that the architectural effect would have been satisfactory and imposing. But as the scaffolding disappears one's hopes are dashed to the ground, for the details of the building are so disconnected and disappointing, and the want of relief (which might have been easily obtained in the façade towards Piccadilly by bolder projections of the end and centre blocks) is rather depressing. Somehow or other many of the details appear to be in discord, and one notes the insignificant appearance of the somewhat shallow main cornice, with its rather elongated-looking consoles, which latter one thinks would have been more in keeping had they not been continued below the springing of the window arches at that level. Directing one's eyes to the top story, the sight is arrested by a balustrade which produces a most unfortunate feeling as regards the proportion of the window openings behind it, and coming down the façade to Piccadilly one feels that the balustrades to the windows at the first floor level would have been more effective and useful if they had been brought forward as small balconies, thus giving some shade and helping to relieve the flatness of the elevation. One feels, too, that the grouping of the bays in the Piccadilly façade should have been more pronounced, in order to give deeper vertical lines of shadow. It is not easy to discern the reason for the unhappy proportions of the windows lighting the upper floors, and in the case of the windows directly above the main cornice it seems that the design would have been happier if the sills had been kept well above the cornice, so that the whole of the window opening might have been visible from the footway on the north side of Piccadilly. The window openings have a very squat appearance, and the window frames give an unfortunately thin effect to what may possibly by others be considered a broad and vigorous design.

The main entrance in the Piccadilly façade does not impress one as being sufficiently imposing for a West-end hotel; and a somewhat similar feature, a sort of dormer gable, introduced on the frontage to the Green Park is scarcely in harmony with the general verticality of the design.

Looking upward to the skyline, a succession of chimney-stacks meets the eye, causing a feeling of restlessness, which is further disturbed by the elaborate ornamentation of the caps, giving the chimneys an overtopped appearance and leading one to think that a simple and severely plain design for them would have been more in harmony.

It is somewhat difficult to reconcile the irregular portions of the building on the roof as seen from the corner of Arlington-street and Piccadilly; and the blazing colour-effect of the ruddy brickwork in the elevation towards Wimborne House is rather startling, and out of tone with the subdued grey of the stonework to the main façades.

In some respects the building shows a lack of perspective, and when looking at it from the Palace end of the Mall it gives one the impression of having been designed to balance on the left hand the excrescence on the right hand at Queen Anne's Gate, and a feeling of sympathy arises on behalf of the Royal residents. In conclusion, the feeling creeps into one's mind that the chance of designing a notable addition to the street architecture of London has been missed, and one deplores that such an important and prominent site has not been covered with a building of a more satisfactory architectural character.

#### THE "HERMIT WINDOW" AT DARTFORD.

THIS little piece of stained glass, the height of which is only 26 in., is shortly to be placed in what was formerly the window of an anchorite's cell in the north-west corner of the parish church at Dartford, Kent. The cell was occupied, almost down to the time of the Reformation, by a succession of hermits, whose office was to guide the Canterbury pilgrims across the ford of the river Darent, which flows by the church. The hermit is, therefore, represented as wading through the river with a pole and lantern.



The "Hermit Window" in the Parish Church, Dartford, Kent. Designed by Mr. Hugh Arnold.

The hermit's cowl and cloak are formed of various shades of dark, rather quiet blue, and the water of very pale, sparkling blue and greenish-blue slab glass. The background is of silver-white slab, unpainted, and the border, also unpainted, of very pale streaky yellow pot-metal, running from almost white to darker yellow and orange in one or two places. The lantern is a piece of jewel-like yellow slab.

The photograph shown was taken from the glass in the studio of the artist, Mr. Hugh Arnold.

A NEW TECHNICAL JOURNAL.—The first number of *Gas and Oil Power*, a new illustrated monthly review for factory owners and other power users, which has been in preparation for several months, will be issued in October. The co-operation of leading experts in this country has been secured, and Mons. R. E. Mathot will act as chief continental correspondent of the new publication. The offices are at 19, Ludgate-hill, E.C.

#### THE CHEAP COTTAGES EXHIBITION.

The following is a list of the awards made by the judges appointed by the Cheap Cottages Exhibition (Committee of Organisation):—

##### Cottages.

Class 1.—Cottage to cost not more than £100.—First prize, 100l., No. 14, Messrs. Green Brothers, Whittington, near Epsom; architect, Messrs. Houlton, Chesterfield; architect, Messrs. Messrs. Bennett & Bidwell, Letchworth. Third prize, 25l., No. 35, Messrs. Potter & Co. (including scullery or kitchen scullery) erected at a cost not to exceed 300l.—First prize, 50l., No. 30, No. 70, A. H. Clough, Bury, Ringwood, Hants. Housing Council.

Class 2.—For the best group of three or four cottages, no one cottage to contain more than two rooms, including scullery, and erected at a cost not to exceed 55l. per room.—A prize of 50l. awarded to No. 61, Geoffrey Lucas, A.R.B.A.

Class 3.—For the best detached cottage, or pair of cottages, each containing not more than two rooms, including scullery, and erected at a cost not to exceed 55l. per room.—A prize of 100l. awarded to No. 79, A. H. Clough, Bury, Ringwood, Hants.

In addition, the following prizes have been awarded:—

Prize of 100l., offered by an anonymous donor, for the cheapest cottage for sale, given—No. 87, A. H. Clough, Bury, Ringwood.

Prize of 50l., offered by the Associated Portland Cement Manufacturers, for the best cottage built of cement concrete—No. 52, the Concrete Machinery Company, Liverpool; architect, G. Fraser.

Prizes for wooden cottages (a wooden cottage is considered to be one built of timber between the roof and the foundation).—First prize, 100l., F. W. Troup. Second prize, 50l., No. 2, Messrs. Smith & Breuer.

##### Designs.

Prizes were also offered, and have been awarded, for the best designs of cottages, etc., on the new lines as the cottages themselves. These prizes were awarded as follows:—

Class 1.—First prize, 10l., Messrs. Bennett & Bidwell, Letchworth. Second prize, 5l., W. A. Carter, Wimbledon.

Class 2.—First prize, 10l., W. R. Mosley. Second prize, 5l., W. Marshall, Hatfield.

Class 3.—First prize, 10l., F. L. Crane.

Class 4.—10l., G. Lucas.

The special prize of 10l., offered by Mr. T. G. Fives, F.R.S., for the best design and specification of a wooden cottage, to be constructed entirely of English timber, has been awarded to the design submitted conjointly by Mr. Delmar Bloor and Mr. Ernest Gimson, of Sapperton, Glou.

##### Diplomas.

The following accessories have been recommended for diplomas:—

Messrs. Vickers & Field, wire bitumen damp course. Exploisor Patent Stone Company, Northampton, for paving.

Blackwell & Co., rubberoid for roofing. R. Whitbread, Carlton, near Nottingham, crane rod casement.

Messrs. Elkay & Cornes, Ltd., model cottage range with copper combined.

Messrs. Clark, Hunt, & Co., "Ideal" range in cottage No. 52.

Messrs. Fred Betts, Ltd., "Sure to Go" range in cottages 69-71.

Messrs. Edwards' copper and hood in cottage No. 61.

The judges' report is signed by Messrs. Gurney Hill, W. R. Lethaby, J. C. McCowan, Robt. West Schultz, Thackeray Turner, G. Sims Woodhouse and Harriot Yorke.

#### FIRE TESTS OF CONCRETE AGGREGATES.

WE have received the following communication from the British Fire Prevention Committee:—

"1, Waterloo-place, Pall Mall, London, S.W., September 26, 1905.

Sir,—Having regard to the importance that is apparently being generally attached to the fire tests the Committee are about to undertake with various concrete aggregates it has been decided to issue exact data as to the concrete varieties that will be used in investigation, together with some additional particulars prior to the actual tests.

The tests are to take place in the middle of October, and, as far as accommodation can be provided, it will be put at the disposal of the technical officers of public bodies interested in the question, who should apply for cards (in writing) to the Assistant Secretary, No. 1, Waterloo-place, S.W., before October 7.—Yours very truly, for the British Fire Prevention Committee.

ELLIS MARSHALL, Gen. Sec. Secretary.  
THE FIRE RESISTANCE OF CONCRETE.  
THE FIRE PREVENTION COMMITTEE'S SPECIAL TESTS WITH VARIOUS CONCRETE AGGREGATES.

The following are the particulars of the arrangements for the fire and water tests with different aggregates of concrete to be undertaken by the British Fire Prevention Committee, with a view to comparing the fire resistance of different aggregates when subjected to fire and water under identical conditions, the aggregates being those in common building practice and the concrete, as specified in accordance with the standards of December



port as "Terncrete" cement, provided by the Portland Cement Manufacturers. The test slabs are to be under test, each slab being 3 ft. 3 in. by 10 ft. 9 in., and being 6 in. thick. The slabs have been placed side by side over the committee's testing chambers, thus forming a continuous series of each slab being supported by several girders. The concrete aggregates of each slab are as follows:

	Parts.
1. Blast furnace slag	3 1/2
2. Clean sand	2 1/2
3. Cement	1
4. Broken brick	3
5. Clean sand	2
6. Cement	1 1/2
7. Broken granite	3
8. Clean sand	2
9. Cement	1
10. Burnt ballast	5
11. Cement	1
12. Coke breeze	5
13. Cement	1
14. Furnace clinker	3
15. Clean sand	2
16. Cement	1
17. Thames ballast	3
18. Clean sand	2
19. Cement	1

Re centering under the slabs will be struck seven days after completion of each slab. The slabs will be tested as for the "fully proved" standard (Class A), which means that the slab will be loaded with 2 cwt. per square foot, that the test will be of two and a half hours' duration, that the temperature will be raised to 1 degree Fahr., and that the fire test is followed by the application of water for two minutes from a steam fire engine to the fire side (under side) of the slab.

FRONT, 40, OLD BOND-STREET.

The front shown here is to be built in white Portland stone with forged iron casements; the roof to be of grey stone tiles. Internally the ground floor is treated with modelled plaster ceiling and frieze, marble floor, and paneling to the walls. The basement, which will form a show-room, will be panelled in white wood, painted blue, with modelled plaster ceiling and mosaic, and the floor laid with mosaic. The staircase will be in oak, and the walls panelled. The architects are Messrs. W. & E. Hunt.

ARCHITECTURAL SOCIETIES.

**BRISTOL ARCHITECTURAL SOCIETY.**—Mr. H. Dan Bryan has recently resigned the position of hon. secretary and treasurer to the Bristol Society of Architects, after having held the office for seven years. Mr. Richard C. James, A.R.I.B.A., of Eagle Insurance-Buildings, Baldwin-street, Bristol, has been elected to fill the office. All communications in future should be sent to him at the above-mentioned address.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—The committee of the Exhibition of Architectural Refinements gave a farewell dinner on the 21st inst., at Messrs. Ferguson & Forster's, to Mr. and Mrs. William Henry Goodyear, on the occasion of their leaving Edinburgh for New York. Amongst the guests present were Mr. and Mrs. Goodyear, Messrs. Cooper, Mr. Hippolyte J. Blanc, Mr. Lorimer, Mr. Sydney Mitchell, Mr. Ross, Mr. F. W. Deas, and Mr. and Mrs. H. O. Tarbolton.

ENGINEERING SOCIETIES.

**SOCIETY OF ENGINEERS.**—On the 20th inst. a meeting was made by the members to the London sewerage and sewage disposal.

It is about seven years since the drainage works were carried out under the direction of Mr. John Kemp, the late Surveyor to the Council. Since then extensions have been necessary, owing to the development of the district, and a hydrolytic tank, on the system devised by Mr. W. Owen Travis, has been provided at the end of all works in order to deal with the sewage before it flows on to the concrete beds. The total cost of these extensions has been about 7,000l., and they have been carried out under the direction of Mr. Sidney E. Chambers, the present Surveyor to the Council, the consulting engineers being Messrs. Shone & Ault. The district presented exceptional difficulties with regard to the construction of sewers, and it was found necessary to employ intermediate lifts. Ultimately the Shone system of collecting





and delivering the sewage was proposed and carried out. The district is divided into eight areas, in each of which, at the lowest point, is an ejector station, containing Shone's pneumatic ejectors in duplicate, with the exception of one station, which is not duplicated, being required for lifting the sewage of three houses only. Each of the ejectors is capable of lifting the maximum quantity of sewage of the contributing area to the disposal works or to an intermediate station. The air pressure required is 28 lb. above atmospheric. The sewers and ejectors are capable of receiving and discharging the sewage of a total population of 20,000. Two 15 nominal horse-power steam air compressors are provided, each capable of dealing with the sewage of 7,500 people. The sewage on its arrival at the disposal works is delivered into a screening chamber, where it passes through a  $\frac{1}{2}$ -in. mesh screen, and from them along a covered channel to the hydrolytic tank, which comprises—(a) Detritus chambers in duplicate, (b) sedimentary chambers, (c) liquefying chamber and sludge space, (d) upward filters. The sludge from the sludge space is drawn off by hydraulic head to a chamber connected to an ejector, which lifts and discharges it on the land. After passing through the hydrolytic tank, the resultant effluent is conveyed to the bacteria beds. These beds are fifteen in number, built in terraces of five each. The screening chamber was formerly open, and objectionable odours were emitted from it owing to the sewage being retained in the rising main for some considerable time. It has therefore been covered in and ventilated as a part of the general ventilation of the new tank and closed channels. From the screening chamber the sewage, as previously mentioned, is conveyed along a covered channel into one of two detritus tanks, which are worked alternately. Each is capable of holding the average flow of sewage during a quarter of an hour, or one-ninety-sixth of the total daily quantity. When one tank has been in work for a fortnight the sewage is diverted to the opposite tank, and the accumulated sludge is removed from the full tank by means of a valved opening, which allows it to pass into the sludge manhole and through it into the ejector, which sends it into the trenches in the land. The sewage leaving the detritus tanks enters the centre of a transverse channel, which conveys it into the sedimentary chambers of the hydrolytic tank, which consists of two parts. The first portion is divided into three compartments by means of light division walls formed of flagstones. Of these compartments, the two outer are the sedimentary chambers and the central the liquefying chamber. Along the bottom of the sedimentary chambers are narrow openings which lead into the liquefying chamber, and form the only means of liquid communication between these chambers. The whole volume of sewage enters the sedimentary chambers, but only seven-eighths leaves them over the weirs; the remaining one-eighth (12.5 per cent.), with practically all the depositing matters, leaves the chambers through the openings in the bottom and passes into the liquefying chamber. The floating solids are retained for a period, and are then removed through the detritus tanks. The capacity of these chambers is such that a unit volume of seven-eighths of the sewage takes five hours to pass through them. The liquefying chamber has a capacity which allows a unit volume of one-eighth of the sewage to pass through it and over its weir in fifteen hours. The greater length of time allows of the deposition of the suspended matters which accumulate in the sludge space. This space is that part of the tank below the lower margins of the openings in the sedimentary chamber; it forms a half-circle below the liquefying chamber. When the sludge approaches the upper boundary of the space a portion is removed by opening one or more of the valves, and is thrown by the ejector into the trenches. The sewage flowing over the weirs of the first portion enters the channel which leads to the second portion of the tank. This consists of four hydrolytic chambers arranged in sequence. The liquid is conducted to the bottom of each chamber by means of nine 6-in. stoneware pipes, where it is delivered below three arches. The arches support the material, and are con-

structed of bricks, arranged so as to leave 24-in. openings between them for the passage of the sewage. The floor under each arch is concave, and forms with the arch a space for the accumulation of sludge. Under each concave floor a line of pipes, having two valved openings, is laid, by means of which the deposit is removed. The material consists of broken flint stone, varying in size from 3 in. to 6 in. The liquid passes upwards through the openings between the bricks and through the material to the surface, where it overflows a wall and enters the downward stoneware pipes of the next chamber. After this operation has been repeated in the four chambers, the liquid, having taken three hours in its passage, enters the effluent channel, which conducts it to the contact beds. The whole of the tank is constructed in concrete, and is covered with armoured concrete. The tank is ventilated by means of a fan driven by a small vertical engine, which causes a lessened air pressure in the air-duct, channels, and tank, and withdraws the gases as they rise to the surface of the liquid. Atmospheric air is admitted at various regulated openings. The chief opening is placed near to the end of the effluent channel, which ensures that the maximum quantity of air shall pass over the surface of the liquid after it has left the tank. This volume is increased in the tank by the air admitted at the several regulated openings. The increased volume passes over the surface of the liquid in the tank, and over that in the effluent channel, to the air-duct and fan. It passes thence to the chimney, where it is discharged into the atmosphere. By these means the air in the tank is at all times practically and relatively, though not absolutely, free from smell.

**JUNIOR INSTITUTION OF ENGINEERS.**—A visit of this Institution recently took place to the Staines Reservoir Communication Works, which was arranged with the object of affording the members the opportunity of seeing the works in an almost completed state, a visit having been paid some time ago, when all the operations of construction were seen in process. The members were shown round by Mr. Joseph Francis, engineer of the works, Mr. C. W. Pettit, representing the contractors, Messrs. John Aird & Sons, and Mr. Durham, of the Metropolitan Water Board. From the Staines reservoir intake the water will flow into a suction tank (1,000,000 gallons capacity), from which it will be pumped to a height of 24 ft. into two subsiding reservoirs (300,000,000 gallons joint capacity). Thence it will flow through 42-in. pipes to the filter-beds, twelve in number. Sand-washing apparatus is provided, and settling tanks and coke filters for treating the effluent sand-washing water before its delivery into the Thames. The filtered water will be pumped through a 42-in. main to Cricklewood (thirteen and a half miles), where it will be again pumped three and three-quarter miles to a service reservoir at Fortis Green, Finchley, at a level of 298 ft. above O.D. The engine-house at Kempton Park contains two first-lift engines, three second-lift engines, and eight boilers.

## Fifty Years Ago.

### ST. JAMES'S PARK.

SIR B. HALL has announced his intention of not proceeding with the proposed road through the enclosure until the project has been considered by Parliament.

In Sir B. Hall's letter respecting the proposed new road through St. James's Park, he lays stress on the desirableness of relieving the traffic for carriages along Parliament-street. Would not this end be attained by opening a carriage-road from Trafalgar-square, at Spring-gardens' corner (where now exists a passage for pedestrians only), and so on to Storey's-gate? This would require the removal of a few houses certainly, but not so many as would be necessary were the park bisected.

A READER.

Another writer, "A Londoner," points out that by taking off a small piece of the garden of St. James's Palace, a safe and good way from the park to Pall-mall may be obtained by the existing road, past the end of the

German Chapel. I think it would be a boon to the but a carriage-road is an inessential good sense. *The Builder*, 1855.

## Illustrations.

### MAIN STAIRCASE, MOUNT MELVILLE, ST. ANDREWS.



E give a view, reproduced from a photograph, of the principal staircase at Mount Melville, private house, &c.

of an old one which stood on a well-hill a few miles outside St. Andrews. The new house occupies a site very nearly identical with that of the old one, and therefore enjoys the same extensive view, and has the advantage of being surrounded by old garden containing many rare and beautiful trees. During the rebuilding of this garden has undergone various additions and improvements, chiefly by way of introducing some formal elements. A covered with grass and trees has out of the excavated earth from the foundations, a sunk garden with stone balustrade has been formed near the house, and the columns of the old front door have been erected as a "temple" at the end of a broad cypress avenue.

The general arrangement of the house was designed during the time when the late Mr. Alfred Waterhouse, R.A., was in partnership with his son, but the garden work above mentioned and the staircase which we here illustrate were entirely the work of Mr. Paul Waterhouse.

The materials used in the staircase are Piastrella for the steps, English slate for the hand-rail and balusters, copper for the detached shafts, and Calicut stone for the piers and pilasters. The marble work was executed by Messrs. Farmer Brindley, and the masonry by Messrs. J. White & Sons, of Glasgow.

### HOUSE, No. 95, SLOANE-STREET.

This drawing, which shows alterations to the house, No. 95, Sloane-street, and a rebuilding of the stables, was exhibited the architectural room at the Royal Academy this year.

The architect is Mr. Ambrose Poynt from whom we have not received any further description of the work, no doubt because like many other Londoners, he is out of town during the present month.

### DETAILS FROM OLD HOUSE, CLIFFORD'S-INN.

THESE two sheets form the remainder of the series of drawings from an old Clifford's inn house, by Mr. John Barbour, of which the first two sheets were published in our last issue.

**HIGH SCHOOL FOR GIRLS, STOCKTON.**—The work in connexion with the erection of the new premises of the Queen Victoria High School for Girls at Stockton has now been completed. They are intended to accommodate 100 pupils, and should the necessity arise, wings can be added. The principal feature of the interior is the school hall on the ground floor, which includes a gallery at the north end and a raised dais at the south end, and will seat from 350 to 400 people. At either end are cloakrooms and other conveniences, one set being for the seniors and the other for the juniors, and both are reached from the playground by means of doors over which porches have been erected. In the front part of the building, as on the ground floor, are two classrooms, in addition to reading rooms for the headmistress and her assistants, storerooms, and the like. The second floor is reached by two staircases, and is occupied by four other classrooms (furnished with oak seats and desks), a library, and a music room. In the southern portion of the second floor are the caretaker's quarters, which communicate with the dining-room on the same floor through a serving hatch. Adjoining the dining-room provision is made for a laboratory for physics and chemistry. The school is fitted with the electric light throughout. The work was carried out from plans prepared by Mr. T. W. R. Clay, whose designs were selected in competition by Mr. A. J. Cooke, of Stockton, under the vision of Mr. T. W. R. Richardson, architect, also of Stockton.



# COMPETITIONS.

**HOLY TRINITY CHURCH, FAIRFORTH, NEAR MANCHESTER.**—In the competition for the new church of Holy Trinity, Fairforth, recently decided, the designs of Mr. Frank Freeman, architect, of Bolton, have been selected by the assessor and committee, and he has been appointed architect for the work.

**BRANCH LIBRARY FOR GREENWICH.**—The Libraries Committee of Greenwich Borough Council reported on Tuesday that the assessor, Mr. A. W. S. Cross, F.R.I.B.A., had submitted to them the conditions of the competition for designs for a branch library to be erected on the site of Bexley House. The conditions had been adopted, and directions had been given for designs to be sent.

# BOOKS RECEIVED.

**CREST AND CONCRETE.** By Louis Carlton Shih, B.S., C.E. (Archibald Constable & Co. 2s.).

**WATERLEY ABBEY.** By Harold Brakspear, F.S.A. (Surrey Archaeological Society: Guildford.)

**STANDARD STEEL CONSTRUCTION,** for the use of Architects, Engineers, and Contractors. Compiled by Hall & Pickles, Iron and Steel Merchants. (Sherratt & Hughes. 10s. 6d.)

# TRADE CATALOGUES.

We have received from Messrs. Verity's, Limited, of Hardman-street, Manchester, their catalogue No. 514, giving full particulars of many types of arc lamps, both "open" and "enclosed," and suitable for either direct or alternating current circuits. Their lamps are well known, and visitors to the Electrical Exhibition at Olympia will have an opportunity of judging their merits, as they are used for lighting the exhibition. The prices are moderate, and both single and double globe lamps are listed. Users of arc lamps would do well to write for the

The Eastern Lift Company send us their catalogue of electric and hydraulic lifts for various duties, attention being directed chiefly to those of the former class. Two general systems of control for electric lifts are described in this catalogue. The first of these provides three different forms: hand-ropes, control, car-switch control, and variable-speed control. The second is the very convenient push-button system for low and high speed passenger lifts and for service lifts in hotels and other buildings. Some useful detail drawings, are given relating to electric gears, various forms of guides, and various hydraulic lifts of the direct-acting and suspended types. It is worthy of note that this firm were early in the field with an improved type of valve, on the Luthy principle, both for high and low pressure hydraulic lifts.

Messrs. G. B. Smith & Co., of Craighall Works, Glasgow, send us their illustrated price list of iron fencing, railings, and structural steelwork. The greater part of the book is occupied by particulars of three first classes of product, while the other portion refers principally to roofing materials, steel roofs, and buildings. It includes also several views of steel and cast-iron bridges, which, although doubtless of recent construction, are sad examples of decay from the aesthetic standpoint.

Mr. L. G. Monchel sends us a well-written and admirably-illustrated book of 175 pages, entitled "The Hennebique Ferro-Concrete System," for which he is the general agent in Great Britain. A good deal that is said in this book as to the advantages of reinforced concrete naturally applies with equal force to methods of construction other than those in which the writer is directly interested. We refer here to the resistance of combined material to fire and damp, to its strength, cleanliness, and general convenience in structural work of all kinds. Of course, the Hennebique system possesses distinct characteristics which are clearly explained and illustrated by reproductions of drawings. The methods of design are clearly in accordance with correct principles, and an important feature is the provision of shearing stresses, the nature of which is insufficiently recognized in other systems. One great

recommendation of the Hennebique system is to be found in the enormous number of works executed in all parts of the world which remain as practical proofs of the reliability of this particular method of construction. The greater part of the present book is filled with drawings and photographic views of buildings, bridges, reservoirs, quays, retaining walls, piers, aqueducts, and other structures, and at the end reports of several official tests are given in full. The volume is one that ought to find a place on the bookshelf of every architect and consulting engineer.

# Correspondence.

## RAILWAY TERMINUS PLATFORMS.

SIR,—Should not all railway terminus platforms be constructed with some impervious material? I frequently alight in the morning at a well-known terminus near the west-end of London, and detect strong smells of fish and other effluvia arising from certain platforms. This, no doubt, is caused by the unloading and depositing on the platforms of fish and other commodities from railway-trucks. The platforms appear to be washed over with water, as a cleansing agent, which only helps to make things worse, as the wood becomes saturated with moisture, and therefore spongy, so that the drainings from the next consignment of the same goods easily penetrates the wood, and the evil is thus perpetuated.

I notice one of the platforms is covered with York flagstones. Why not all?

SANTARIAN.

## LONDON BUILDING ACTS AMENDMENT BILL.

THE Works and General Purposes Committee of Hackney Borough Council reported on Tuesday having had before them a letter from the London County Council stating that, with the view of introducing next session another Bill to amend the London Building Acts, they would be glad to receive suggestions as to the proposed measure. The Committee, having considered the communication and also a report thereon by the borough surveyor, reported that the points to which they desired to call the attention of the Building Committee of the London County Council were twenty-two in number, and were as follow:—

- (1) A more extended definition of the word "inhabited," so as to include rooms used as living rooms or workrooms, and for the expression, "used for human habitation," to include such rooms.
- (2) To secure a definition of the words "in any direction," in sect. 13, of the Act of 1894, so as to prevent the re-erection of buildings within the prescribed distance, to a greater height than the height of the old buildings.
- (3) To provide for an appeal from the certificate of the district surveyor under sect. 13, subsect. 5, of the Act of 1894, in reference to existing buildings within the prescribed distance.
- (4) To require plans of existing buildings erected beyond the "general line," to be prepared and certified before the alteration or re-erection of any such buildings, and to prohibit altered or re-erected buildings so far as they are beyond such "general line," of a greater height than the previously existing buildings.
- (5) To require attested copies of all plans certified by the district surveyors, to be deposited with the local authorities, who, in case of dissatisfaction with such certificate, should have a right of appeal to the Tribunal of Appeal.
- (6) To exempt buildings belonging to borough councils from the provisions of the Building Acts, if buildings belonging to the London County Council are to be exempted.
- (7) To prevent the formation of undesirable "back passages."
- (8) To amend the provisions as to "space at rear of domestic buildings," so as to require an open space to exist at the rear of all such buildings above the level of the adjoining pavement in streets laid out and in course of development before the Act of 1894.
- (9) To secure a greater minimum depth than 10 ft. of space at the rear of all domestic buildings, it being suggested that the depth should be a graduated depth, increasing with the distance of the buildings from the centre of London, excepting in the cases of main roads; provision to be made for the suspension of this suggestion in the cases of roads and estates laid out and in course of development previously to the passing of the amendment.
- (10) To prohibit encroachments on open spaces at the rear of buildings which would make them less than the minimum allowed under the Act of 1894.
- (11) To prevent buildings being erected at the rear of domestic buildings without the necessary provision being made as regards open space, as required in the case of domestic buildings.
- (12) To prevent the erection of buildings at a greater height than the width of the street, in streets laid out before 1892.
- (13) To empower local authorities to alter the levels of unfenced forecourts, remove obstructions therefrom, and pave the same as part of the adjoining footpaths.
- (14) To prohibit the erection of irregular temporary structures, such as sign boards, show-cases, etc., on forecourts, without the consent in writing of the local authority.
- (15) To prohibit the erection of projecting

advertisement signs and other like structures, without the consent of the local authority.

- (16) To prohibit the erection of buildings with "ground story" habitable rooms below the level of the adjoining pavement.
- (17) To require habitable rooms erected over stables to be separated horizontally by solid concrete partitions, and the staircases to such rooms to be approached directly from the outside air.
- (18) To require land adjoining public streets to be fenced to the satisfaction of the local authority.
- (19) To transfer to the local authorities the supervision of the construction and inspection of street boxes, underground conveniences, etc., and to exempt payment of fees to district surveyors in respect to such structures.
- (20) To transfer to the local authorities the remaining powers under part 7 of the Act of 1894, having reference to "iron buildings" and "temporary iron or other buildings" or "structures," so as to remove the confusion which now exists with reference to the provisions of sect. 34.
- (21) To secure that all future new streets shall be of a minimum width of 42 ft. in lieu of the present minimum width of 40 ft.
- (22) The committee are of opinion that either in a Building Amendment Act, or otherwise in some Metropolitan Management Amendment or General Powers Act, powers should be given to metropolitan borough councils to enable them to compulsorily acquire any properties which may be needed for future purposes, in addition to those which may be wanted for street widenings or improvements.

## COURT OF COMMON COUNCIL.

THE Lord Mayor presided on Tuesday at a meeting of the Court of Common Council, held at the Guildhall.

**Blackfriars Bridge.**—A letter was read from the Clerk of the London County Council, relative to the decision of the Council to introduce into Parliament, in the session of 1906, the legislative proposals embodied in the London County Council (Tramways) Bill, 1905; and inviting the Corporation to also introduce a Bill next session for the purpose of either widening or rebuilding Blackfriars Bridge, and expressing the hope that the Corporation may see its way to confer with the Council upon the whole subject.—After some discussion it was decided to refer the matter to the Bridge House Estates Committee.

**The Old Bailey.**—Mr. Cooper asked the Chairman of the City Lands Committee, by whose instruction an inscription had been placed over the portals of the New Sessions House.—Mr. Ellis requested that notice of the question should be given.

**Thames Barrage.**—The Special Port of London Committee's report recommending that a recommendation should be made to the Government in favour of the appointment of a Commission or Department Committee to inquire into the proposal to construct a barrage across the Thames at Gravesend was adjourned.

# The Student's Column.

## STEAM BOILERS AND PIPES.—XIII.

CHIMNEYS (continued).

HAVING dealt sufficiently with head, or draught power, we will now discuss its influence upon the entering air and hot gases in a chimney.

**Velocity or Draught.**—The velocity or draught imparted by the head to the cold air entering the furnace at the foot of a chimney, and to the hot gases passing through the chimney itself, is governed by the fundamental formula

$$v = \sqrt{2gh} \dots \dots (13)$$

where  $v$  = velocity in feet per second;  
 $g$  = the acceleration due to gravity = 32.2 ft.; and  $h$  = head in feet of air.

The velocity of the chimney gases is governed by the same formula, with the addition of a factor ( $a$ ) representing the ratio of the cold air to the heated air or gases.

Thus, for the velocity of the chimney gases we have

$$v = \sqrt{2gh(a)} \dots \dots (14)$$

If no friction or other losses occurred (1) at the inlet or (2) in the furnace and flues, and in the chimney itself, the velocity of the entering air would be exactly as given by formula (13), and the velocity of the hot gases as given by formula (14).

Consequently the velocities so calculated are usually termed *theoretical velocities*.

Formula (13) can be adapted for calculating the theoretical velocity of the cold air by substituting the expression for  $h$  contained in formula (7), p. 326.

Then, denoting the velocity by the symbol ( $V$ ) for the sake of distinction, we have

$$V = \sqrt{2g \left( H \frac{D - d}{D} \right)} \dots \dots (15)$$



Example (6).—Required the velocity of the cold air entering the furnace at the foot of a chimney 100 ft. high, the temperature of the air and gases being 62 deg. and 585 deg. respectively.

The weights per cubic foot of the air and chimney gases, as calculated on p. 326, are 0.0761 lb. and 0.03805 lb. respectively.

By formula (15) we get

$$V = \sqrt{64 \cdot 4 \left( 100 \frac{0.0761 - 0.03805}{0.0761} \right)}$$

$$= \sqrt{64 \cdot 4 \times 50} = 56.7 \text{ ft. per second.}$$

During its passage through the fire the air enters into combination with various constituents of the fuel, but the volume of the resulting gases is practically equal to that of air at the same temperature.

To calculate the theoretical velocity of the hot gases, we substitute in formula (14) the value of  $h$  given by formula (7), and for the factor  $a$  the ratio of the densities of the cold air and the hot gases.

Denoting the velocity of the hot gases by the symbol ( $v$ ), we have

$$v = \sqrt{2g \left( H \frac{D - d}{D} \right) \left( \frac{D}{d} \right)} \dots (16)$$

Example (7).—For the chimney in example (6) the theoretical velocity is:—

$$v = \sqrt{64 \cdot 4 \left( 100 \frac{0.0761 - 0.03805}{0.0761} \right) \left( \frac{0.0761}{0.03805} \right)}$$

$$= \sqrt{64 \cdot 4 \times 50 (2)} = 113.4 \text{ ft. per second.}$$

In cases where the theoretical velocity of the cold air has already been calculated, the corresponding velocity of the chimney gases can be ascertained by the simple rule

$$v = V \left( \frac{D}{d} \right) \dots (17)$$

From formulae (15) and (16) it is evident that the theoretical velocities of the cold air and hot gases are proportional to the square root of the head, or, in other words, to the square root of the height of the chimney and to the square root of the ratio  $\left( \frac{D - d}{D} \right)$ .

Table XIX., calculated by formula (7), gives the head ( $h$ ) in feet of air for chimneys of various heights and containing gases at some of the temperatures most frequently obtaining in practice. It will be observed that at the temperature of 585 deg. F. the head is exactly half the height of the chimney.

By the use of this table calculations are considerably simplified, if the proper values of ( $h$ ) be substituted in formulae (13) and (14), as in the following example:—

Example (8).—For the chimney in example (6) the head is 50 ft. of air.

Then the velocity of the cold air by formula (13) is

$$V = \sqrt{2g \cdot 50}$$

$$= \sqrt{64 \cdot 4 \times 50} = 56.7 \text{ ft. per second.}$$

The velocity of the hot gases is given by formula (14) after substitution of the value already found for the ratio  $a = \left( \frac{D}{d} \right)$ .

$$v = \sqrt{2g \cdot 50 (a)}$$

$$= \sqrt{64 \cdot 4 \times 50 (2)} = 113.4 \text{ ft. per second.}$$

To calculate the velocity of the air and gases when the head is expressed in inches of water modifications of formulae (13) and (14) can be employed, in which  $2g$  is divided by the conversion factor 0.01466.

For the velocity of the cold air

$$V = \sqrt{(2g \div 0.01466) h_2} \dots (18)$$

For the velocity of the hot gases

$$v = \sqrt{(2g \div 0.01466) h_2 \left( \frac{D}{d} \right)} \dots (19)$$

Table XX., calculated by formula (9), *ante*, gives values of ( $h_2$ ) for chimneys of various heights and containing gases at different temperatures. The use of this table is shown by the following examples:—

Example (9).—For the chimney in example (6) the head is 0.733 in. Substituting this value in formula (18), we get for the velocity of the cold air

$$V = \sqrt{(64 \cdot 4 \div 0.01466) 0.733} = 56.7 \text{ ft. per sec.,}$$

and by formula (19) we find the velocity of the hot gases to be

$$v = \sqrt{(64 \cdot 4 \div 0.01466) 0.733 (2)} = 113.4 \text{ ft. per sec.}$$

By taking the value of  $2g$  at 64 instead of 64.4 rules can be derived from formulae (15) and (16) for approximate determinations of the theoretical velocity when the head is known.

When the head is expressed in feet of air, formulae (15) and (16) reduce as follows:—

For the theoretical velocity of the cold air

$$V = 8 \sqrt{h} \dots (20)$$

For the theoretical velocity of the hot gases

$$v = 8 \sqrt{h} \left( \frac{D}{d} \right) \dots$$

When the head is expressed in inches of water, the value of ( $h$ ) must be multiplied by the factor 0.01466. Thus we get:—

For the theoretical velocity of the cold air

$$V = 66.1 \sqrt{h_2} \dots$$

TABLE XIX.—HEAD IN FEET OF AIR FOR CHIMNEYS OF VARIOUS HEIGHTS AND CONTAINING GASES AT DIFFERENT TEMPERATURES, THE TEMPERATURE OF THE EXTERNAL AIR BEING 62 DEG. F.

Height of Chimney in Feet. (H)	Head (h) in Feet of Air.							
	350 deg.	400 deg.	450 deg.	500 deg.	550 deg.	585 deg.	600 deg.	650 deg.
10	3.5	3.9	4.2	4.5	4.8	5	5.0	5.5
20	7.1	7.8	8.5	9.1	9.6	10	10.1	11.0
30	10.6	11.7	12.7	13.6	14.4	15	15.2	16.5
40	14.2	15.7	17.0	18.2	19.3	20	20.2	22.0
50	17.7	19.6	21.2	22.7	24.1	25	25.3	27.5
60	21.3	23.5	25.5	27.3	28.9	30	30.4	33.0
70	24.8	27.4	29.8	31.9	33.7	35	35.4	38.5
80	28.4	31.4	34.0	36.4	38.6	40	40.5	44.0
90	31.9	35.3	38.3	41.0	43.3	45	45.6	49.5
100	35.5	39.2	42.5	45.5	48.2	50	50.7	55.0
120	42.6	47.1	51.0	54.7	57.9	60	60.8	66.0
140	49.7	54.9	59.6	63.8	67.5	70	71.0	77.0
160	56.8	62.8	68.1	72.9	77.2	80	81.1	88.0
180	63.9	70.6	76.6	82.0	86.9	90	91.2	99.0
200	71.0	78.5	85.1	91.1	96.5	100	101.4	110.0

TABLE XX.—HEAD IN INCHES OF WATER FOR CHIMNEYS OF VARIOUS HEIGHTS, AND CONTAINING GASES AT DIFFERENT TEMPERATURES, THE TEMPERATURE OF THE EXTERNAL AIR BEING 62 DEG. F.

Height of Chimney in Feet. (H)	Head (h) in Inches of Water.							
	350 deg.	400 deg.	450 deg.	500 deg.	550 deg.	585 deg.	600 deg.	650 deg.
10	0.052	0.057	0.062	0.066	0.070	0.073	0.074	0.081
20	0.108	0.115	0.124	0.133	0.141	0.144	0.148	0.158
30	0.166	0.172	0.187	0.200	0.212	0.219	0.223	0.238
40	0.208	0.230	0.249	0.267	0.283	0.293	0.297	0.318
50	0.240	0.267	0.312	0.334	0.353	0.366	0.371	0.395
60	0.312	0.345	0.374	0.400	0.424	0.438	0.448	0.475
70	0.354	0.402	0.436	0.467	0.495	0.512	0.521	0.550
80	0.416	0.460	0.499	0.524	0.556	0.568	0.574	0.605
90	0.468	0.518	0.561	0.601	0.638	0.650	0.659	0.692
100	0.520	0.575	0.624	0.668	0.707	0.718	0.725	0.760
120	0.624	0.690	0.749	0.801	0.849	0.879	0.891	0.930
140	0.728	0.815	0.878	0.935	0.990	1.026	1.040	1.085
160	0.833	0.920	0.988	1.069	1.132	1.172	1.189	1.241
180	0.937	1.036	1.123	1.202	1.273	1.313	1.336	1.390
200	1.039	1.151	1.248	1.356	1.446	1.486	1.509	1.565

TABLE XXI.—THEORETICAL VELOCITY OF THE COLD AIR ENTERING CHIMNEYS OF VARIOUS HEIGHTS AND CONTAINING GASES AT DIFFERENT TEMPERATURES, THE TEMPERATURE OF THE EXTERNAL AIR BEING 62 DEG. F.

Height of Chimney in Feet. (H)	Velocity (V) in Feet per Second.							
	350 deg.	400 deg.	450 deg.	500 deg.	550 deg.	585 deg.	600 deg.	650 deg.
10	15.1	15.9	16.5	17.1	17.6	17.9	18.0	18.8
20	21.3	22.4	23.4	24.2	24.9	25.3	25.5	26.7
30	26.1	27.5	28.6	29.6	30.5	31.0	31.3	32.8
40	30.2	31.8	33.1	34.2	35.2	35.8	36.1	37.9
50	33.8	35.5	37.0	38.3	39.4	40.1	40.4	42.4
60	37.0	38.9	40.5	41.9	43.1	43.9	44.2	46.3
70	40.1	42.0	43.8	45.3	46.6	47.4	47.8	49.9
80	43.7	44.9	46.8	48.4	49.8	50.7	51.1	53.2
90	47.3	47.6	49.6	51.4	52.8	53.8	54.2	56.3
100	47.8	50.2	52.3	54.1	55.7	56.7	57.1	59.2
120	52.3	55.0	57.3	59.3	61.0	62.1	62.5	64.6
140	56.5	59.4	61.9	64.1	65.9	67.1	67.6	69.7
160	60.4	63.6	66.2	68.6	70.5	71.7	72.2	74.3
180	64.1	67.4	70.2	72.7	74.8	76.1	76.6	78.7
200	67.6	71.1	74.0	76.6	78.8	80.2	80.8	82.9

TABLE XXII.—THEORETICAL VELOCITY OF THE HOT GASES IN CHIMNEYS OF VARIOUS HEIGHTS AND CONTAINING GASES AT DIFFERENT TEMPERATURES, THE TEMPERATURE OF THE EXTERNAL AIR BEING 62 DEG. F.

Height of Chimney in Feet. (H)	Velocity (v) in Feet per Second.							
	350 deg.	400 deg.	450 deg.	500 deg.	550 deg.	585 deg.	600 deg.	650 deg.
10	23.4	26.1	28.7	31.4	34.0	35.8	36.5	38.4
20	33.0	36.8	40.7	44.4	48.1	50.6	51.7	53.9
30	40.4	45.2	49.8	54.3	58.9	62.0	63.5	66.0
40	46.8	52.3	57.6	62.8	68.0	71.6	73.2	75.8
50	52.3	58.4	64.4	70.3	76.1	80.2	81.9	84.9
60	57.3	64.0	70.5	76.9	83.3	87.8	89.6	92.9
70	62.1	69.1	76.3	83.2	90.1	94.8	96.6	99.9
80	66.1	73.8	81.5	88.9	96.2	101.4	103.7	107.0
90	70.2	78.3	86.4	94.4	102.1	107.6	110.0	113.4
100	74.0	82.6	91.0	99.3	107.6	113.4	115.8	119.0
120	81.0	90.6	99.8	108.9	118.0	124.2	126.9	130.0
140	87.5	97.7	107.8	117.8	127.5	134.2	137.2	140.0
160	93.0	104.7	115.8	125.8	136.3	143.4	146.5	149.0
180	9.8	110.9	122.3	133.6	144.6	152.2	155.4	158.0
200	104.7	117.0	128.9	140.7	152.4	160.4	163.6	166.0

For the theoretical velocity of the hot gases  
 $v = 681 \sqrt{\frac{D}{d}}$  (23)

Theoretical velocities of the cold air  
and hot gases for chimneys of different  
heights and with different values for  
the coefficient  $\frac{D}{d}$  are given in Tables  
XXI. and XXII. which have been calculated  
from (15) and (16).

The foregoing discussion shows that the head,  
or driving power of a chimney is directly pro-  
portional to the product of the height and the  
square of the velocity.

but that the velocity is propor-  
tional to the square root of the same product.  
Therefore, for any given value of the ratio

the effect of increasing the height  
10 ft. to 100 ft. is to increase the head as  
 $10 = 10$  times, while the velocity is only  
as  $\sqrt{10}$ ;  $\sqrt{100} = 10$  times.

Consequently, for a chimney of any given height  
the effect of increasing the value of the ratio  
from 0.35 to 0.5 is to increase the head  
as  $1.25$  times, whereas the velocity  
increases as  $0.35 : 0.5 = 1.18$  times.

Conversely, by reducing the height of a  
chimney and the temperature of the gases it  
carries, the effect upon the velocity is com-  
paratively small as compared with that upon  
the head.

Comparison of Tables XIX. and XX. upon  
Tables XXI. and XXII. will make clear the  
effect of these facts upon the output of  
chimneys having different heights and em-  
ploying different values of the ratio.

The actual velocity of flow in chimneys is  
rather to which attention will be directed  
in the next week.

OBITUARY.

CHARLES LUCAS.—Many architects in  
Paris will share our regret at hearing of the  
death at the age of 67, of M. Charles Lucas, who  
was in close connexion with this country and with  
the work of the Institute of British Architects  
in Paris. M. Lucas was a pupil of Constant  
Dupleix and of the Ecole des Beaux-Arts. As  
Inspector of the Paris Municipal "Architecte"  
he was concerned in the carrying out of many  
important works, such as the Caserne de la Cité  
and the Prefecture of Police, the Hotel of the  
Ministry of the Interior, the school in the Rue  
Rodier, and a number of other school buildings in Paris.  
He was the architect also of the Ecole Esplanade  
and carried out a good many interesting  
restorations. It was M. Lucas who wrote the  
course of History of Art at the Ecole des Beaux-  
Arts, when he was professor; and he was in-  
fluential in the affairs of the Société des  
Architectes and of the "Caisse de Secours"  
of which he was the general manager. He was  
also a member of the Conseil Municipal des  
Habitations à Bon Marché, and of the Société  
des Ingénieurs de France; and he was in  
connexion with various foreign societies,  
of which he gave important assistance.  
M. Lucas was an admirable lecturer both in  
his own style and eloquence, and made numerous  
lectures on subjects of architecture, archaeology,  
and property, on which latter subject he was  
author of special knowledge. Among his  
works he is cited "L'Architecture à travers  
les siècles," "L'Habitation à Toutes les  
Échelles," "Le Palais d'Ulysse à Ithaque,"  
and "La coopération en connexion avec le  
travail des artisans" dwellings was especially  
his in consequence of his detailed know-  
ledge of the structural and practical details  
of the class of work. M. Lucas was a  
man of (no allusion to) robust physical health.  
He was of untiring energy; he seemed never  
to grow old, and his active life was a constant  
one. He was for some years back, in spite of  
his advanced age, which he always took in the  
most cheerful manner, and he was found time to write for us the  
report of the Annual Conference of French  
Architects, which appeared in the BUILDER.  
M. Lucas was a man of most  
pleasant manners, who gave one the impression of  
being always busy and always in a good humour.  
He was a son of Edward Binyon, a sugar refiner

and tea dealer, of Manchester, and a member of the  
Society of Friends. On leaving the Quakers' School  
at Kendal he, in 1863, became a pupil of  
Alfred Waterhouse, with whom he remained until  
1871, when he left England for a tour on the  
Continent and in Egypt and Palestine. Upon  
his return he settled in Ipswich, where he carried  
on an extensive practice during twenty-six years.  
By reason of ill-health he was compelled to retire  
from the profession, and transferred his practice  
as from December 1, 1897, to his former assistant,  
Mr. George H. Burgess, of the present firm of  
Messrs. Brown & Burgess, of Ipswich. Mr.  
Binyon won the first premium in each of the  
following competitions:—Sunderland Town Hall,  
on the award of Alfred Waterhouse (illustrated  
in the BUILDER of May 21, 1887, drawing and two  
plans); Swindon New Town Public Offices, with  
provision for the addition of a large public hall  
(BUILDER, April 27, 1889); Folkestone Public  
Library, Ipswich Corn Exchange, after the Italian  
Renaissance manner, 1880-2; the concert pavilion,  
with winter garden, beach bathing houses, etc., on  
the new promenade for the Spa and Winter  
Garden Company, Felixstowe, 1897; and many  
public elementary schools for the Swindon School  
Board. He was architect of the Public Library in  
West Stockwell-street, Colchester, designed some-  
what after the Jacobean style, and opened in  
October, 1894; the lecture hall for the Young  
Women's Christian Association premises, and (in  
an honorary capacity) the Nathaniel Home for  
the Aged in Luther-road, Ipswich; Burlington  
Baptist Chapel, Ipswich; his own residence, to-  
gether with several seaside houses at Felix-  
stowe; and a mansion at Woburn, North Devon,  
for Mr. J. R. Holland, at one time M.P. for  
Brighton. Of his other works we may mention  
the Barrett-Browning memorial at Ledbury;  
"The Grove," and the alteration and enlarge-  
ment of "The Hall" for Mr. W. K. D'Arey, at  
Stannore, where, fifteen years ago, he was  
employed in developing the Stannore Park  
Estate. Mr. Binyon was an able decorative  
artist, and during the early part of his career  
designed largely for Messrs. Jeffery & Co. and for  
Mr. Henry Capel, late of Great Titchfield-street,  
London, for whom he designed the furniture for  
the "Scorpis" for the King, when, as Prince of  
Wales, he visited India. He also designed  
needlework or furniture for the Queen, the  
Empress of Russia, Princess Christian, the  
Duchess of Edinburgh, the Countess of Carnarvon,  
Lord Frederick Cavendish, Lord Selborne, Sir  
Roundell Palmer, and for many other distinguished  
persons. He was a very rapid and persistent  
sketcher; a series of ten small sketch books, filled  
principally during his eastern tour, are, for truth-  
fulness and architectural accuracy of detail, as  
well as for their artistic merit, most interesting  
and instructive. Owing to failing health, he  
retired from the profession in 1897, when his  
practice was continued by his first pupil (Mr.  
Frank Brown) and Mr. Burgess, who had been  
associated with him for many years.

Mr. LUFF.—We have to announce the death, on  
September 20, at Audley House, Great Grandson,  
of Mr. George Henry Luff, aged sixty-three years,  
of 64, Chapel-street, Devonport. Mr. Luff  
was elected in 1884 an Associate and in 1901 a  
Fellow of the Royal Institute of British Archi-  
tects. He was Chairman of the Three-Towns  
Branch of the Devon and Exeter Architectural  
Society in 1890-1901, and President of that  
Society for the session of 1901-2; he was elected  
one of the representative members of allied  
societies, Royal Institute, for 1902-3. Of Mr.  
Luff's architectural works, we may mention the  
branch at Keyham of the Union Savings Bank,  
Devonport; the enlargement and improvement of  
the workhouse infirmary at Stoke Damerel for the  
Union Guardians (1898); the parochial offices for  
the Union at Camel's Head, Devonport; and, in  
the course of last year, the extensive alterations,  
together with a new wing, of the Morice Town  
Council Schools for the Education Committee,  
Devonport. He was the architect of many  
private houses and similar buildings in that town  
and in the vicinity.

GENERAL BUILDING NEWS.

ROMAN CATHOLIC CHURCH, TYNE DOCK.—On  
the 23rd inst. the foundation-stone of a new  
Roman Catholic church was laid at Tyne Dock.  
The building is to be erected on the site adjoining  
the Presbytery in Belle Vue Terrace, and will be  
100 ft. in length and 52 ft. broad. Accrington  
pressed bricks are being used, and there will be  
stone facings. The style will be Romanesque,  
and accommodation will be provided for 800  
worshippers. The nave will be separated from  
the two aisles by circular arches supported on  
stone columns, and the roof, which is to be of  
pitch-pine, will be barrel-shaped. Two side  
chapels, organ gallery, sanctuary and sacristy are  
to be included in the building. The architects  
are Messrs. Broderick, Lowther, & Walker, Hull,  
and Mr. James Young, Tyne Dock, is the con-  
tractor.

WESLEYAN CHAPEL, ULROME, NEAR BRID-  
LINGTON.—A new Wesleyan church has been

opened at Ulrome. It was designed by Mr. S.  
Dyer, architect, Bridlington, and built by Mr.  
F. Postill, contractor, Bridlington, and will  
accommodate seated 150 people, while the  
adjoining schoolroom (connected to the chapel  
by a sliding door) will provide accommodation on  
special occasions for 100 extra.

BAPTIST CHAPEL, HADDENHAM.—A new Baptist  
chapel was recently opened at Haddenham. It  
has been erected from plans by Messrs. John  
Wells & Sons, of Derby and London, and the  
design is late English Gothic. The walls are  
faced with red bricks, with Bath stone dressings  
to the doorways, windows, spire, etc. The  
internal joinery is of pitch-pine, and the windows  
are glazed with cathedral-leaded lights of suitable  
design. There is hot-water apparatus, and  
ventilation on the "natural" system. The total  
accommodation is for 339 adults, or a mixed  
congregation of 450. Most of the seating accom-  
modation is on the ground floor, but there is also  
a small gallery at the front end. The choir  
and organ are accommodated in the south  
transept. Mr. H. Feast, of Haddenham, was the  
builder. The total outlay involved was  
about 3,200.

TRUANT SCHOOL, SHETLESTON, N.B.—The  
new truant school for boys which has been  
erected at Shetleston for the School Board of  
Glasgow was opened on the 21st inst. by the  
Marquis of Linlithgow. It has been built from  
plans prepared by Mr. Andrew Balfour, architect,  
Glasgow. Its external style is English Renais-  
sance, and in plan the school comprises a four-  
sided group of buildings 230 ft. square, with a  
play and drill ground. There are dormitories  
for 150 boys, with classrooms, tailors' work-  
shop, shoemakers' workshop, needle-room,  
laundry, and manual instruction-room, teachers'  
dining and sitting rooms, dining-hall for boys,  
and a small hospital section, with nurses' rooms,  
etc.

PUBLIC SCHOOL, DRUMCHAPEL, N.B.—The  
new Drumchapel Public School, which has been  
erected by the New Kilpatrick School Board on a  
site on Cowdenhill Estate, was recently opened.  
The building has been erected from plans by  
Mr. D. Macnaughtan, architect, Glasgow, and  
has at present accommodation for 200, capable of  
being extended by the erection of wings to 400.

ACADEMIC HOUSING, HOLBORN, N.B.—Additions are being made to this school.  
The scheme is estimated to cost between 7,000,  
to 8,000. It is being carried out from designs  
by Mr. W. H. Brierley, architect, of York, by  
Mr. Ullathorne, contractor, of Selby. There are  
to be new dormitories for boarders, chemical  
and physical laboratories, art room, and lecture  
hall accommodating seventy-five students, and  
these apartments will be approached by a wide  
staircase leading from where the old laundries  
were. The main schoolroom will be at the rear  
of the present principal schoolroom, and will  
face south, and there are to be eight new class-  
rooms alongside the main school, affording  
accommodation for 220 boys. The present  
main school will be divided into two classrooms,  
and its present front will be taken out and rebuilt  
with new windows. The central hall system  
is to be adopted in the extension scheme. There  
will be a new laundry, a workshop, and a dressing-  
room fitted with shower and other baths. All the  
rooms will be supported on steel girders, and  
have fireproof ceilings and wooden block  
floors.

GRAMMAR SCHOOL, NEWCASTLE.—The founda-  
tion-stone of the new Royal Grammar School  
in Newcastle was laid on the 28th inst. The  
site of the new school is in the Brandling-fields,  
between Eskdale-terrace and Brandling-park, and  
comprises an area of about 10 acres. The  
approach is from Eskdale-terrace, on which  
is the principal front to the buildings. These  
are laid out from north to south, having the  
school in the centre, and the science and gym-  
nasium blocks at either end, with the changing  
rooms between these and the central block,  
the whole being connected by covered ways.  
The headmaster's and secretary's rooms are off  
the entrance-hall, which opens into the large  
school-hall, round which are grouped on three  
sides the classrooms, those on the first floor  
being entered from the school-hall covered ways lead  
to the senior and junior boys' changing-rooms,  
lavatories, etc., which are in separate blocks,  
also approached from the boys' entrances in the  
Eskdale-terrace and the playing-fields. The  
covered ways continue through these blocks  
to the science-school on the north, and to the  
gymnasium and dining-hall on the south. The  
buildings are of Windy Nook stone and Leicester-  
shire red brick, with fireproof floors, and the  
design is Renaissance. The architects are  
Messrs. Russell & Cooper, London; the builders  
being Messrs. Arnold & Son, Doncaster; and the  
clerk of works Mr. J. Holden. The contract  
for the buildings amounts to nearly 22,000.

GRAMMAR SCHOOL, AMERHAM.—The new  
premises of the Amerham Grammar School were  
opened on the 21st inst. They consist of an  
assembly hall, 27 ft. 6 in. by 22 ft. 4 in., which







FOREIGN.

The monument raised by public subscription to Camille Desmoulins, in the garden of the town of Arras, was inaugurated last week. The monument, designed by M. Boverie, sculptor, and M. L. de la Motte, architect, is to be rebuilt, at an estimated cost of 495,000 francs. A new school and a post-office building have been opened in the town of Valenciennes. A monument to Thaine was inaugurated at Valenciennes. A monument to the principal defenders of the siege of Saint-Omer in 1844, has been erected in that town. The monument, designed by M. L. de la Motte, is the architect. The monument, about 100 ft. high, consists of a large base on which a pedestal representing a fragment of the ramparts, in front of which are the figures of the principal defenders of the town, while on the top of the pedestal is a woman leaning on a flagstaff. A fountain is to be opened shortly at Valenciennes, erected by public subscription. M. L. de la Motte is the sculptor, who exhibited a model of the fountain at the last Salon. The monument includes a figure of Venus advancing to the home of two Tritons. The Duke of Orleans, who has purchased a large estate at Valenciennes, has built a villa there in accordance with the designs of M. A. Vye-Parmintier, of Valenciennes. The Salon d'Automne, which will open on October 19 at the Grand Palais, will include a collection of the paintings and drawings of the late Duke of Orleans, and also a good many of the works of the Duke of Orleans. On the pedestals at the doorway of the Louvre, the plaster models of two figures of stages, designed by M. Auguste Cain for the Château de la Roche, and which were left by the Duc de Nemours to the Musée des Arts Décoratifs. The town of Hiron (Aisne) has opened a competition for the plans for a new upper class girls' school. The Municipality of Paris have given a pension scholarship (bourse) for young men of both sexes admitted to the Ecole des Beaux-Arts and the Conservatoire de Musique. The town of Agen is about to open a competition for a new Municipal theatre. The works for the construction of a new Bourse de Commerce at Roubaix are to be shortly commenced. The town of Arras is to be shortly taken in hand for the improvement of the port of Arras (Algérie), at a cost of 1,200,000 francs. A new building, forming the headquarters of the Insurance Company in South Africa, has been formally opened in the presence of a large number of representatives. The strike in the town of Lyons, resulting from the dispute between the Lyons Society and the Master Builders' Association, in reference to the deduction of 5 francs to pay the premiums under the new Compensation Act has been settled by the master builders withdrawing their strike. The Treasurer of Cape Town has laid the foundation-stone of the Girls' School at Port Elizabeth. The new school has a frontage of 200 ft. and has sound-proof fire-resisting floors. The roof is to be covered with English red Bursley tiles. The plan by Messrs. Stucko & Bannister. The architect is Mr. McClelland, whose contract is valued at 12,500l. The bridge over the Valsch River is to be opened by the Lieut.-Governor in the first week of October. The London Builders' and Manufacturers' Association have combined to form a mutual fund as a means of assurance for their members against risks in connexion with the new Liability Act. The articles of association have been approved, trustees and officers appointed, and offices opened. At the same time the main contract for a new building to be erected for the Standard Bank has been given out for tender. The building will occupy a site at the corner of Henrietta and Commissioner streets.

MISCELLANEOUS.

ANNOUNCEMENTS AND BUSINESS ANNOUNCEMENTS.—Mr. Henry Hall, architect, has removed to 19, Doughty-street, to No. 20, Quernmore-road, Green, Haringey Station. Mr. J. Jones & Co., late managers to Messrs. J. Jones & Co., general engineering contractors (Newcastle and London), has taken over the business which will now be carried on by the J. P. Ward Co., at the same premises, Emerson-chambers, Blackett-street, Newcastle-on-Tyne. DIRECTOR FOR ARCHITECTS.—The Manchester Guardian reports that a lively discussion took place at the meeting of the Ashton Town Council on the 19th inst. on a recommendation in the report of the Education Committee that a new school should be erected. The architect proposed by the Education Committee, Mr. J. P. Ward, was urged to supervise the construction at Ryecroft School, the total cost of which is not to exceed 1,000l. The matter had been referred back, and the county council called upon to adjudicate upon the

plans. Mr. Coop said that so long as local architects were suffering from depression in trade he would object to work going outside. They had capable men in Ashton, and the town hall and technical school had been built under the supervision of local men. The last time an outside man was engaged by the Corporation was about forty years ago, and the result was a barn-like structure, the baths. The minutes were ultimately passed. THE "ENGRATIC" NON-SLIPPING STAIR-TREAD.—The Engratic Stone Company (Fulham) send us a specimen of their stair-tread, which appears to be a very good and durable contrivance for giving firm foothold on stairs. The stairs are made of the Company's artificial stone called "engratic." Into each step, while being moulded, two strips of teak are inserted, with the grain endways, and projecting slightly above the surface of the stone. These give an excellent foothold, as we have proved on trial, they will stand a great deal of wear, and make less noise under the foot than metal of any kind. The engratic stone itself seems a very good material of its type. It can be made either of a coarser grain, for steps and other practical purposes, or of a finer grain for carving. The patentees claim that it can be carved as easily as Portland stone, which the finer kind rather resembles in appearance. We have not seen any carving executed in this material, but we should expect, from its texture, that carving could be satisfactorily executed in it. THE LINOLITE LAMP.—We have received from the Linolite Company, of 25, Victoria-street, Westminster, a pamphlet giving the results of a comparative test made on the illuminating power of a "linolite" lamp and an ordinary glow lamp. The test was carried out by Mr. D. L. Sands at the Municipal School of Technology, Manchester. The average value of the illuminating power over an area 12 ft. in diameter under each lamp was found, the lamps being fixed at a distance of 5 ft. 6 in. above the horizontal surface. It was found that for the same consumption of power the linolite lamp gave about 57 per cent. more light than the ordinary glow lamp. It is stated that an aluminium reflector was used with the linolite lamp and an opal reflector with the glow lamp. We would suggest that the apparent advantage of the linolite lamp was due to the greater efficiency of the aluminium reflector over the semi-transparent opal reflector. The glowing carbons, each consuming the same amount of energy presumably, give out the same amount of light. If they do not, one must be at a higher temperature than the other. In this case we would be comparing a "high efficiency" short-life carbon filament with a "low efficiency" long-life carbon filament, and the comparison would be valueless so far as the relative efficiency of the linolite lamp and the glow lamp are concerned. The test shows clearly that an opal reflector is worse than an aluminium reflector. The linolite lamp has its uses, but a glow lamp suitably silvered would give a floor illumination equal to that measured by Mr. Sands. We think that the pamphlet might mislead the ordinary non-technical reader into thinking that the linolite lamp gave out more light than if the carbon filament were enclosed in a bulb-shaped lamp. UNIVERSITY COLLEGE, LONDON.—The work of the Architectural Department, under Prof. E. M. Simpson, is being specially developed. The courses for the three years' training are now completed. At the opening of the session on October 3 two new studios will be provided for junior and senior students, and also special smaller studios for more advanced students doing special work. With the help of the Carpenters' Company arrangements have been made for a series of demonstrations on the working of materials and their construction, to be held at the Company's Trades' Technical School, Great Titchfield-street. This will bring the lectures into close association with practice, and will save the necessity of duplicating a museum of materials and structures. PRESERVATION OF ANCIENT MONUMENTS AT CORK.—At an adjourned meeting of the Cork County Council last week an influential deputation sought the aid of the Council in the preservation and renovation of the ancient monuments in the district. Dr. Windle, president of Queen's College, Cork, said he had seen the destruction of these heirlooms, which should be preserved and handed down to succeeding generations. To destroy them was almost as serious as to destroy the title deeds of an estate, because they were the things to which they were able to point as the existing living memorials of what took place in bygone days. People had not been educated up to this view of things, and they had sometimes seen ruins destroyed and stones with ancient inscriptions broken up to mend the roads. The object of the deputation, Dr. Windle added, was to urge upon the Council to take up the guardianship of these prehistoric relics. They did not ask for the expenditure of much money—merely sufficient to prop up these monuments and save them from decay or injury. The chairman (Mr. Howard) said the Council were in full sympathy

with the object of the deputation. Formerly this duty devolved on the Irish Board of Works, and they did it badly. He would object to spending money on private work unless they were given control of these monuments. He suggested that these needing repair should be scheduled and inspected by the county surveyors, and the cost of repair, etc., be ascertained. They could then approach the Board of Works and find out why they neglected the protection of these national monuments. This suggestion was agreed to.—Times. ANNUAL CONVENTION OF THE NATIONAL ASSOCIATION OF MASTER HOUSE PAINTERS AND DECORATORS.—The twelfth annual convention of this Association was opened at the Guildhall, Plymouth, on the 20th inst. Mr. H. Vigurs Harris, the President, in the course of his opening address, said that he thought they might fairly say that until about ten years ago the house painting and house decorating trade was rather on the down grade. It was quite true in some favoured parts of the country there was intelligence shown, and the material which was supplied to the operators was good, but on the commercial side there had been a distinct depreciation; the workmen, he thought, were not so qualified as they were some thirty or forty years ago. The unhappy side of trade unionism—and it had a very unhappy as well as a happy and useful side—was sometimes unduly predominant, and there had been a scarcity of good and steady operators. He thought, however, through the energy and service of the Association, they were beginning to alter that state of things. He had never been able to find out any satisfactory reason for that decadence, saving the alteration in the public method of having its work done. They changed from the old-time method of keeping the man who had served them well, and the whole of the public—public bodies especially—accepted the system of contract by public tender. He believed that that system of wild and almost unchecked competition had had a most disastrous effect on a great many branches of the building trade, and not least upon the trade of the painter and decorator, because when things were reduced to their lowest level, and a man did not know whether he would get out with 5, 10, or 20 per cent. profit or loss, he did all he could to save himself from loss. The result was the apprentices were no longer so carefully trained, as they were turned into money-producing apprentices instead of apprentices who had to take their part later on in the life and service of the nation. Their Association had been glad to make its members more serviceable. A large amount of money was being spent in educating the youth of the country, not only in the handling of their tools, but also in the conception of beauty they were doing something. They believed their institution would help to stimulate the youth of their towns, as well as the masters themselves, and they would see large and abundant fruits from the competition. On the conclusion of the address, Sir Joseph Bellamy opened the exhibition, which was held in connexion with the convention.—The evening session was held with closed doors, the President being in the chair. Greetings were received from the Associations of Master Painters in Scotland and Ireland, and these were ordered to be entered upon the minutes. The Secretary reported that the committee had to look back upon a year which, if not marked by great eventfulness, contained the record of useful work accomplished and steady progress made. During the year ended August 31, twenty-seven new members joined. The Painting school completed its full session in March last, and in the opinion of the committee, fully justified its establishment from an educational standpoint. The committee had to acknowledge the kindness of the Wallpaper Manufacturers in again placing 100l. at their disposal for scholarships. The Educational Committee's report stated that there appeared to be a great lack of enthusiasm in some districts, for although there was an increased entry of competitors in the district where the convention was held for a short time, they soon fell away.—On Wednesday Mr. G. C. Haité, R.I., read a paper on "The Future of Decoration in this Country: Some Considerations and Suggestions." He said the fine arts were not the cause, but the effects of commercial energy and prosperity, which, on the contrary, the applied and industrial arts were the cause and not the effect of a nation's prosperity. Decorative and applied art was governed absolutely by rules and laws which would, if observed, dignify even the ordinary achievement by its intelligence and fitness, but which if avoided would nullify the greatest efforts of genius, and render their examples of misapplied efforts. These principles of law were impartable, and should be imparted. Art could not be taught, but inherent abilities could be directed. The knowledge of the governing laws of art could be imparted, and must be to the appreciation of art. The Royal Academy Schools had provided professors of painting, sculpture, architecture, anatomy, and chemistry. Had not the time arrived for a professor of decoration—of applied design? The



past mischief must honestly be laid at the doors of the Royal Academy, which had dominated the fashion, and educated the public to look upon decoration as something quite inferior to painting, and the painters had received honour denied to the other branches, so that able men had been content, if not compelled, to be known by a third-rate picture rather than as a master in any other phase of art. He ventured to predict that the future of decoration and decorative art would be more in the hands of those properly trained, and would be regarded as worthy to rank with the other arts, that there would be additional professorships at the Royal Academy of Arts, and that the trade would work under conditions that would cause good work to be recognised, appreciated, and equitably remunerated. Papers were also read by Mr. A. E. Bramley, head master of the Association's Painting School, on "Methods of Training for Decorators," and Mr. W. Whitelaw on "The Importance of the Local Association; How to Develop Interest in it, and Make it Useful." The fifth annual meeting was also held, the President presiding. Mr. Preston proposed a vote of thanks to Mr. Vigurs Harris, the retiring President. Mr. Whitelaw seconded, and the proposition was also supported by Mr. Hickson, Mr. Squire (Bideford), and the general secretary. Thanks were also accorded the outgoing officers. On the motion of the retiring President, seconded by Mr. Millington, and supported by Messrs. Preston and Spencer, Mr. J. H. Turner, of Wakefield, was unanimously elected President for the ensuing year. Mr. J. W. Bellamy (Birmingham) was elected Treasurer, in the room of Mr. Turner, and Messrs. Cantrill (Manchester), Teal (Birmingham), Smyth (West Hartlepool), and Evans (Bristol), were appointed Vice-Presidents. The auditors were re-elected. On Thursday the annual banquet was held at the Royal Hotel, Plymouth. Mr. J. H. Turner, President-elect, proposed "The Mayor and Corporation of Plymouth," to which the Mayor replied. Mr. G. C. Haite, R.I., submitted "Architecture and the Allied Arts," and Mr. Alton Bazeley, in response, said it was not so much from Corporations as from the public that architects suffered. Members of their profession often got all the blame for things which were not quite satisfactory, when really the blame should be on the shoulders of the public, and what they wanted to do was more than ever to cultivate the taste of the public. Sir Joseph Bellamy gave "The National Association of Master House Painters and Decorators of England and Wales Incorporated." Mr. J. W. Bellamy, Treasurer-elect, responded, and the President, who said that the Association stood for the restoration of the trade and the craft, something in the same way as the old guilds.

## Legal.

### PARTY WALL DISPUTE.

THE case of Newton v. Huggins came before Mr. Justice Bray, in the Vacation Court, on Wednesday, on a motion by the plaintiff for an interim injunction.

Mr. Draper, in support of the motion, said that the plaintiff was the owner of property at Ealing, and he asked for the injunction to restrain the defendant, the owner of a public-house called "The Halfway House," Uxbridge-road, from continuing to remove the party wall dividing plaintiffs premises, No. 274, Uxbridge-road, and the public-house, and from committing any injury to the premises until the trial of the action or further order.

His lordship: You are not within the provisions of the London Building Act?

Mr. Draper: No, my lord.

His lordship: Then you rely on your common law rights?

Mr. Draper: Yes.

His lordship: Then the matter resolves itself into what right you have got to interfere with the defendant rebuilding the party wall.

Mr. Draper said that was so. He submitted that this was a party wall of which the two owners were tenants in common. His contention was that having regard to the manner in which the party wall was demolished, and the damage which the defendant was doing, the plaintiff was entitled to an injunction in the proceedings he had instituted.

His lordship said he would assume in Mr. Draper's favour that the wall in question was a party wall, of which the parties were tenants in common.

Mr. Draper submitted that in the counts which had happened the injunction should go. The plaintiff bought the property in 1901. On June 16 last the plaintiff had a notice from the defendant's surveyor to say that it was proposed rebuilding the public-house, and in reply plaintiff's solicitor wrote that he should require the defendant to indemnify his client for any loss he sustained. On September 6 the plaintiff, who was a retired man of business, walking by the premises, found the defendant's

workmen pulling down the brickwork and taking off the slates.

His lordship: The damage appears to be done. You have got your full remedy for damage. Circumstances showing great carelessness, and so on, will have to be considered at the trial.

Mr. Galbraith, for the defendant, said that the plaintiff had to satisfy his lordship that permanent injury would be done to his premises by what had been done.

His lordship: I cannot grant an interim injunction, but I will reserve the costs of this motion for the judge at the trial.

Mr. Draper: Do you not think that some undertaking should be given by the defendant as to the care with which the work should be done?

His lordship: That is useless, as he is bound to use that care.

Mr. Draper: My learned friend should undertake that any client's permission should be obtained before entering upon my premises or from continuing the trespass.

His lordship: That is a comparatively small matter. You will get your damages if they have been guilty of trespass. I think the work should go on. I will make no order except that the costs of this motion should be dealt with by the judge at the trial.

## PATENTS OF THE WEEK.

### APPLICATIONS PUBLISHED.\*

12,036 of 1904.—F. R. LUKS: *Fireproof Doors*. A fireproof door consisting in the combination of two or more slabs of fibre-cement or other suitable fire-resisting material held apart by stiles or rails or distance pieces, so as to leave an air space between the slabs, strips or blades of metal upon the faces of said slabs adjacent to the edges, and if desired over the rails or distance pieces. Hinges having straps embrace the slabs over the rails, and bolts or rivets passing through the several thicknesses solidly connect the parts together.

23,384 of 1904.—B. WAYGOOD & Co., LTD, and H. C. WALKER: *Hydraulic Lifts and Hoists*. This relates to electrically controlled hydraulic lifts and hoists, and consists in means, comprising a solenoid, electrical connections between the latter, lift enclosure doors and lift controller, and means such as an arm or lever connected with the plunger of the solenoid so that the movement of the latter is caused to operate a spindle having a suitable connexion with an auxiliary valve whereby the latter is actuated to open the water supply, upon any spontaneous upward or downward movement of the cage, to restore equilibrium.

26,516 of 1904.—J. STANDT: *Manufacture of Artificial Stone Composition*.

A process of manufacturing artificial stone composition which consists in mixing powdered quartz meal and quartz sand with from 5 per cent. to 20 per cent. of linseed oil, then rubbing and screening the mixture into the form of a powder, afterwards adding the powder in a thin layer to stiffen it without destroying its plasticity and thereafter moulding the mixture and baking it into stone at a temperature up to 200 deg. C. from twelve to twenty-four hours.

7,134 of 1905.—S. WARREN: *Apparatus Applicable as a Level or Plumb Rule and for Measuring and Plotting Inclinations*.

This consists in the combination with a measure and protracting rule of a spirit level which can be placed parallel with or at right-angles to a blade of said rule by means of a plate inserted in one of the faces of a blade of the rule and having notches to receive lugs on a bracket carrying the spirit level, the said bracket being held in place by a screw, and the level by lugs on the bracket.

7,511 of 1905.—P. A. SHELLEY: *Chimney Cowl*.

A chimney cowl having a body or cap provided with an arched cover forming a transverse opening, an intermediately valved valve pivoted within the cowl slightly below the lower side of said opening whereby the lower blade of the valve is shielded, the walls of the body or cap being provided with troughs, over which the lower edge of the valve is adapted to swing, and with openings by which these troughs communicate with the outside of the cowl of the chimney.

8,306 of 1905.—T. HANNAH, F. HANNAH, and A. J. ROSENTHALER: *Spring Actuated Door Closures*.

A door closer consisting in the combination of a casing, a pintle mounted therein and arranged to turn with a door to which it is connected, a coiled spring in said casing having its upper and lower coils ending in arms extending inwardly and terminating in loops loosely

encircling said pintle in such a manner that with both arms normally under tension, adjustment on said casing adapted to prevent the movement of the lever arm in one direction and the upper arm in the opposite direction, means carried by said pintle for adjusting the arms and holding them in position, and a screw causing one or other of the said arms to engage with the pintle to increase the tension of the arm being held against the other arm.

8,608 of 1905.—J. R. DUNCAN: *Closures for Plumbing Traps, or the like*.

This consists in the combination of a sliding having hand-holes formed in a neck integral with the body of the fitting, said opening having an inner shoulder, a tapered screw thread, and a rotatable closure of similar form, the closure being tapered to fit the neck of the fitting, and having a boss to be engaged in retaining the closure, and a cap of non-corroding material upon the neck over the closure, the cap having a cavity in its inner surface, the closure being engaged round its periphery only, and being firmly into its seat by the pressure of the cap.

11,945 of 1905.—T. A. AMBROSE: *Machines for Cutting Mortises*.

A machine for forming mortises characterised by the outer thereof being drawn back, and the inner being drawn forward, so that the cutter having back and front cutting faces arranged that strips are formed in one piece, which on removal of the discharging arm, undercuts groove of any appropriate shape.

13,273 of 1904. M. BAYARD: *Device for Use in Domestic Baths*.

This invention relates to a device for use in domestic baths for a ready support for the person using the bath sinking below the surface of the water in case of sudden faintness. The support may be secured to any ordinary form of bath by means of clips or suspending levers fitting on the edges of the bath. These carry a horizontal body-rest of wood or other suitable material, partly embracing the body of the user, and to these are hinged arms, which can be turned round the body of the user and secured embracing the body beneath the arms and preventing it slipping down entirely below the surface of the water.

23,314 of 1904.—W. BRÖCKE: *Manhole Closure for Sewerage*.

This relates to the construction of the junction parts of invert channel blocks and invert cover, and consists in the combination of a raised step upon one or both sides of the blocks, in conjunction with a shoulder or lip piece upon the underside of the invert or cover used therewith.

23,348 of 1904.—D. GREGG, S. CHANLER, and J. CHANLER: *Apparatus for Automatically Lighting and Extinguishing Public and other Lamps*.

According to the invention, a suitable valve is provided, the bottom of which is charged with liquid. In this vessel is fixed a drum valve, which rotates on a hollow, fixed axis, passing through its centre and the cover wall of the vessel. This axis is the gas supply to the drum valve. The level of the liquid is above the centre of the shaft, in order to seal the joint. The outer edges of the drum valve are provided with suitable crossbars, leaving a space between the body and the bar. A bell-holder or holder are arranged in position to rise and fall with the pressure of gas, and attached to the bell or holder is a rack, having a number of lugs or teeth, which engage the crossbars of the valve drum and cause the rotation of the drum valve half a revolution, for opening the gas supply. The holder descends on removal of the pressure.

24,729 of 1904.—J. H. HALLER and R. R. MACHILL: *Pipe Joints*.

This relates to joints of earthenware pipes and the like, and consists in the formation of the socket end with a groove and a pouring hole or holes, and the spigot end with a portion of its extremity reduced in thickness, and a boss or flange on the inverted, the reduced portion of the spigot end corresponding with the groove in the socket, that a ring of canvas or the like can be placed round the reduced portion, and within the groove, with means for placing and securing such strip of canvas in position.

26,351 of 1904.—A. KOREN, JUN.: *Conduits and the like*.

A tubular conduit for fluid under pressure, comprising a plurality of tubular sections, each coping within each other with packing rings and the like, maintaining a tight joint between the sections, so that the entire structure forms a conduit adapted to be collapsed and to be extended, connections being provided between the end flanges of each set, which maintain the passage for the fluid in all positions of the conduit, said tubular conduit being constructed

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



capable and extensive branch conduit through the medium of a manually operated valve.

**Pat. of 1904.—M. J. ADAMS: Flushing Cisterns.**  
This consists in the use, within a cistern or in communication with the same, of a siphon having a valve communicating with a siphon outlet pipe and an inlet pipe, and in connection with the inlet pipe a bellows, or air vessel, which when pressed, shall pass air contained within the vessel first named; this vessel is placed in the cistern, or is in such communication therewith, that when water is fed to the cistern it also enters the vessel. The object of the invention is to eject the water contained in the vessel by air pressure from the bellows, thus passing over the siphon outlet pipe, and setting up a discharge which, by means of the siphon inlet feed valve supplying the siphon, will draw off the contents of the cistern, and use any apparatus with which it is connected.

**SOME RECENT SALES OF PROPERTY:**

**ESTATE EXCHANGE REPORT.**

**Oct. 16.—By H. F. RUSSELL & SON (at Lomister):**  
Cotter, Bedford.—"Derford Land," 10 a. 7 r. 20 p. f., £150  
Bedford.—"Brook End House" and 4 a. 0 p. 16 p. f., 435  
"Fauld" and "Venerable Croft" Exch. 430  
Cotter, 8 a. 2 r. 3 p. f., 180  
"Mariner's Cross Field," 4 acres, f., 490  
"West Field," 10 a. 3 r. 19 p. f., 490  
**8th Nov.—By A. C. LOVELL & SONS (at Exeter):**  
Devon.—"Porters of the Duchesbury Estate, comprising farms, back cottages, etc., area 1,100 a. 2 r. 21 p. f. (in 1/2), 11,780  
**18.—By NORT & HOWES (on the premises):**  
Devon.—"Newland's Pk., "Stamford Lodge," 1 p., 1,125  
**19th.—By DAVID BURNETT & CO.**  
Devon.—"Crowland-rd., f.g. rents 116s., reversion in 83 yrs., 2,740  
Devon.—"f.g. rents 122s., reversion in 21 and 34 yrs., 2,840  
Campt.—"Radcliffe-rd., "Chisholm Lodge" and 1 of an acre, f. p., 1,050  
Devon.—"15, Pembroke-rd., f. y. r. 30s., 380  
4 and 42, Paconsfield-rd., u.t. 71 yrs., g.r. 11s., y. r. 52s., 410  
**By RUTLEY, SON, & VINE.**  
Cotter Town.—"15, Georgians-st., u.t. 34 yrs., f. p. 8s., 355  
**By TERNBORROW & CO. (at Penitth):**  
Cotter, Cumberland.—"Mount Eden Farm," 10 a. 3 r. 30 p. f., 3,250  
**By L. LOVELL & SONS (at Coventry):**  
Cotter, Warwick.—"20 and 21, Much Park-st., area 729 yds., f. y. r. 9s., 1,300  
Devon Butte-la.—"Four enclosures, 15 a. 3 r. 1,125  
Devonshire, Walsley.—"Three closes of land, 31 a. 0 r. 25 p. f., 540  
**By PERKINS & SON (at Southampton):**  
Devon, Hants.—"Cope-hill" and 3 a. 1 r. 1,650  
Various pieces of land, 33 a. 3 r. 28 p. f., 4,240  
Devonshire cottages, and 0 a. 0 r. 32 p. f., 593  
Devonshire, with stable, store, etc., 1 a. 2 r. 48 p. f., 270  
**September 20.—By P. & O. GEN.**  
Devonshire—3 to 51 (odd), Waterloo-rd., also "Commercial Buildings," u.t. 34 yrs., g.r. 70s., 455  
**October 21.—By RUTLEY, SON, & VINE (at Devon):**  
Devonshire—73 to 85 (odd), Greenfield-rd., f. y. r. 2,210  
**Conditions used in these lists.—E.g., for freehold ground-rent; f.g. for leasehold ground-rent; L.g. for ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for purchase; a. for estimated rental; w. r. for weekly rental; q. r. for quarterly rental; y. r. for yearly rental; u.t. for unexpired term; p. a. for per annum; y. a. for years; s. for street; r. d. for road; sq. for square; p. l. for place; t. r. for terrace; c. r. for crescent; g. r. for garden; y. d. for yard; g. r. for ground; c. h. for cowhouse; p. h. for public-house; o. for other; & for shops; c. for court.**

**MEETINGS.**

**SATURDAY, SEPTEMBER 30.**  
**Eastern Architectural Association.**—Students' Sketch-Book Exhibition.  
The Royal British Institute of Certified Carpenters.—At the Garden City and Exhibition of Cheap Cottages, Lambeth. Leave King's Cross, G.N.R., by the 1.45 p.m. train.  
**Sunday Engineers, Ltd.**—Visit to the Works of the Associated Portland Cement Manufacturers, Ltd., at Northfleet. Assemble at Northfleet 9.30 a.m.  
**MONDAY, OCTOBER 2.**  
**Society of Engineers.**—The ordinary meeting will be held at the Royal United Service Institution, Whitehall, at 8 p.m. The paper will be entitled "Machine Drills for Gun Work," by Mr. Arthur H. Smith, A.M. Inst. M.E. The chair will be taken at 7.30 p.m. precisely.  
**WEDNESDAY, OCTOBER 4.**  
**Institute of Sanitary Engineers, Ltd.**—Sessional Meeting. Mr. A. A. Kemp on "Estate Development."  
**Association of Builders' Foremen and Clerks.**—Ordinary Meeting of the Members. 8 p.m.  
**FRIDAY, OCTOBER 6.**  
**Royal Sanitary Institute.**—Mr. A. W. Welleley Harris, F.R.S., D.P.E., on "Elementary Statistics." 7 p.m.

**TERMS OF SUBSCRIPTION.**  
"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum (26 numbers) PREPAID. To parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 25s. per annum. Remittances (payable to J. MOSEMAN) should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.  
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**PRICES CURRENT OF MATERIALS.**

\* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
Hard Stocks.	1 8 0 per 1000 alongside, in river.
Rough Stocks and	
Grizzlies	1 4 0 " " " "
Facing Bricks	2 0 0 " " " "
Shippers	2 0 0 " " " "
Flettons	1 7 0 " " " "
Red Wire Bricks	1 14 0 " " " "
Best Fareham Red	3 13 0 " " " "
Best Red Pressed	
Brusbon Facing	5 0 0 " " " "
Best Blue Pressed	
Staffordshire	4 2 6 " " " "
Do. Bulloose	4 7 6 " " " "
Best Stourbridge	
Fire Bricks	4 0 0 " " " "
GLAZED BRICKS.	
Revet White and	
Ivory Glazed	
Stretchers	12 0 0 " " " "
Quoins, Bullnose,	
and Flats	16 0 0 " " " "
Double Stretchers	19 0 0 " " " "
Double Headers	18 0 0 " " " "
One Side and two	
Ends	19 0 0 " " " "
Two Sides and	
one End	20 0 0 " " " "
Splays, Cham-	
ferred, Squints	20 0 0 " " " "
Best Dipped Salt	
Glazed Stretch-	
ers, and Headers	12 0 0 " " " "
Quoins, Bullnose,	
and Flats	14 0 0 " " " "
Double Stretchers	15 0 0 " " " "
Double Headers	14 0 0 " " " "
One Side and two	
Ends	15 0 0 " " " "
Two Sides and	
one End	15 0 0 " " " "
Splays, Cham-	
ferred, Squints	14 0 0 " " " "
Second Quality	
White and	
Dipped Salt	
Glazed	2 0 0 " " less than best.
s. d.	
Thames and Pit Sand	7 0 per yard, delivered
Stones Ballast	5 9 " " "
Best Portland Cement	30 0 " " "
Best Ground Blue Lias	30 0 " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.  
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dep't.

**STONE.**

BATH STONE—delivered on road wag-	s. d.
gones, Paddington Depot	1 6 3 per ft. cube.
Do. do. delivered on road wag-	
gons, Nine Elms Depot	1 8 3 " "
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road	
wagons, Paddington depot, Nine	
Elms depot, or Fimlico Wharf	2 1 " "
White Basebed, delivered on road	
wagons, Paddington depot, Nine	
Elms depot, or Fimlico Wharf	2 2 3 " "
Ancaster in blocks.....	
11 per ft. cube, delivered rly. dep't.	
Beer	1 6 " "
Greenhall	1 10 " "
Darley Dale in blocks	2 4 " "
Red Corshill	2 2 " "
Closeburn Red Freestone	2 0 " "
Red Mansfield	2 4 " "

YORK STONE—Robin Hood Quality.	
Scooped random blocks	2 10 " "
6 in. sawn two sides	
landings 40 sizes	
(under 40 ft. super.)	2 3 per ft. super.
6 in. rubbed two sides	
ditto, ditto	2 6 " "
3 in. sawn two sides	
slabs (random sizes)	0 11 3 " "
2 in. to 2 1/2 in. sawn one	
side slabs (random	
sizes)	0 7 3 " "
1 1/2 in. to 2 in. ditto, ditto	0 6 " "
HARD YORK—	
Scooped random blocks	8 0 per ft. cube.
6 in. sawn two sides,	
landings 40 sizes	
(under 40 ft. super.)	2 8 per ft. super.
6 in. rubbed two sides	
ditto	3 0 " "
3 in. sawn two sides	
(slabs random sizes)	1 2 " "
2 in. self-faced random	
flags	0 5 " "

STONE (continued).	
HARD YORK (continued)—	s. d.
Horton Wood (Hard Bed) in blocks	2 0 per ft. cube.
" " " " " " " " " " " "	deld. rly. dep't.
" " " " " " " " " " " "	
" " " " " " " " " " " "	6 in. sawn both
" " " " " " " " " " " "	sides landings
" " " " " " " " " " " "	2 7 per ft. super.
" " " " " " " " " " " "	deld. rly. dep't.
" " " " " " " " " " " "	
" " " " " " " " " " " "	8 in. sawn both
" " " " " " " " " " " "	sides random
" " " " " " " " " " " "	slabs.....
" " " " " " " " " " " "	1 0 " "
" " " " " " " " " " " "	2 in. do.
" " " " " " " " " " " "	0 8 3 " "

SLATES.	
in. in.	s. d.
20 x 10 best blue Bangor	18 2 6 per 1000 of 1200 at r. d.
20 x 12 " "	13 17 6 " "
20 x 10 first quality	13 0 0 " "
20 x 12 " "	13 15 0 " "
16 x 8 " "	7 5 0 " "
20 x 10 best blue Port-	
madoc	12 12 6 " "
16 x 8 " "	8 13 6 " "
20 x 10 best Eureka	
green unfading	15 17 6 " "
30 x 12 " "	18 7 6 " "
18 x 10 " "	18 5 0 " "
16 x 8 " "	10 5 0 " "
20 x 10 permanent	
green	11 12 6 " "
18 x 10 " "	9 12 6 " "
16 x 8 " "	8 12 6 " "

TILES.	
s. d.	
Best plain red roofing tiles	42 0 per 1000 at rly. dep't.
Hip and Valley tiles	3 7 per doz.
Best Broseley tiles	50 0 per 1000 " "
Do. Ornamental tiles	52 6 " "
Hip and Valley tiles	4 0 per doz.
Best Brusbon red, brown or	
brindled do. (Edwards)	57 6 per 1000 " "
Do. Ornamental do	60 0 " "
Hip tiles	4 0 per doz.
Valley tiles	3 0 " "
Best Bed or Mottled Stafford-	
shire do. (Peakes)	51 9 per 1000 " "
Do. Ornamental do	54 6 " "
Hip tiles	4 1 per doz.
Valley tiles	3 8 " "
Best "Rosemary" brand	
plain tiles	48 0 per 1000 " "
Best Ornamental tiles	50 0 " "
Hip tiles	4 0 per doz.
Valley tiles	3 8 " "
Best "Hartshill" brand	
plain tiles, sand faced	50 0 per 1000 " "
Do. pressed	47 6 " "
Do. Ornamental do	50 0 " "
Hip tiles	4 0 per doz.
Valley tiles	3 6 " "

BUILDING WOOD.	
At per standard.	s. d.
Deals: best 3 in. by 11 in. and 4 in.	13 10 0
by 9 in. and 11 in.	15 0 0
Deals: best 3 in. by 9 in.	13 0 0
Battens: best 3 in. by 7 in. and	
8 in. and 3 in. by 7 in. and 8 in.	11 0 0
Battens: best 2 1/2 by 6 and 3 by 6.	10 0 0
less than 7 in. and 8 in.	
Deals: seconds	1 0 0 less than best.
Battens: seconds	0 10 0 " "
3 in. by 4 in. and 3 in. by 6 in.	9 0 0
3 in. by 4 in. and 3 in. by 5 in.	8 10 0
Foreign Sawm Boards—	
1 in. and 1 1/2 in. by 7 in.	0 10 0 more than
battens.	
2 in.	1 0 0
At per load of 50 ft.	

Fir timber: best middling Danzig	
or Mamel (average specification)	4 10 0
Seconds	4 0 0
Small timber (6 in. to 8 in.)	3 12 6
Small timber (8 in. to 10 in.)	3 10 0
Swedish balks	2 10 0
Pitch-pine timber (30 ft. average)	3 15 0

JOHNSON'S WOOD.	
At per standard.	s. d.
White Sea: first yellow deals	13 10 0
3 in. by 11 in.	24 0 0
8 in. by 9 in.	22 0 0
Battens, 2 1/2 in. and 3 in. by 7 in.	16 10 0
Second yellow deals, 3 in. by	
11 in.	18 10 0
8 in. by 9 in.	17 10 0
Battens, 2 1/2 in. and 3 in. by 7 in.	15 10 0
Third yellow deals, 3 in. by	
11 in.	18 10 0
8 in. by 9 in.	17 10 0
Battens, 2 1/2 in. and 3 in. by 7 in.	15 10 0
Petersburg: first yellow deals	
3 in. by 11 in.	21 0 0
Do. 8 in. by 9 in.	18 0 0
Battens	15 10 0
Second yellow deals, 3 in. by 11 in.	17 10 0
Do. 8 in. by 9 in.	14 10 0
Battens	11 0 0
Third yellow deals, 3 in. by	
11 in.	18 0 0
Do. 8 in. by 9 in.	12 10 0
Battens	10 0 0
White Sea and Petersburg—	
First white deals, 3 in. by 11 in.	14 10 0
" " 8 in. by 9 in.	13 10 0
Battens	11 0 0
Second white deals, 3 in. by 11 in.	13 10 0
" " 8 in. by 9 in.	12 10 0
Battens	10 0 0
Pitch-pine: deals	18 10 0
Under 2 in. thick extra	0 10 0
Yellow Pine—First, regular sizes	44 0 upwards.
Oddments	32 0 0
Seconds, regular sizes	33 0 0
Yellow Pine oddments	32 0 0
Kauri Pine—Planks, per ft. cube	0 8 6 0 5 0
Danzig and Stettin Oak Logs—	
Large, per ft. cube	0 3 0 0 3 6
Small	0 2 6 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 0 0 5 6
Dry Wainscot Oak, per ft. sup. as	
inch	0 0 8 0 0 9
do. do.	0 0 7 " "

PRICES CURRENT.—Continued on page 353.



## COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.
Large Shelter or Concert Hall, with Café .....	Bridlington Corporation .....	36l. 15s. and 21l. ....

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Painting Works .....	Abrebury Estates Committee .....	Borough Surveyor, The Square, Shrewsbury .....
Erection of Farmhouse at Maidencombe .....	Mr. G. Nickels .....	Mr. Back, 4, Victoria-street, Totnes .....
General Repairs, etc., at School, Rotherham .....	West Riding Education Committee .....	County Architect, County Hall, Wakefield .....
Supply of Granite and Steam Rolling .....	Pelkistowe and Walton U.D.C. ....	Council's Surveyor, Town Hall, Felixstowe .....
Painting, Whitewashing, etc., at Fushill Hospital .....	Carlisle Guardians .....	Master's Office, at Hospital, Carlisle .....
Extension of East Roof of Glasgow Central Station .....	Caledonian Railway Co. ....	Company's Engineer, Buchanan-street Station, Glasgow .....
Supply of Pitch for Paving Purposes .....	Manchester Corporation Tramways .....	Tramway's Department 55, Piccadilly, Manchester .....
Block of Eighteen Workmen's Dwellings .....	Bottom U.D.C. ....	Borough Surveyor, Bottom .....
Enlargement of Filter Beds .....	Ashton-in-Makerfield U.D.C. ....	Council's Waterworks Engineer, Ashton-in-Makerfield .....
Repairs to Roof of Town Mills .....	Saliz U.D.C. ....	Borough Engineer, Guildford .....
Caring and Laving Cast-Iron Water Mains, etc. ....	Willenden District Council .....	T. J. Spoones, 10, Orchard-street, Bristol .....
ROAD-MAKING AND PAVING WORKS .....	Littlehampton U.D.C. ....	Council's Engineer, Dyne-road, Kilburn, N.W. ....
Supply and Delivery of Broken Granite .....	do. ....	Council's Surveyor, Town Offices, Littlehampton .....
Works of Scarifying and Steam Rolling .....	do. ....	do. ....
Paving Works .....	The Committee .....	Lynell House Llanesmet .....
Fix. Hot-water Apparatus, Bethel Chapel, Llanesmet .....	Taunton Education Committee .....	Bryan & Roberts, 2, Hammer-street, Taunton .....
New Elementary Schools .....	Weybridge U.D.C. ....	Council's Surveyor, Weybridge .....
Materials, Cartage, Hire of Roller, etc. ....	Ile of Wight Education Committee .....	Office of Architect, 5, St. Thomas-street, Hyde, I.W. ....
Erection of School Buildings at Gurnard .....	Glasgow Corporation .....	Burnett, Boston, & Caruthers, 180, Hope-street, Glasgow .....
Erection of Warehouse, High-street .....	"Irish News," Ltd. ....	J. J. McDonnell, 27, Chichester-street, Belfast .....
New Premises Belfast .....	Rothwell U.D.C. ....	Council's Surveyor, Rothwell, Northants .....
Supply of Road Materials .....	New Mills .....	Borough Engineer, Albyn House, Ramsgate .....
Supply of Granite Chandel .....	Woodwich Guardians .....	Clerk, Union Offices, Woolwich .....
Painting Works at Hospital Buildings .....	Metropolitan Asylums Board .....	Council's Surveyor, School-street, Pontyclun .....
WIRE GUARDS FOR GORE FARM EVER HOSP. ....	Bristol Guardians .....	Office of the Board, Embankment, E.C. ....
Construct. Culvert, Boundary Walls, etc., Workhouse .....	Ormskirk Guardians .....	T. J. Spoones, 10, Orchard-street, Bristol .....
Extension of Electric Power Station .....	Aston Manor Corporation .....	Borough Engineer, Council House, Aston Manor .....
New Schools, Tilehurst .....	Berks Education Committee .....	E. C. Plaks, Parliament-mansions, Victoria-street, S.W. ....
Drainage and Purification Works .....	New Mills and Greenholm T.C. ....	Town Clerk, New Mills .....
New Classrooms and Alter. to Schools, nr. Wakefield .....	West Riding Education Committee .....	County Architect, County Hall, Wakefield .....
Steam Rolling .....	Wrotham U.D.C. ....	Council's Surveyor, Borough Green, Sevenoaks .....
Supplying and Laving Cast-Iron Pipes, etc. ....	Lanark C.C. ....	Warren Stuart, 94, Hope-street, Glasgow .....
Alterations and Additions to Junction Hotel, Bargoed .....	Rhondda Valley Breweries, Ltd. ....	Office of Company, Pontypidd .....
Installation of Electric Light at Council Offices .....	do. ....	Council's Surveyor, Council Offices, Prestwich .....
Sewerage and Sewage Disposal Works .....	Long Ashton R.D.C. ....	A. P. I. Cottrell, 28, Baldwin-street, Bristol .....
Supply of Stoneware Drain Pipes for One Year .....	Croydon Borough Council .....	Borough Road Surveyor, Town Hall, Croydon .....
Supply of Stores for One Year .....	do. ....	do. ....
New Road at Cemetery, East Finchley .....	Islington Borough Council .....	Borough Engineer, Town Hall, Islington .....
Sewerage Works, Waterloo, Hants .....	Catherington R.D.C. ....	G. C. Vernon-Inkpen, 40, Commercial-road, Portsmouth .....
Addition to Administrative Block at Hospital .....	Barnes U.D.C. ....	Council's Engineer, High-street, Mordkale, S.W. ....
SUPPLY OF STORES FOR TWELVE MONTHS .....	Metropolitan Railway Co. ....	Secretary's Office, 32, Westburne-terrace, W. ....
New Schools, Northwich .....	Chesham Education Committee .....	A. E. Powles, Architect, 7, Winton-street, Northwich .....
Making of New Streets etc., Northwich .....	do. ....	do. ....
Rebuilding Penetration Inn, Thornhill .....	Messrs. S. Webster & Sons, Ltd. ....	Jackson & Fox, 7, Rawson-street, Halifax .....
Tar-paving Works .....	Southampton Corporation .....	Borough Engineer, Municipal Offices, Southampton .....
Laying Sewers .....	do. ....	do. ....
Roof Covering to Destructor Furnaces .....	Waldstone U.D.C. ....	Council's Surveyor, Council Offices, Waldstone .....
Making-up and Lighting Roads .....	Swansea Corporation .....	Borough Surveyor, 13, Somerset-place, Swansea .....
Underground Conduits .....	Gosport Waterworks Co. ....	Company's Engineer, 1, High-street, Gosport .....
Laying Mains .....	Great Western Railway Co. ....	Secretary, Paddington Station, W. ....
Supply of Timber .....	Harbour Harbour Commissioners .....	Borough Engineer, Aberdeen .....
Supply of Articles for Twelve Months .....	Glamorgan County Asylum .....	Clerk of Asylum, Glamorgan .....
Materials for Masons, Engineers, and Painters .....	Commissioners of H.M. Works, etc. ....	J. Wager, H.M. Office of Works, Storey's-gate, S.W. ....
NEW SORTING OFFICE AT DULWICH .....	London C.C. ....	Parks Department, 11, Regent-street, S.W. ....
SUPPLY OF GRAVEL FOR P.K.S. & OPEN SPACES .....	Twistock R.D.C. ....	G. D. Bellamy, 64, Courtenay-street, Plymouth .....
Drainage Works, Torraboridge .....	Islington Borough Council .....	Borough Engineer, Town Hall, Upper-street N. ....
Asphalt Paving .....	Commissioners of H.M. Works, etc. ....	Director-General, Ordnance Survey, Southampton .....
Litho. Stone, etc., Ordnance Survey, Southampton .....	Lancashire Education Committee .....	Director of Education, County Offices, Preston .....
Supply of Deals for Schools .....	Great Western Railway .....	C. Nickson, Gas Department, Town Hall, Manchester .....
Steel Roof, etc., Boiler House, Rochdale Rd. Gasworks .....	Bournemouth Town Council .....	Stores Superintendent, Swindon .....
Supply of Stores for Twelve Months .....	Horsforth U.D.C. ....	Borough Engineer, Municipal Offices, Bournemouth .....
Two Passenger Lifts on East and West Cliffs .....	do. ....	E. J. Silcock, 10, Park-row, Leeds .....
Borehole Pump for Waterworks .....	Croydon Borough Council .....	Borough Engineer, Town Hall, Croydon .....
Section Gas-Producing Plant and Gas Engine .....	Commissioners of H.M. Works, etc. ....	H.M. Office of Works, Storey's-gate, S.W. ....
ERECTION OF CENTRAL FIRE STATION .....	Carmalton U.D.C. ....	Council's Surveyor, High-street, Carmalton .....
NEW POST-OFFICE, BENFIELD .....	Hammersmith Borough Council .....	L. Street Frank, A.B.T.S.A., 11, Pancras-lane, Queen-street, E.C. ....
Erec. of Pub. Baths, Washhouse, Shepherd's Bush .....	Rye R.D.C. ....	Council's Surveyor, High-street, Rye .....
WATER MAINS AND TOWER .....	Commissioners of H.M. Works, etc. ....	H.M. Office of Works, Storey's-gate, S.W. ....
NEW POST-OFFICE, LEEDS .....	Stratford-on-Avon R.D.C. ....	Wilcox & Bates, 61, Temple-row, Birmingham .....
Sewerage Works .....	Manchester Education Committee .....	Educational Offices, Damgate, Manchester .....
ALTERS & ADDS. TO MUNICIPAL SCH. BESWICK .....	East Sussex C.C. ....	F. J. Wood County Surveyor, Lewes .....
NEW POLICE OFFICES, ETC., LEWES .....	East Suffolk Education Committee .....	G. W. Leighdon, Architect, Priests-street Ipswich .....
ERECTION OF SECONDARY SCHOOL .....	Buckie Education Committee .....	Harrington, Lev, & Kelkum, 1, Bishopsgate Wharf, E.C. ....
REPOINT WALLS, ETC., AT HOSPITAL, WELLEY .....	War Department .....	War Office, Artillery-street, Grosvenor-road, S.W. ....

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.
*ARCHITECTURAL ASSISTANT .....	Hull Education Committee .....	100l. ....
*OVERSEER (MAINTENANCE OF ROADS) .....	Hong Kong Public Works Dept. ....	210l., etc. ....
Highway Sur. Sec. Inspector, Insp. of Nuisances .....	Wantage U.D.C. ....	130l. ....

Those marked with an asterisk (\*) are advertised in this number.

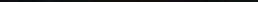
Competitions, —

Contracts, iv. vi. viii. x.

Public Appointments, etc.

Per gallon.

## TO CORRESPONDENTS.



\_\_\_\_\_

etc., also a cookery school, for the Bucks County Education Committee. Messrs. John Mott Kennard & Harold Kennard, architects, 18, Railway Approach, London, W. 1.	
Farthing & Bon, 48, Strand, London, W.C.—	
C. Cleaver	£1,177 0 0
W. Cox & Son	£8,787 12 0
J. Harrison & Son	£1,000 0 0
Oak Building Co., Ltd.	£1,888 0 0
J. Barker & Co., Ltd.	£1,787 0 0
B. E. Moss & Co.	£1,764 0 0
Bartholomew Lockley	£1,000 0 0
G. D. Cannon	£1,678 0 0
J. Appleby & Sons.	£1,660 0 0
D. G. Minter	£1,533 0 0
S. G. Brown & Son	£1,500 0 0
Martin, Wells, & Co., Ltd.	£1,470 0 0
W. T. Bloxham	£1,308 0 0
Mayne & Son	£1,290 0 0
H. H. & Son	£1,200 0 0
H. D. Bowyer	£1,100 0 0
T. Stimson & Son	£1,047 9 0
R. Elvy	£1,047 0 0
C. Brooke & Son	£992 0 0
G. Henson & Son	£922 0 0
J. Mead	£874 0 0
G. C. Hunt	£767 0 0
G. Gillingham	£749 0 0
Webster & Cannon	£698 0 0
W. Coran & Son	£660 0 0
Kettering Co-operative Builders'	
	£,903 0 0
G. H. Gibson	£,984 0 0
G. J. Fisher	£,300 0 0
S. L. Grist, Enfield	£,260 0 0
R. Jewell & Co., Ltd.	£,755 0 0

CRICKLEWOOD.—For the erection of new sorting office, for S.M. of Works :			
J. Allen & Sons		Edward &	
Ltd. ....	£2,745	0	Medway .... £2,330
C. Ansell .....	2,082	0	Aldridge & Son. .... 2,800
J. T. Robey .....	2,577	0	G. Wigze .....
E. Laurence .....			Galbraith Bros. .... 2,800
Sons .....	2,387	0	B. Eley .....
R. Dean & Co. ....	2,364	10	Pollard & Brand .....
Martin, Wells, & Co., Ltd. ....	2,340	0	Gathercole Bros. .... 2,200
B. Parnley & Smith .....	2,380	0	B. E. Nightingale .....
			2,190

HIGGATE.—Proposed new road from Horney-la- to Whitbaital Park.				Complete with York Stones.		Allowance for Harborton.		Net Amount for York Paving.	
	£	s.	d.	£	s.	d.	£	s.	d.
Castle & Co. ....	2,643	0	0	—	—	—	2,643	0	0
W. Manders .....	2,685	0	0	—	—	—	2,685	0	0
Wilkinson Bros. ....	2,416	0	0	30	0	0	2,386	0	0
T. Free & Sons. ....	2,427	13	8	100	0	0	2,327	13	8
W. Neave & Son .....	2,242	0	0	50	0	0	2,192	0	0
F. Cochrane .....	2,108	0	0	30	0	0	2,078	0	0
T. Turner .....	2,204	11	6	50	0	0	2,154	11	6
E. Lee, sen. ....	2,230	0	0	95	0	0	2,135	0	0
R. Ballard, Ltd. ....	2,127	0	0	50	0	0	2,077	0	0
J. Sheburne & Co. ....	2,268	0	0	125	0	0	2,100	0	0
Cunningham .....	2,084	0	0	—	—	—	2,084	0	0
Forbes, & Co. ....	2,100	0	0	40	0	0	2,060	0	0
Parry & Co. ....	2,100	0	0	35	0	0	2,065	0	0
E. J. Bichard .....	2,140	12	0	130	0	0	2,010	12	0
F. Hoffmann .....	2,041	10	0	—	—	—	2,041	10	0
Wilson, Border, & Co. ....	2,040	0	0	40	0	0	2,000	0	0
T. Adams .....	2,082	0	0	—	—	—	2,082	0	0
J. G. Porter .....	1,979	0	0	—	—	—	1,979	0	0
G. Bell .....	2,026	0	0	50	0	0	1,976	0	0
G. B. Mann .....	1,938	4	7	15	0	0	1,923	4	7
J. Jackson .....	1,937	0	0	99	0	0	1,838	0	0
Harvey Bros. ....	1,897	18	0	—	—	—	1,897	18	0
Killigback & Co. ....	1,897	0	0	100	0	0	1,800	0	0
W. Taylor .....	1,926	0	0	80	0	0	1,846	0	0
W. R. Taylor .....	1,937	0	0	200	0	0	1,737	0	0
Co. Stone, Parley, & Co. ....	1,781	6	9	50	0	0	1,731	6	9
W. H. Wheeler .....	1,812	0	0	80	0	0	1,732	0	0
Fleming & Co. ....	1,781	0	0	100	0	0	1,681	0	0
J. C. Crampton, Junr. ....	1,733	14	0	33	14	0	1,700	0	0
T. C. Crampton .....	1,781	0	0	125	0	0	1,656	0	0
Swaeney, Kent .....	1,785	0	0	125	0	0	1,660	0	0



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W. J. Bloxham 3,940 0 A. J. Colborne... 3,399 5  
H. D. Bowyer... 3,705 0 G. Henson & Son 3,328 0  
J. Christie... 3,690 0 Kettering Co-operative Builders... 3,298 16  
East & Hyde... 3,855 0 G. H. Gibson... 3,284 0  
Y. J. Lovell... 3,690 0 J. T. Harris... 3,229 0  
W. T. Toogood & Co. 3,504 0 High Wycombe\* 3,177 0  
G. Darlington... 3,590 0 Enness Bros... 3,177 0  
C. H. Hunt & Son... 3,573 0

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W. Grayson... 1,477 S. Skeritt... 1,560  
H. J. Linzell... 1,649 J. C. Smith... 1,450  
C. Borrett... 1,597 S. A. Kenner, Bur-  
C. A. Green... 1,583 rail-street, Ipswich\* 1,375  
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T. James & A. Gower... £15,273 0 0  
C. A. Green... 13,590 0 0  
Oak Building Co., Ltd... 13,400 0 0  
A. Sadler... 13,255 0 0  
G. Grimwood & Sons... 13,213 0 0  
T. Parkinson & Son... 13,068 9 6  
T. H. Blyth... 13,000 0 0  
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S. A. Kenney, Ipswich\*... 11,675 0 0  
Clark & Sons... 11,600 0 0  
W. H. Maxey & Son... 11,443 0 0  
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W. Davies, Llandudno... £3,144 13

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Aldridge & Son... 370 0 High-street, W.\* 317 0  
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H. Flewelling... 723 0 Swindon\*... 540 0  
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T. W. Marsh 234 13 2 South-east-  
J. May... 233 7 4 on-Sea\*... 177 14 3  
J. C. Trueman 199 0 0

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W. Parsons... 299 5 6 Jenner, South-  
T. W. Marsh... 269 19 10 end-on-Sea\*... 205 10 11  
J. May... 268 13 2

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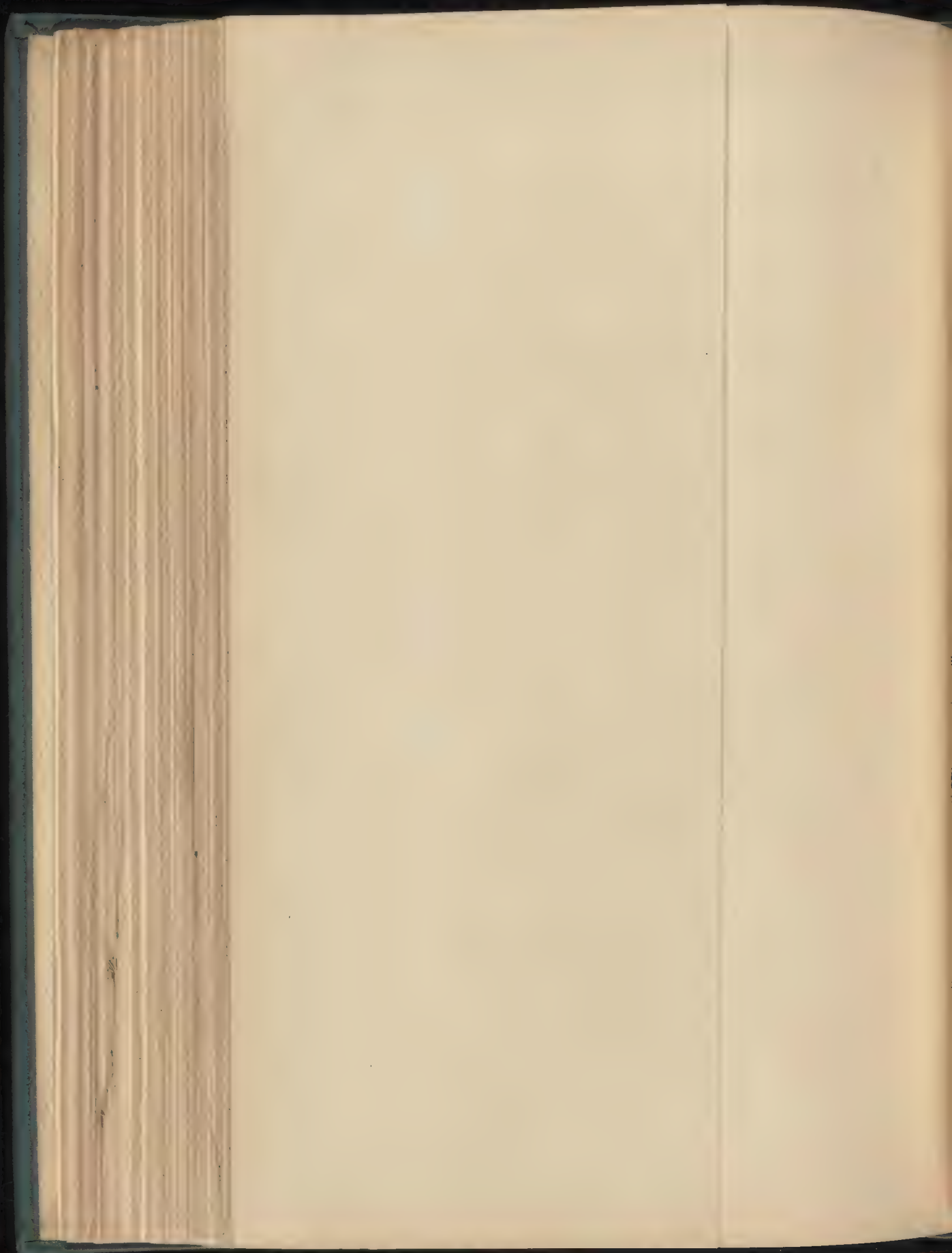
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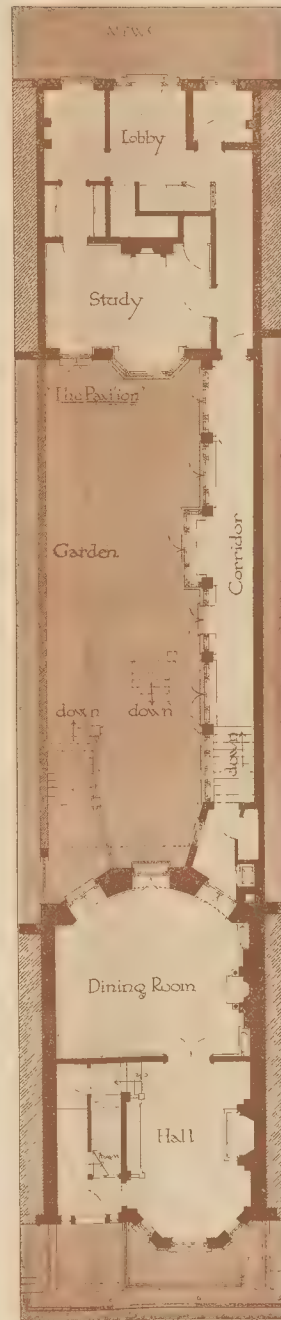


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PLAN OF GROUND FLOOR.

MR. AMBROSE POYNTER, ARCHITECT

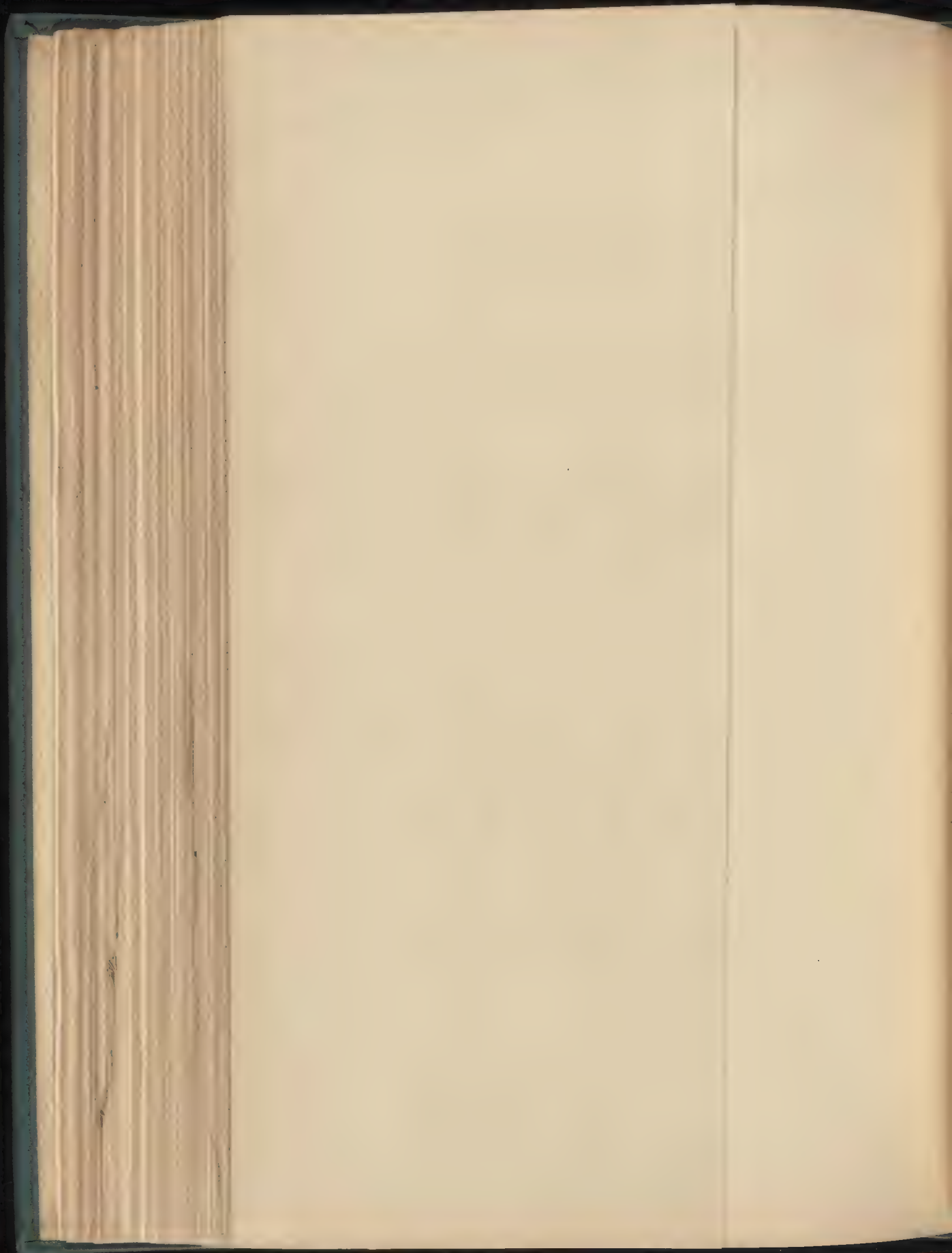


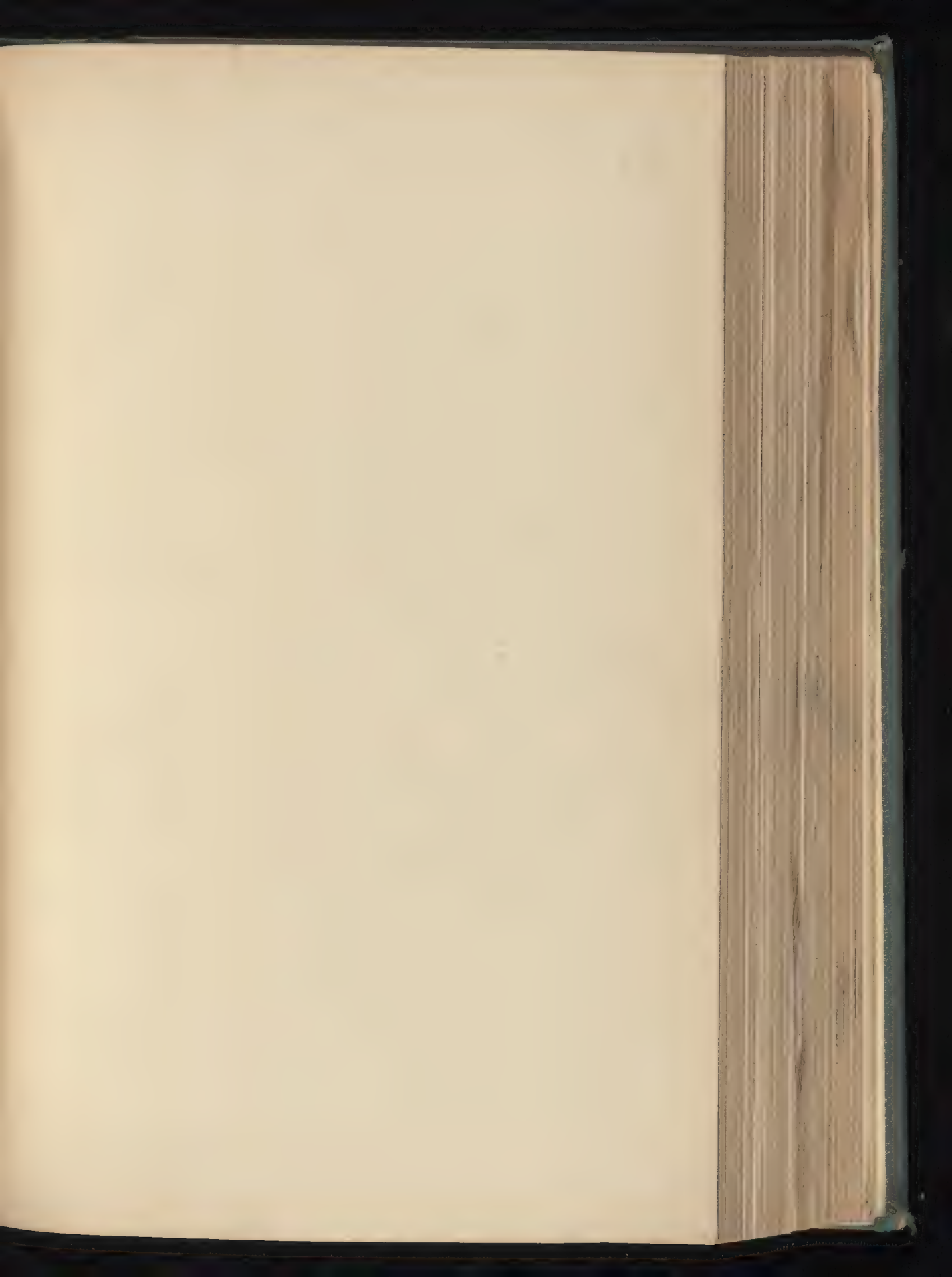
ELEVATION TO MEWS.



ELEVATION TO GARDEN.



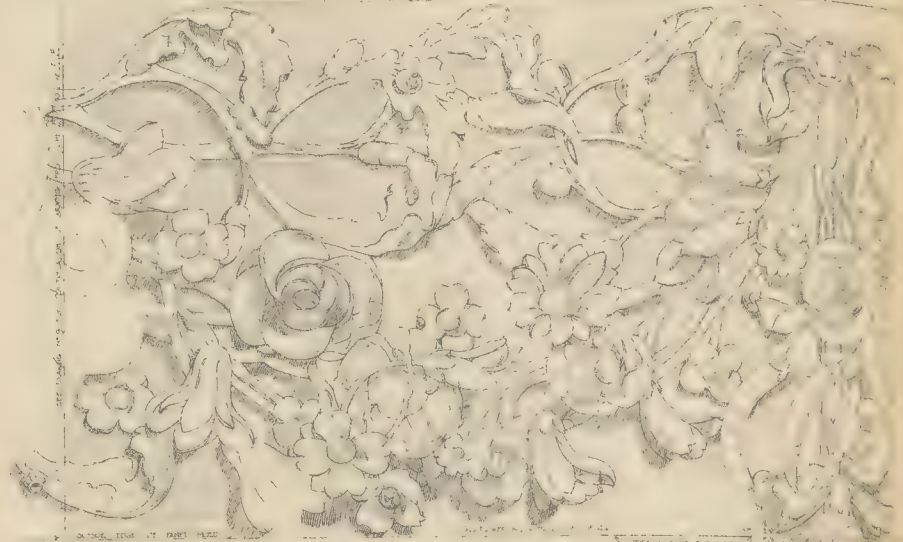






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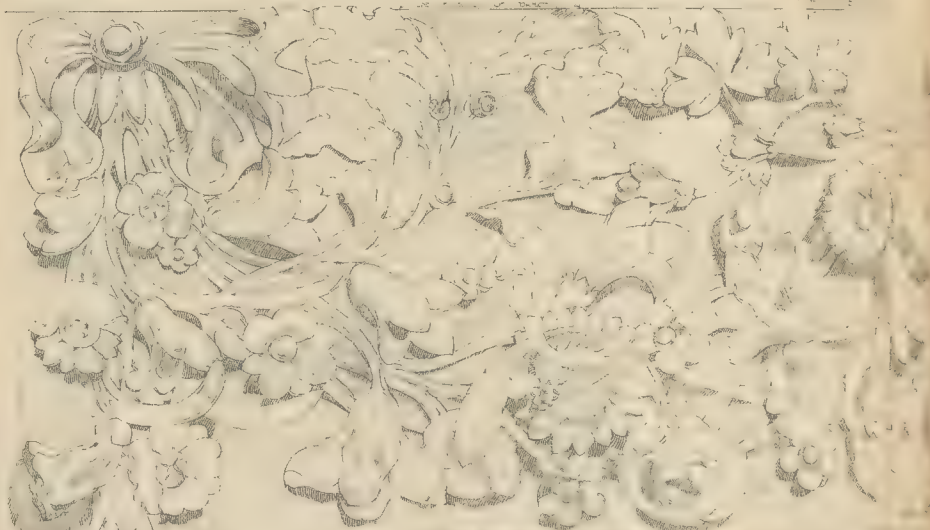


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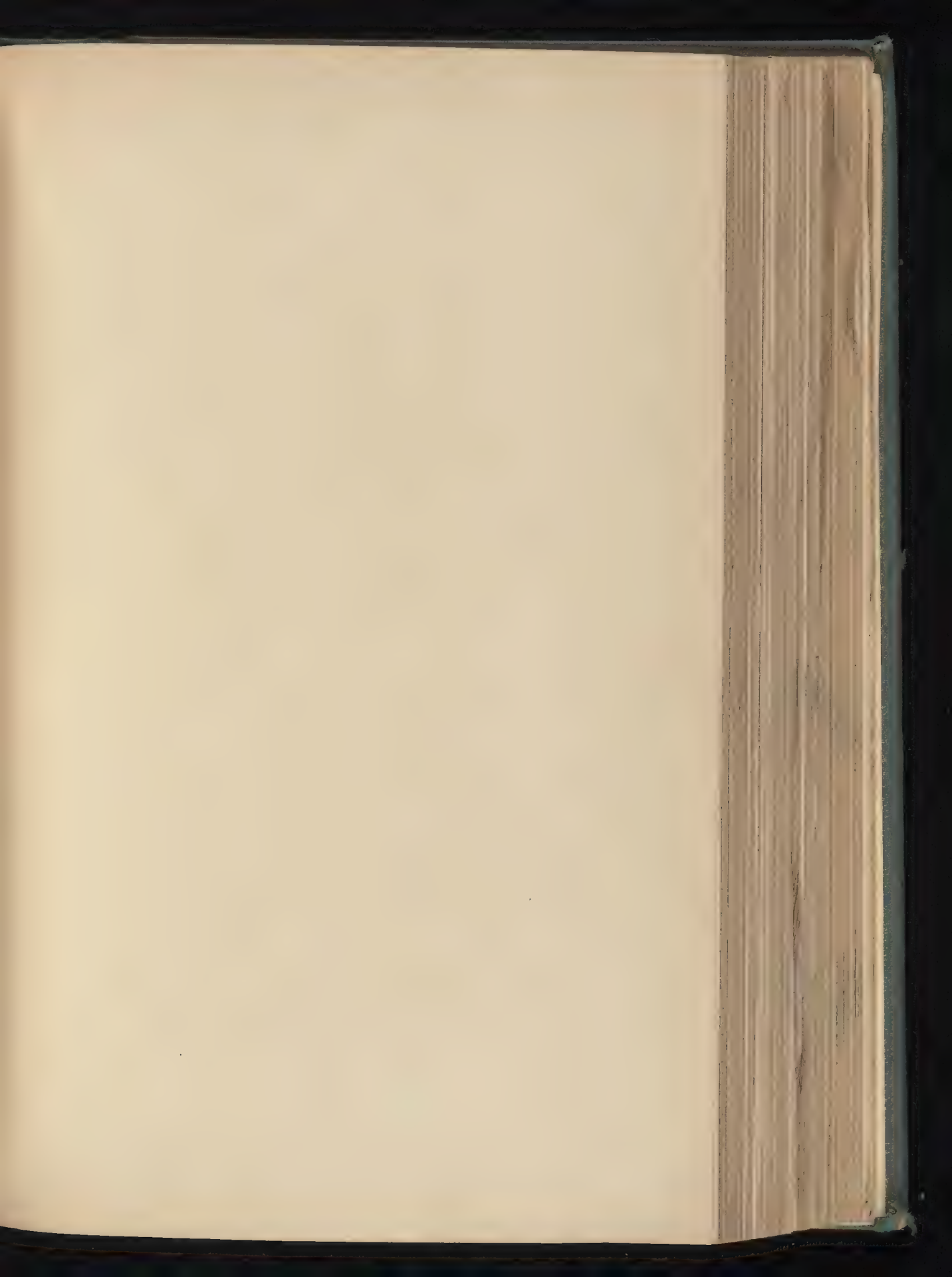
SEE ALSO DRAWING Nº 45-849.

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DETAILS OF PANELLING ROOMS.

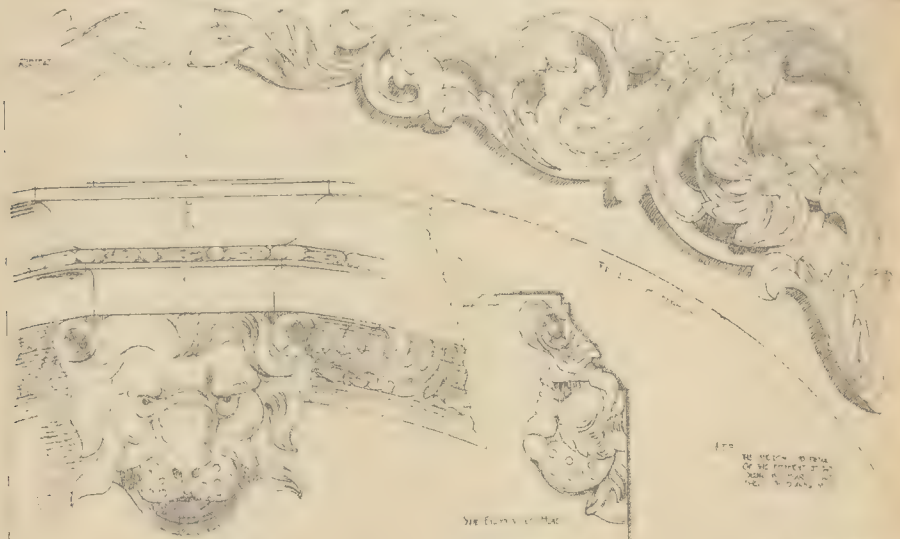


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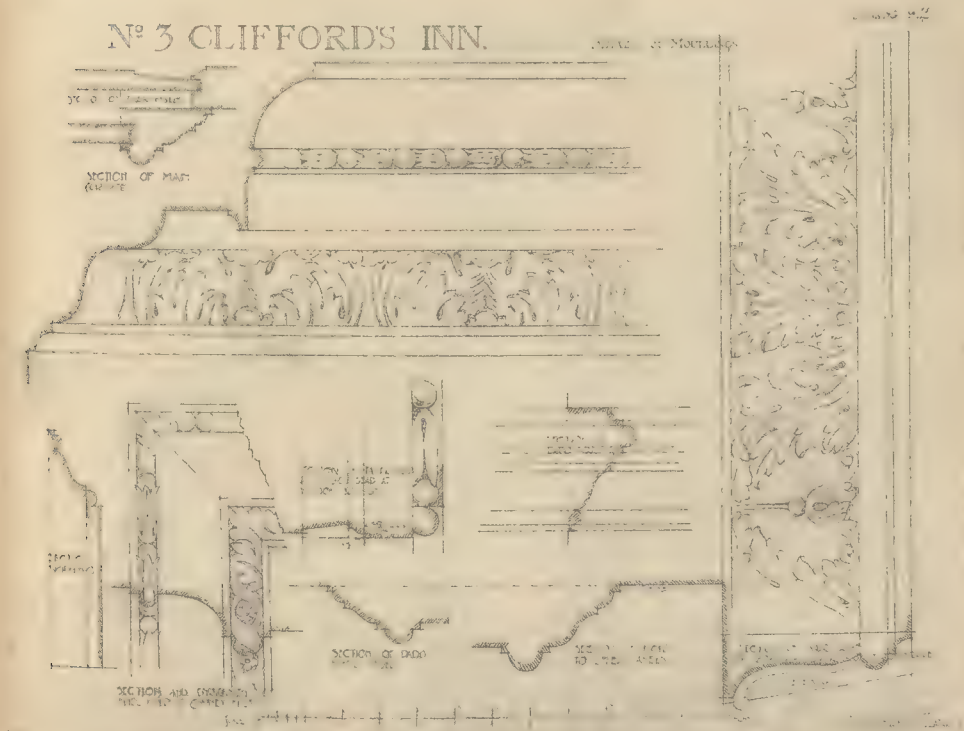
OVER DOOR DETAILS

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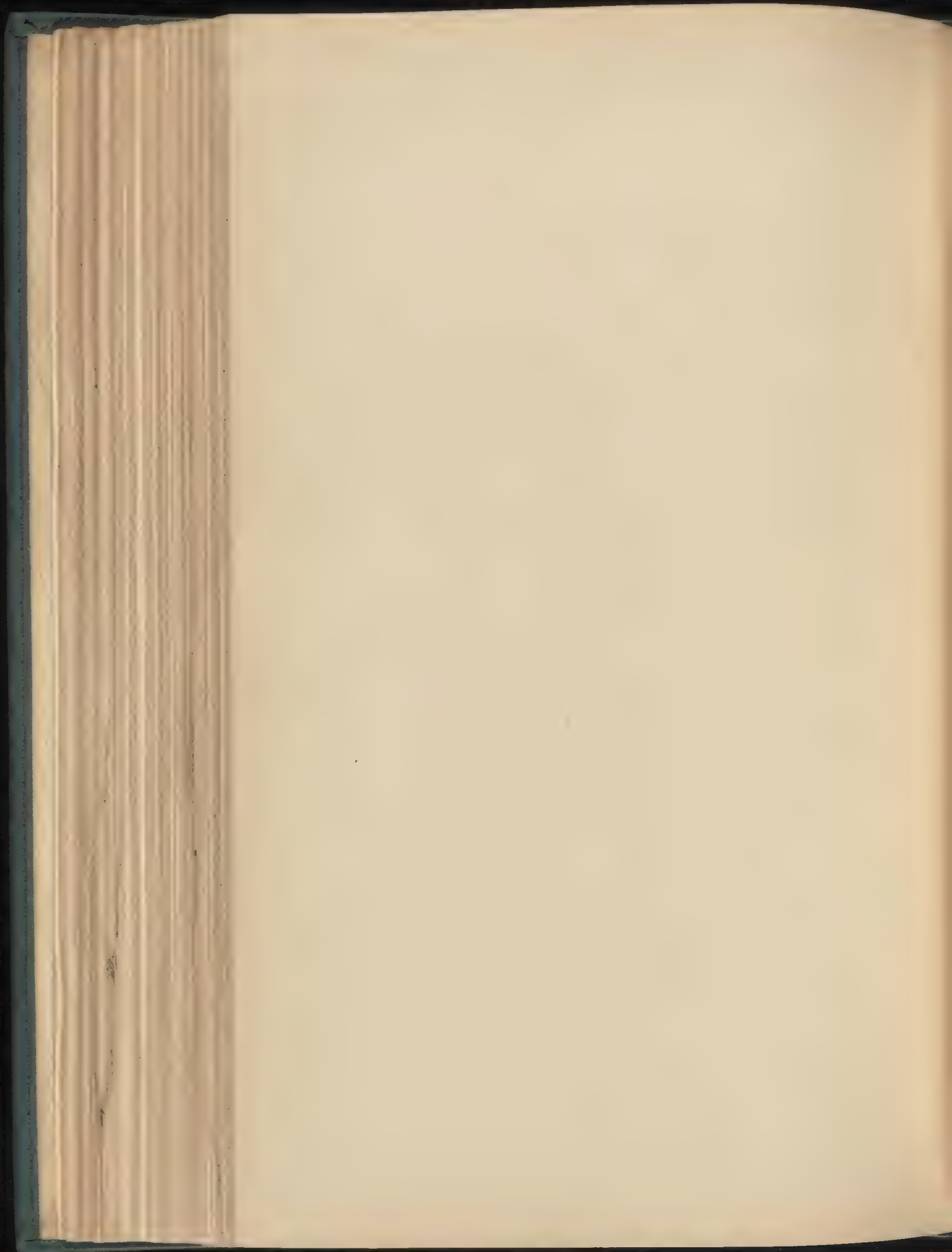
DETAILS OF PANELLED ROOM.



DOOR DETAILS (SEE FRIEZE DETAILS, PARTING NO. 10, 11, 12)



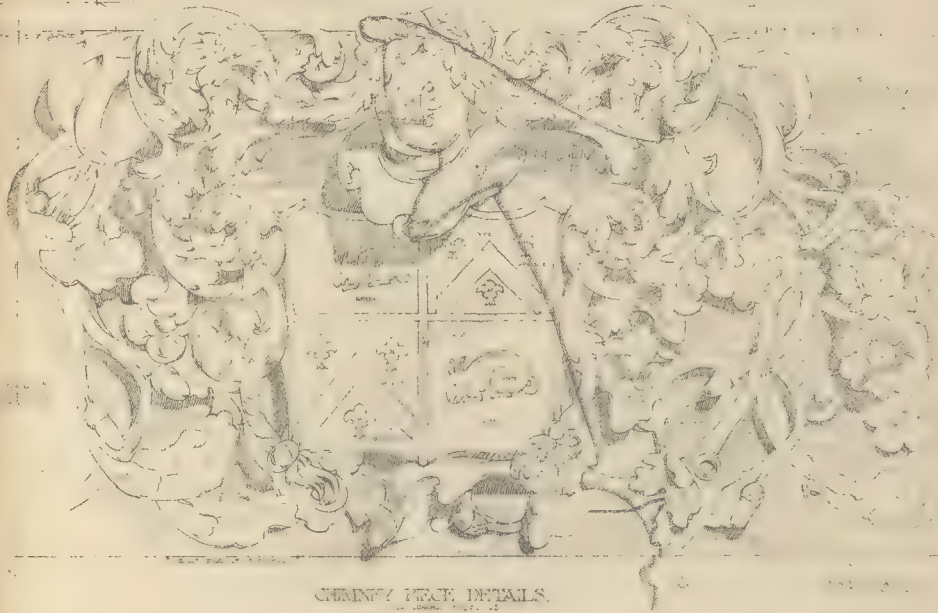




## N<sup>o</sup> 3 CLIFFORD'S INN.

Design N<sup>o</sup> 9

DETAILS OF HANDED LIVING ROOM.

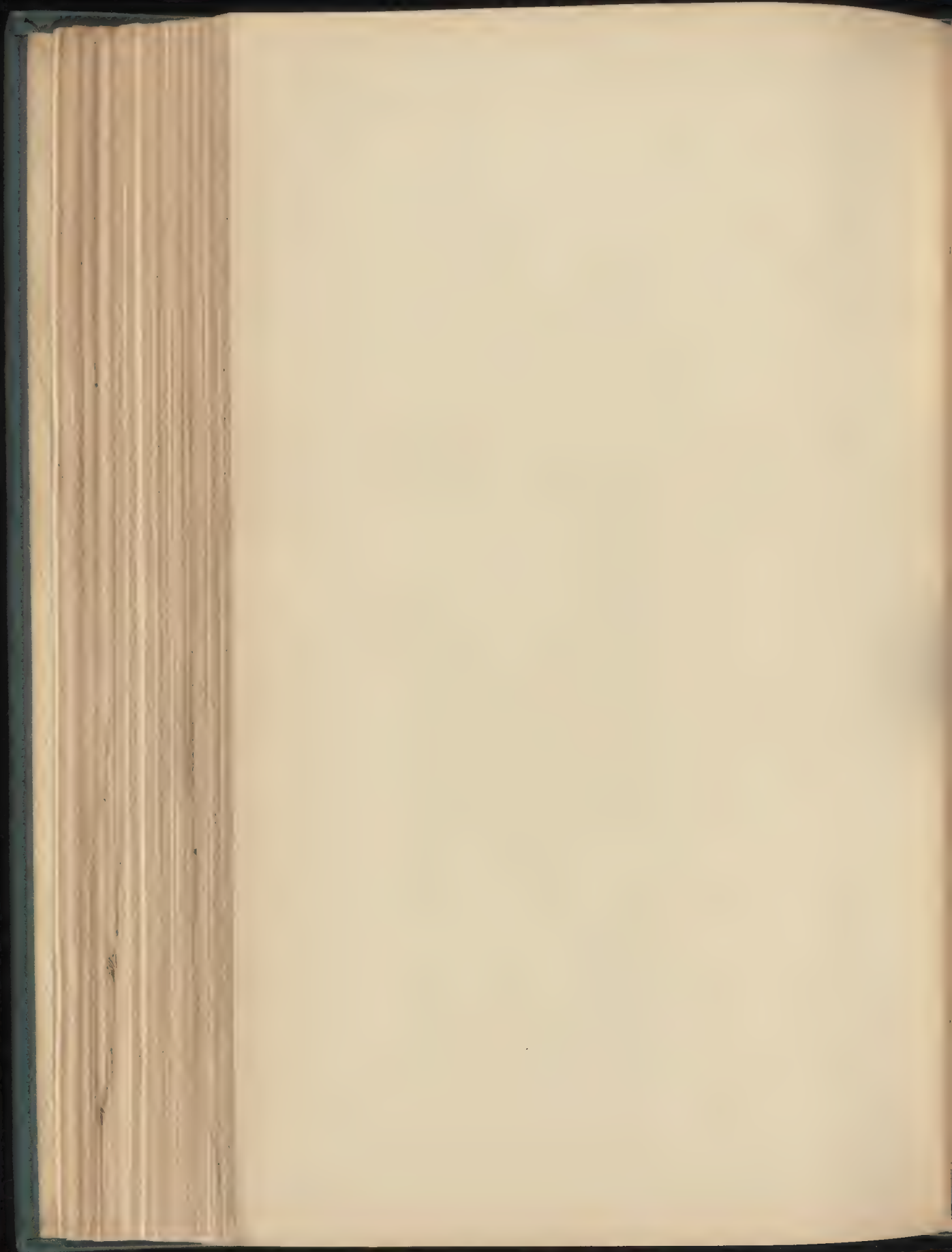


## N<sup>o</sup> 3 CLIFFORD'S INN.

DETAILS OF BEDROOM ROOM.







# The Builder.

VOL. LXXXIX.—No. 3370.

OCTOBER 7, 1905.

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Royal Academy Studentship Sketches.....	By Mr. J. B. Fulton
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### The Church of Watford.



HE ancient market-town of Watford, fifteen miles north of London, formed part of the large gift of King Offa to the Abbey of St. Albans, and in the Conqueror's

time was held by that Abbot. The parish church was of old appropriated to the Abbey, and the vicars were appointed by the Abbot and convent down to the time of their suppression.

About the middle of the XIIth century the abbey assigned the tithes of the manor of Cashio and two-thirds of the tithes of the whole parish of Watford to the newly-founded Benedictine nunnery at Mergate, Bedfordshire. From the Taxation Roll of 1291 it is seen that the nuns of Mergate at that time had an income of 12*l.* out of the church of Watford, whilst the refectory of the Abbey of St. Albans drew 8*l.* 13*s.* 4*d.* from the like source. The vicarage, when first ordained, was exceptionally well endowed, but the same official of the abbey at that time claimed the large pension of 8*l.* out of the vicarage, leaving to the actual vicar of Watford the small salary of 4*l.* 13*s.* 4*d.* The *valor*, however, of the time of Henry VIII. shows that the vicarage was then worth 21*l.* 12*s.* a year.

The church, which is dedicated to St. Mary, stands at the upper end of the town, on the south-west side of the

main street. It consists of a chancel with north and south chapels; a clear-storied nave of six bays, with north and south aisles widened at the east ends into quasi-transpts; north and south porches; and a fine western tower, with the aisles continued on each side of it.

The various historians of Hertfordshire are decidedly curt in their notices of this fabric, contenting themselves with details as to its many important endowments of comparative late date. Modern guide-book writers confine themselves for the most part to calling the church "a spacious edifice." Nevertheless, this much-restored fabric has decided interest pertaining to it, apart from the monuments.

Sir Henry Chauncy, the first historian of the county, wrote, in 1700:—"This Church is situated near the middle of the Town, and contains three large Isles, with a fair Chancel at the East end, and two Chapels on either side of the Chancel, whereof the largest was built by Sir Charles Moris, where the Lords of Caishobery are interred: The Church, Chancel, and Chappels are covered with Lead; at the West end of the Church adjoins a square Tower, in which hang a Ring of six Bells, with a short Shaft or Spire erected thereupon."

We may be quite sure that this old town had a church in the later Saxon days; but of that there is no trace, though it may safely be assumed that it stood on this site. When the church underwent a very considerable "restoration," involving not a little rebuilding, in the year 1871, a large number of

wrought and moulded stones of the early Norman style came to light, proving that a substantial stone church had been here erected soon after the Conquest. Some of these can still be detected in various parts of the building, particularly in the tower. In the inner wall of the north aisle, close to the doorway, is a small recess with a plainly-moulded semi-circular head. Possibly this may be the niche over a holy-water stoup of Norman date; but this is only a surmise, for we cannot be sure that it is in its original position.

There is an obvious remnant in the present fabric of early English work of the time of Henry III. This is to be found in the east respond of the south arcade of the nave, against the walling between the arches into the chancel and St. Katharine's chapel. The respond is of three grouped shafts; the base-mouldings prove beyond doubt that there was an arcade here of early English design. Several XIIIth as well as XIVth century carved and moulded stones were brought to light in 1871. Some of the best of these, including examples of bold dog-tooth ornament, may be seen in the priest's vestry at the west end of the north aisle.

All the main features of this church, both interior and exterior, are obviously of XVth or early XVIth century date. The quasi-transept enlargements of the nave aisles at their east ends seem, however, to speak of a time, probably in the XIIIth century, when the church had a true cruciform plan. The nave is divided from the aisles by arcades of





Watford Church.

six arches on each side, supported by octagon pillars with plainly-moulded XVth century capitals and bases; but the terminals of the hood-moulds of the arches at each end of the south arcade retain XIIIth century characteristics. The clearstory has six large three-light windows on each side. The western tower is a substantially built, well-buttressed erection in four stages, with an embattled parapet. Including the very short octagon leaded spire, which rises from the centre, the height somewhat exceeds 100 ft. There is a newel stair turret in the north-east angle, rising above the rest of the battlements. In the bell-chamber swing eight bells, the tenor weighing 22 cwt. At the base of the tower are various old wooden tablets recording the achievements of the ringers of this celebrated peal of bells. The low-roofed nave aisles are continued each side of the tower, forming convenient vestries.

On the south side of the chancel is an aisle or chapel (now used as an organ chamber) dedicated to St. Katharine, and usually known as the Heydon chapel. Chauncy mentions a memorial in this place to John Heydon of the Grove, who died in 1400. Another memorial mentioned by Chauncy, Newcourt, Clutterbuck, and other later writers stated that this "south Isle" or chapel was built by William Haydon, of Newstreet, Watford, and by Joan his mother. Joan died in 1505, and William in 1515. It was probably a rebuilding of an older chapel. It is separated from the chancel by a double arcade, supported by a lofty, somewhat slender octagon pillar and responds. In the south wall of the chancel, close to the east end, is a large double piscina—double piscinas are usually *temp.* Edward I.

To the north wall of the chancel, two old monumental brasses have been

affixed; an inscription states that they were moved here from the centre of the chancel floor for their better preservation in 1871, when the floor was relaid. The old inscription plates are lacking, but we know from Weever's "Ancient Funerall Monuments" (1631) that they commemorated Sir Hugh Holes, Justice of the King's Bench, who died in 1415, and his wife Margaret, who died in the following year. Above the brasses is a mural tablet to various members of the family of Ewer, erected in 1667.

The large north chapel of the chancel, usually termed the Essex chapel, is of Elizabethan date, and contains a most remarkable and important display of monumental statuary and other memorials, which can here be only briefly epitomised.

This chapel was built in 1595, on the site of a previous one then used as a vestry, by Lady Bridget Countess of Bedford, formerly the wife of Sir Richard Morrison. The Morrisons were lords of Cashibury, and patrons of the vicarage of Watford after the dissolution of the monasteries. The monument of the founder is in the centre of the east end of the chapel. The recumbent effigy of the Countess is on a lofty table-tomb of alabaster. The ermine-lined mantle is thrown back, showing a loose-fitting gown. On the head is a kind of 'kerchief headdress, surmounted by a coronet, and the feet rest on a dog. The inscription at the east end of the tomb indulges in unlimited eulogy, concluding with describing her as "one of the noblest matrons of England for her wisdom and judgement." She was a daughter of John Lord Hussey, and married (1) Sir Richard Morrison, (2) Henry Earl of Rutland, and (3) Francis Russell Earl of Bedford. Her only issue was a son and two daughters by her first husband. She died on January 12, 1600-1.

On the north and south sides of the tomb and at the west end are the various armorial bearings of her three marriages.

West of this monument stands another table-tomb, bearing on the cover, which is supported by six marble shafts, the effigy of a lady similarly clad to the Countess in most respects, but showing, after an interesting fashion, the change that came about in costume in the period of eleven years. The ruff, for instance, of the last effigy gives way to a high standing collar rising up at the back of the head. This is the tomb, as described in a long and plaintive epitaph, of Dame Elizabeth Russell, wife of Sir William Russell, one of the sons of Francis Earl of Bedford; she died in 1611.

Against the south side of the chapel at the east end (the easternmost of the two archways into the chapel has been filled up) is the striking monument—splendid of its kind—of Sir Charles Morrison, the only son of Lady Bridget; it has classical pillars supporting a canopy surmounted by a pediment, beneath which is the mailed figure of the knight, but without either helmet or gauntlets, reclining on the left elbow. At the east end of the monument is the kneeling figure of his son Charles, and at the west end the kneeling figure of his other surviving child, Bridget, wife of Robert Earl of Sussex. Both these subsidiary figures are under marble canopies of drapery. Sir Charles predeceased his mother the countess, for he died in 1599, at the age of 51.

This remarkable monument was the work of Nicholas Stone, an English sculptor of repute. Walpole, in his "Anecdotes of Painting," notes from this artist's memoranda:—"1619. A bargain was made with Sir Charles Morrison, of Cashibury, in Hertfordshire, for a tomb of alabaster and touchstone, and a picture of white marble for his 1st wife."





most part to such matters as disputes as to appointments of particular vicars, and are, therefore, not pertinent to an essay on the fabric. One, however, of these references may be cited, as it relates to the church itself. In October, 1467, Abbot William Albon proceeded to Watford for performing the ceremony of "reconciling" the parish church. It had become polluted by the negligence of two parish clerks, who had caused, or permitted, certain bloodshedding within its walls. The church was, therefore, closed to every kind of divine service until ceremonially cleansed. The solemn office of reconciliation of a polluted sanctuary was an episcopal function, but mitred abbots were, as a rule, permitted, by papal dispensation, to consecrate and reconcile churches which were in their own gift. The town of Watford had to pay heavily for this affray in their church, for the Abbot remained there for two days, having in his train twenty-four mounted attendants, as well as eight of his monks. The whole cost of their entertainment had to be defrayed by the parishioners. Such expenses doubtless acted well in ruder times as a check on brawling in church.

#### NOTES.

##### Tintern Abbey.

THE report of the Commissioners of Woods and Forests as to the condition of work on Tintern Abbey during last year, which has just been issued, shows that in some respects the vesting of these interesting and charming ruins in the Government came none too soon. The east window was in so dangerous a state, especially the large centre mullion and the remains of the tracery in the head of the window, that the stonework has consequently had to be reset. This and other work seems to have been undertaken in a purely conservative spirit, and was necessary if the remains of the Abbey were not to become more ruinous. Some visitors have already complained that the "atmosphere" of Tintern has been lost by this work. Unfortunately there is sometimes no choice either between the loss of the mediæval feeling and the loss of the building. Ruins will not always remain in a particular state, and it is impossible, if work is done, not to interfere with the poetic feeling which comes from the sight of time-affected buildings—moss and ivy covered. We somewhat regret, however, to notice that "interesting discoveries have been made," "the dwarf wall of the cloisters and the drains from the lavatory" have been laid bare. The charm of Tintern arises from the beauty of its situation and the grace of its remaining part, and to make it a mere archaeological curiosity would be to rob it of the loveliness which surrounds it, and to turn it into a mere museum. "The landscape with the quiet of the sky," as Wordsworth found in 1798 when he wrote the lines at Tintern, is what one comes to this delightful spot to enjoy.

WORKMEN'S Compensation Statistics. In the recent Parliamentary paper dealing with the Workmen's Compensation Acts and the Employers' Liability Act it is shown that the number of cases carried to

the Court of Appeal showed a decrease for the year 1904 as compared with the year 1903, although the number of cases brought in the County Court showed an increase. This is evidence that the difficulties caused by the extraordinary form in which the Workmen's Compensation Acts were drafted are at last being elucidated. Nevertheless, the number of cases carried to the Court of Appeal is very large indeed when it is remembered that these Acts were an attempt at rustic justice—i.e., Acts which illiterate men would be able to avail themselves of without legal assistance. Of cases of death in England and Wales out of which claims arose the number was 2,065, and of these 524 were the subject of proceedings, but not necessarily of trial, since some were settled after the institution of proceedings. No percentage can be given in the case of injured persons, since no machinery exists for obtaining exact statistics of persons suffering an injury incapacitating them for more than fourteen days. The evidence before the Departmental Committee showed that the number of cases litigated was small in comparison with those settled by arrangement, and the year 1904 seems to have proved no exception to those dealt with in the Report of the Committee.

##### By-laws Relating to "Lodging-Houses."

A PUBLIC inquiry has been held before one of the inspectors of the Local Government Board in connexion with the new by-laws regulating lodging-houses proposed by the Woolwich Borough Council, and the chief subject of complaint seems to have been the registration of such houses without notice. It was stated that the giving of notice had not been sanctioned in any by-laws made since 1897, as it defeated the intention of the Legislature. A much more important point seems to us to be the definition of what is to be included in the word "lodging-house." In such by-laws the definition generally adopted is "a house or part of a house which is let in lodgings or occupied by members of more than one family." Now it is obvious that such a definition is far too wide; it includes houses let in Harley-street to two medical men, and may even embrace a house where one boarder or even a child is taken in. This was certainly not the intention of the Legislature, as it cannot have been seriously intended that such houses should be subject to inspection and to cleansing and limewashing at stated times. If section 94 of the Public Health (London) Act, 1891—the section under which such by-laws are made—is studied, it will be seen that the Act contemplates the sanitary authority making and enforcing such by-laws as are requisite for "fixing the number of persons who may occupy a house or part of a house which is let in lodgings or occupied by members of more than one family and for the separation of the sexes in a house so let or occupied," and the other provisions are all made subject to this. The by-laws which do not fix the number therefore deliberately fail in carrying out the intention of the Legislature. These by-laws have already been the subject of judicial comment in reported cases, some of which were noted by us in our issue of February 13, 1904, and some of them have been held to be

invalid; but the Local Government Board should confirm by-laws containing so loose a definition of lodging-houses as mentioned above. It was not the intention of the Legislature that the local authorities should expend public funds in inspecting the houses this definition embraces, nor that a class of owners and lodging-houses should be subject to the drastic provisions contained in the Act. It is a pity that an Englishman's house is so quickly being shut of all meaning; but it would be too much if he were to be subject to spring-cleaning and limewashing at times to be fixed by the local authorities.

##### Registration of Motor-Cars.

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##### Motors and the Roads.

IT is stated in the Times, October 2, that the Kent County Council "have agreed to a proposal" that certain roads shall be treated with tar in order to cope with the dust raised by motor-cars, and that the cost shall be shared between the County Council and the District Councils. The Urban Rural District Council (Canterbury) has circulated a letter throughout the county saying that, having regard to the heavy expenditure already incurred upon the roads in Kent, they view with dismay this proposal to increase the burden. The letter very properly points out that roads have proved adequate for

purposes of the public, and that no inconvenience was experienced from dust before the advent of the motor-car, and that the majority of the motor-cars contribute nothing to the District Councils, although house property contiguous to the roads has been seriously depreciated. Kent is a very great sufferer by the motor-car traffic from the Metropolis, and the depreciation in property from dust is not limited to house property, but is equally serious to the fruit and hops. The persons who have to expend money to abate this nuisance should certainly not be those who have already suffered so severely in pocket by its creation. The migratory motorist interferes with the use of the roads for business purposes, and the ratepayers should not be taxed for his convenience.

**Coast Defences.** THE recent northerly gale and consequent high tides have been followed by the usual record of damage to the cliffs and protective works at various exposed places on the East Coast. At Scarborough the new marine drive, still under construction, along the front of Castle Hill, was once more in trouble. Some 60 ft. of the wall were demolished, and about 100 sq. yds. of asphalt paving, together with a considerable length of iron railing, were washed away. The new protective works at Southwold were virtually destroyed, and hundreds of tons of the cliff, undermined by the water, have been carried away. In contrast to the feeble resistance offered by massive works built upon easily destroyed foundations, we have ample proof of the efficient protection afforded by the sand dunes of Suffolk and Norfolk. These natural defences, bound together by the marrum grass, withstand the action of wave and tide, while the more ambitious works of man perish ignominiously. The lesson is that in coast protection works of the future far more attention should be paid to the accumulation of shingle and sand by means of groynes, than to the building of expensive and futile masonry walls and other works. The sea must be humoured rather than defied.

**The New Bridge at Budapest.** CONSIDERABLE interest attaches to the chain-cable bridge at Budapest as a handsome example of construction and an embodiment of the most advanced suspension-bridge design. Crossing the Danube in a single span of 957 ft. between the piers, the bridge has a total length of 1,235 ft. and a width of about 60 ft. The towers at each end are hinged on steel pivots attached to cast-iron plates upon the top of the piers at each side of the river, thus permitting the towers to move slightly in response to the varying pull of the cables. The cables are built up of eyebars and comprise two pairs, one above the other at each side of the bridge, the upper cables passing over saddles, and the lower cables being fixed at the tower heads. The platform is stiffened by two longitudinal lattice girders extending from end to end of the bridge, and lateral bracing is provided by four lattice girders and counter-bracing for each length of 20 ft., the main girders being attached to the

suspenders at the cross-girder connexions. In one respect the new bridge is open to criticism, for, instead of stiffening the platforms in the manner described, it would have been preferable if the cables themselves had been incorporated into parabolic ribs. This type of design would have had the effect of giving a marked increase of stiffness and probably of reducing the cost of construction by a considerable amount.

**Modern Locomotives.** JUDGING by the returns for 1904, railway companies have ample reason for gratification in the results obtained by the use of the larger types of locomotives which have been introduced upon their systems. So far as concerns goods traffic alone, the companies carried last year 34 million tons more merchandise than in 1901, with a saving of nearly 18 million train-miles and a reduction of 71,000 in wages. If the same amount of traffic had been dealt with by the methods followed in 1901, fully 32 million more train-miles would have been run with a corresponding increase of the wages bill. The figures afford a striking demonstration of the advantages conferred by the advance of locomotive design, but the satisfaction of the companies is by no means shared by engine drivers and firemen, for, as stated this week by the President of the Amalgamated Society of Railway Servants, hundreds of the men are now out of employment, hundreds of drivers are reduced to firing, and hundreds of firemen to cleaning. The position is one which railway employees very naturally regard with anxiety—a mental condition that will most likely be aggravated as electric traction comes more and more into use.

**Railway Amalgamation in Scotland.** THE North of Scotland is not a little perturbed, almost excited, by the proposed amalgamation of the Highland Railway Company with the Great North of Scotland Railway. The headquarters of the first company is Inverness, of the second Aberdeen, and Inverness will, under the proposed arrangement, lose the business which arises to the city from this fact. But the arrangement, when agreed upon by the two boards of directors, will have to be ratified by the shareholders and by Parliament. It is by no means as yet certain, therefore, that the matter will go through, especially as it arouses so much local feeling. It is obvious, however, that such an arrangement is to the benefit of the shareholders if fairly worked out, and it should also be a benefit to the Highlands by the creation of one strong company in place of two rather weak financially. There is now very little competition between the two companies, for the Great North of Scotland's territory extends to the east of that of the Highland Railway, and therefore the public advantage to be gained by competing systems is not in jeopardy under the proposed arrangement.

**No. 17, Fleet-street and Inner Temple Gato.** WRITING to the *Times*, Mr. E. S. Mostyn Pryce tells one or two fresh facts which appear to relate to the house of which the original front may now be seen *in situ*, having been restored, together with the

painted ceiling, at the South Kensington Museum under Sir C. Purdon Clarke's superintendence. Mr. Mostyn Pryce says that among his muniments at Gunley is a parchment dated February 5, 1656, which recites that Richard Pryce, of Gunley, a member of the Barebones Parliament, had in that year "lately purchased of the Protector under an Acte for selling the houses manors and lands heretofore belonging to the late King Queene & Prince all that House and Stables situat lyeing and being in the Citie and Countie of Middlesex." As Richard Pryce's last will of February 20, 1674, contains no mention of "The Dutchy House" he infers that at the Restoration Richard Pryce "restored" the property, but he is somewhat at fault in his chronology in adding, "and we further know that the ancient palace was Royal property again in the reign of James I." The traditionary association of the house with Henry VIII. and Cardinal Wolsey cannot be sustained; there is however reason to believe it contained the Council Chamber of the Duchy of Cornwall in the time of James I.'s son, Henry Prince of Wales and Duke of Cornwall. In a "Note" in our issue of January 21 last we gave some particulars of the building, and of its predecessor bought by Richard Tottell in 1556, showing that the present house is identical with the Prince's Arms, afterwards the Fountain Tavern, which, together with the Inner Temple gateway and the narrow house over the gate, one John Bennett rebuilt in 1610, in covenant with the Benchers of the Inner Temple. The gateway is to be set back in alignment with the former frontage, so that the "jettie" of Bennett's building again projects over the pavement.

**The Baillie Gallery.** MR. JOHN BAILLIE'S Gallery at No. 1, Prince's-terrace, Bayswater, is at present given over to an exhibition of paintings and sketches by Mr. C. Percival Small and Mrs. E. M. Roughton as well as a collection of curious paintings and handicraft from Tibet. Mr. Small's drawings are on a high plane of excellence—quiet, refined work recalling that of the water-colourist of forty years ago. The treatment of No. 14, "Heathland," without the exquisite detail of John Ruskin's drawing, reminds us of his work. "Harwich Harbour" is a study of atmospheric effect, as also is the drawing entitled "Frosty Morning"; both these subjects are difficult ones, and in both the theatrical element has been avoided and nature portrayed as seen by an artist. Shanklin, Isle of Wight, is a delicate drawing. "Trimley, Suffolk," and "A Sunny Corner" are full of colour and sunshine. "The London Sketches" of Mrs. E. M. Roughton are valuable records of vanishing corners of Old London, but they lack the inspiration of artistic handling. The collection of paintings and curios from Tibet are interesting as the native work of a comparatively unknown country.

**The Black-Frame Sketch Club.** AN exhibition of pictures by members of the Black-Frame Sketch Club is now on view at the Royal Society of British Artists. Why a society should pledge themselves



to black frames we do not know. If frames have to be uniform we prefer them in gold. The truth, however, is that some pictures look best in black frames and some in gold, while others will look better in white than in either black or gold. The most successful picture-framing at an exhibition that we remember to have seen was that shown by Mr. and Mrs. Adrian Stokes some years ago when they were holding an exhibition of their paintings in Bond-street. The Black-Frame Sketch Club include some clever artists among their exhibitors. Amongst much that is clever and nothing else Mr. F. Heath's work stands out; it is broad in treatment, clean in colour, and shows healthy sentiment. The "Story of Susette" (No. 73) is delightful. Both in this picture and in 157, "A Prayer to St. Barbe," the figures are finely done; from study such as these indicate, good work should follow. Mr. Paul Paul's "A Breezy Day" and Mr. S. E. Scott's "Port St. Michel, Paris," are noticeable drawings, as also is that by Mr. S. I. L. Birch entitled "Carn Dhu, Lamorna." Mr. T. T. Blaycock shows a large number of drawings, the most satisfactory of which perhaps is No. 20, "A Dusty Road." Mr. Reginald Frampton's "St. Dorothea" is an ambitiously handled subject of unsatisfying quality. The drawings on the screen by I. Friedensen are some of the best in the exhibition.

#### The Avon Gorge.

ALTHOUGH the Bristol Corporation have been so far influenced by public opinion as to form a special committee for the preservation of the Avon banks, matters do not progress very rapidly in the desired direction. We believe that the Corporation have already decided to find some source of supply for road metal away from the Avon gorge quarries, and have approached the chief landowner with a view to arranging for the purchase of the wooded banks now in course of spoliation. For the moment, however, there seems to be some kind of hitch in the negotiations, and it is gratifying to find that the Avon Gorge Preservation Committee are by no means relaxing their persistent efforts to bring the matter to a successful conclusion, so that the beautiful gorge of the Avon may be preserved for the use and enjoyment of the public for all time.

**COTTAGE HOSPITAL, ABERTILLY.**—It is proposed to erect a new cottage hospital at Abertillery, Mon., and at a meeting of the hospital committee recently, Mr. Arthur E. Sheppard, of Newport, was appointed architect for the proposed hospital.

**CARPENTERS' COMPANY.**—For the examination held at King's College last week, in connexion with the two scholarships presented by the Carpenters' Company, there were twenty-one entries, and Messrs. Thos. W. Bricknell and H. Cook were the successful candidates.

**REOPENING OF THE ST. ANDREW'S HALLS, GLASGOW.**—Considerable alteration has been made to the interior of the St. Andrew's Halls, Glasgow. The principal change in the large hall has been made in the back gallery, where the pillars have been removed. The whole of the halls have undergone renovation as far as concerns the painting and decoration, and also the furnishings. The grand organ has been reconstructed by Messrs. Lewis & Co., London, and a new case of Austrian wainscot oak has been erected to the designs of Mr. A. B. McDonald, City Engineer. The blowing apparatus is worked by three high-pressure engines by Messrs. T. Melvin & Sons, engineers, Glasgow.

#### LETTER FROM PARIS.

It is announced that the Ecole des Beaux-Arts has this term received twenty-two lady students out of a total of 107; a larger proportion than has ever been seen there before.

At the Académie des Beaux-Arts there is likely to be a spirited contest for the succession to the places formerly occupied by Henner and Bouguereau. The list of candidates increases daily; and includes, besides the veteran painters Harpignies and Ziem (who may be chosen, but who will not actively put themselves forward), the names of Tony Robert-Fleury (President of the Old Salon), Besnard, Gabriel Ferrier, Chartran, Toudouze, Albert Maignan, Gervex, and Raphaël Collin. The election will be made between the 21st and the 28th inst.

The Paris correspondent of the *Daily News* referred the other day to a scheme for the erection, on the site of the Tuileries, of a very large building with a central dome, which was to form the new National Library and Reading-Room. Such a scheme has actually been suggested by M. Bouchot, the curator of the print-room in the present establishment; but, though very tempting, it is far too magnificent for execution, at present at all events. The cost, which M. Bouchot himself estimates at fifty million francs (two million sterling), might no doubt be somewhat reduced by the sale of the land occupied by the present National Library; but even with this assistance it would be too much for the budget of the present Government, which can only allow the architect, M. Pascal, an annual expenditure of 300,000 francs. It will take nine or ten years, at this moderate annual credit, to complete the whole of the work now in progress (commenced in 1898); but the new reading-room, in the form of a rotunda, will be finished shortly, as also the block of building next to the Rue Vivienne. It is not likely therefore that Parliament will vote an immense sum of money for a new and larger scheme; nor probably will the public look favourably on a project which to a great extent would deprive them of the lawns and the statuary which now decorate the site of the Tuileries.

The plans for the Metropolitan line from north to south of Paris have been approved. The central line will start from the Gare Mont-Parnasse, following the lines of the Boulevards Mont-Parnasse and Raspail, and dividing into two tubular sections at the Boulevard St. Germain; these will pass under the Seine below the Pont de la Concorde. On the right bank the double tube railway will run to the Rue Royale, where it will become single and will go round the Madeleine to gain the St. Lazare terminus by the line of Rue Tronchet and Rue du Havre. This new line is the scheme of M. Bechmann, Director of the "Compagnie Nord-Sud," and who was the colleague of Alphand and Belgrand in carrying out the great sanitation scheme by which the sewage of Paris was taken to the plain of Achères.

The Mairie of the Xth Arrondissement, of which M. Rouyer was the architect (and which was illustrated in the *Builder* of April 11, 1896), has remained still unfinished in regard to its decoration. The Municipal Council have now taken the matter up, and have selected the artists who are to put the finishing touches to the building. The two principal fronts are to be decorated with eight stone statues symbolising the principal industries of the quarter. Those on the façade towards the Faubourg St. Martin are to represent river navigation, glass-work, embroidery, and ceramic ware; these will be executed by MM. Barrau, Demaille, Moncel and Larche. The four on the façade towards the Château d'Eau are to represent silversmith's work, artificial flowers, perfumery, and theatrical art. They will be executed by MM. Carlus, Causse, Crétien, and Gaston Leroux. In the interior M. Henri Martin is to take in hand the large panel in the Salle des Mariages, and a number of other artists, among whom are MM. Paul Baudouin and Bérard, are to paint the vertical panels and the ceilings of the two rooms which adjoin the Salle des Fêtes. A sum of 118,000 francs has been voted for the work.

M. Girault, the architect of the Petit Palais, has, at the request of the Council, been preparing a plan for increasing the

wall space and the height of the galleries by the introduction of a new gallery, and the elevation of the existing galleries will enable the collection, which are now scattered over a large space, to be more easily seen in a more intimate manner.

The Carnavalet Museum is to be much extended, and the arrangements for the work will be one of the first things before the Municipal Council after the next session. The present galleries are insufficient, and the store-rooms of the museum are full of objects of interest which cannot at present be exhibited. The alterations at the Hôtel de Ville will also shortly occupy the attention of the Council. The Caserne Napoleon, in Place Lobau, having become the residence of the Municipality, the former apartment is to be transferred there, and the new Council-room built in its place. This is to be on a semi-circular plan, which will necessitate a considerable alteration in the exterior design of the Hôtel de Ville on the side next the Rue de Rivoli.

The Musée de Marine is now to become a part of the art galleries of the Louvre, and in preparation for this transformation a number of historic or pre-historic objects brought home by navigators or explorers are being transferred from it to the Musée de St. Germain. The Chinese and Japanese objects forming the MacMahon collection will be removed to the Trocadéro; and the models of ships are to be removed to the Hôtel des Invalides, where the military museum is already formed. The present contents will thus be entirely dispersed, and the galleries left free for receiving some of the art-treasures of the Louvre for which space is at present wanting.

M. Blavette, the architect to the Natural History Museum, has presented to the department of "Bâtiments Civils" a plan of a large rotunda building to be erected in the Jardin des Plantes, near Rue Cuvier for the larger wild beasts, which are at present very badly housed. The centre of the rotunda, which will be elliptical in plan, is to be occupied by a basin of water surrounded by parterres of flowers, with a large gallery for the public between these and the cages. The cost is estimated at a million and a half of francs.

Work is to be commenced soon for the re-building of the Ecole Polytechnique, in which the first step will be the demolition of the house in the Rue Descartes, which at present forms the Cour d'honneur of the Ecole.

An interesting piece of work is about to be undertaken at the church of Saint Sulpice, the north façade of which is to be decorated according to a design made, in 1724, by François Dumont. The model for this has been accidentally discovered in a room in the roof of the church. The model shows a circular pediment terminated by groups of children, and with a central design in which the Pontifical Tiara and Keys are combined beneath a cross. The whole design is to be carried out in the place for which it was originally intended over the north porch. The work is under taken at the suggestion and with the support of the Vieux Paris Committee.

**PRIMITIVE METHODIST CHURCH, KETTERING.**—The foundation stones were recently laid of a new Primitive Methodist church which is being erected in Bath-road, Kettering. The building is being constructed by Mr. O. P. Dewar, of Kettering, from the plans of Messrs. Barry & Bird, architects, of Macclesfield, and will provide accommodation for about 650 people.

**THEATRE, EDINBURGH.**—At the Edinburgh Dean of Guild Court, on the 28th ult., the plans for the new theatre which is to be erected by the Edinburgh Construction Company at the corner of Leven-street and Tavistock-street. It will be a three-storey theatre, and the auditorium will be 200 ft. in length and 70 ft. in breadth. The main entrance is to be from Leven-street, and there will be entrances from both sides—Tavistock-street and the new street which runs parallel with it. The architect is Mr. J. D. Swanston, Kirkcaldie and Mr. James Davidson, Coatbridge.



## THE ELECTRICAL EXHIBITION.

The Electrical Exhibition at Olympia is a most interesting one. What it has to teach can easily be learned, and one is not oppressed with a multiplicity of exhibits. The recent electrical exhibitions at Paris, Düsseldorf, and St. Louis were almost too large. Unless one specialised in a particular department, it was hopeless to get a clear idea of what was being done in the manufacturing world. The present exhibition is more for the user of electricity than for the manufacturer, and is proving a success.

The Robertson Electric Lamp Company and the Edison & Swan United Electric Light Company have turned their stands into miniature factories, so that the process of making glow lamps can be watched, and the skill of the workgirls will be found worthy of admiration. The last electrical exhibition in London was at the Crystal Palace in 1892. Glow lamps were then 5s. 9d. each, and practically the only type of arc lamp was the "open" arc. Although the price of glow lamps is less than a third of what it was fourteen years ago, yet their finish is much better, and their efficiency and durability have very considerably increased. Of the many hundred arc lamps exhibited hardly any are of the "open" type, the majority being either "flame" arcs—that is, arcs which burn between carbons which have cores containing various chemical salts—or "enclosed" arcs, which are entirely screened from the air, and the carbons of which, consequently, last ten times as long as when burning in the open air. The distinct feature of this exhibition is the number of arc lamps exhibited. We were sorry, however, that no firm exhibited the magnetite arc lamp of Professor Steinmetz, of America. The chief novelties exhibited were tantalum lamps, osmium lamps, and mercury vapour lamps of a new and greatly improved pattern. Many forms of electric radiators for heating are shown, and the Dowsing Company have an attractive exhibit of electric cooking. The Post Office exhibit is not unlike that shown at the Crystal Palace Exhibition, but we have now a large exhibit by the Marconi Company, who show all the apparatus required for wireless telephony. The most useful exhibits are those which illustrate the various uses to which small motors may be put. We think that it would have been in the interests of the electrical industry if greater attention had been given to this point by exhibitors. Electricians are able to appreciate the various uses of motors, but the public will not buy them until they actually see them driving sewing machines or brushing boots. The varieties of electric motors which bewildered the public in 1892 have been reduced to a few standard types. They are now nearly all "protected" types. They have generally four poles, laminated pole pieces, slotted armatures, and self-oiling bearings. Carbon brushes also are practically always used. There is much to interest the technical expert, and even the scientist in the exhibition. We have never seen a neater application of the principle of resonance to a measuring instrument than that shown in Frahm's speed indicator, shown by Messrs. Lucy & Co.

The General Post Office exhibits both an historical and a modern section. The former is of more general interest than the latter, which can only be fully appreciated by the telegraph expert. A high-speed duplex automatic apparatus, with repeater, is shown in working order. This is the method adopted by the Post Office for transmitting press and special news. The message is first recorded on slips of paper by punching holes in them, the sequence of the holes expressing the words in the Morse code. The rest of the transmission is entirely automatic. Quadruplex apparatus is also shown for sending four messages simultaneously by a single wire, two going one way, and two the other. In the historical section Wheatstone's instrument, Bright's bell, Varley's relay, and Thomson's (Lord Kelvin's) electrometer are shown. A telegraph pole, damaged by woodpeckers, and Cooke's original goose quill insulators are interesting and curious. The exhibit of the Marconi Company, which is also in the gallery, is instructive, and the working of the apparatus is much simpler and easier to understand than the complicated automatic devices used in multiplex telegraphy.

Manufacturers are well represented. The stands of Messrs. Drake & Gorham are particularly instructive. No. 3, which is labelled "general estate appliances," shows a three-throw pump, a cream separator, a churn, etc., all driven electrically. Full data as to the cost can also be obtained. They show a working model of a service lift on the push-button control system, which is getting so popular. A dining table, tastefully arranged, the lamps being supplied with current by white silk flexible cord, is shown in their third exhibit (55 and 60). Messrs. Drake & Gorham are the agents for the well-known Nernst lamps, which they now enclose in well-made iron cases. The Phillips' grinder for smoothing commutators should prove useful.

The exhibit of Messrs. Ferranti will be of interest to station engineers. They exhibit a switch-board of the well-known "cellular" type. The current and pressure transformers, switches, meters, etc., are enclosed in separate cells, and, from the point of view of simplicity and safety, it is deserving of high praise. The high-tension feeder charging gear is cheap, and seems excellently adapted to fulfil its functions.

The Electrical and Ordnance Accessories Company, Ltd., of Birmingham, show a model passenger lift, the motor, with its automatic control, being geared for a low speed, so that its working can be studied. The row of Stellite motors, ranging from  $\frac{1}{2}$  h.p. to 15 h.p., provided with various kinds of gearing, is a very instructive exhibit. Messrs. Vickers, Sons, & Maxim show a very large planing machine, electrically driven, and fitted with automatic reversing gear.

The speed of the motor is varied entirely by shunt regulation, and its efficiency is never less than 87 per cent. As the extremes of speed are nearly in the ratio of 4 to 1, it will be seen that this result is extremely satisfactory. We would advise all electricians to make a special study of the method of driving and controlling the speed of this planing machine. On the cutting stroke the motor runs at its lowest speed, but on the return stroke it runs at its highest speed, and thus the maximum work is done in the minimum time.

The Langdon-Davies Company have a very interesting exhibit of electric motors for alternating and direct current. In a pamphlet they issue, full particulars are given of the running costs of motors for driving printing presses, sausage machinery, chaff-cutting machines, hair-cutting machines, etc. It is interesting to remember that this motor is the outcome of a theoretical study of the properties of a rotating magnetic field made by Mr. Langdon Davies some twelve years ago. It is one of the few alternating current motors that were invented in this country. The Lahmeyer Electrical Company have a most praiseworthy exhibit. They are one of the very few firms that show large machines in operation. The high-voltage synchronous motor is of typical German design, and, from the theoretical point of view, it is practically perfect. They also exhibit electrically-driven hauling and winding gears of various types. The Fuller-Wenström Company also show some excellent single-phase and polyphase motors of their well-known design.

The Phoenix Dynamo Company show some excellent machines. The large motor generator exhibited should be studied with the help of the clear description given in their pamphlet. The small 35 B.H.P. variable speed motor is of very creditable design. Its speed can be varied between 425 and 1,800 revolutions per minute by regulating the shunt resistance alone. This is accomplished by means of a very ingenious system of auxiliary poles. It runs sparklessly, and is capable of withstanding a 50 per cent. overload for short intervals at any speed. The exhibits by Electromotors, Ltd., and Spagnoletti & Co. also deserve a visit. A large number of electrical instrument makers have exhibits. One of the best is that of Messrs. Elliott Brothers. The highly-novel network ohmmeter, made by Mr. Groves, which gives the insulation resistance of the whole network by a single reading, is worthy of the attention of every station engineer. This method of measuring insulation resistance was described by Mr. Alexander Russell in the *Journal* of the

Institute of Electrical Engineers some six years ago, and we draw attention at the time to the importance of station engineers measuring their leakage currents by his method. We are glad to see the method in concrete form, and it would be in the best interests of station engineers if the Board of Trade would insist on their making weekly records of the insulation resistance of their networks. Mr. Russell, in the paper referred to above, shows how this resistance tells us practically the leakage currents which are flowing from the mains, and the power wasted by these currents. It is notorious that the readings of the present Board of Trade ammeter in the earth connexion with the middle wire are of no value. Messrs. Elliott Brothers exhibit a substantial marble switch-board, in addition to their recording voltmeters and ammeters, and their well-known instruments for standardising laboratories and for workshop use.

Messrs. Nalder Brothers & Co. show a "flicker" photometer, and all the appliances required for photometric work. Messrs. Everett, Edgcombe, & Co. show a very novel recording voltmeter and various types of accurate measuring instruments. The exhibit by Messrs. Fricker & Miller of thermal volt and ampère meters is of great interest, as the instruments are of very novel design. They also show the well-known Mordey-Fricker electric meter.

The electric lamp makers are very well represented. The process of making Robertson and Ediswan lamps is shown fully; the brilliantly lighted stands, the neat uniforms, and the skill of the workgirls eliciting the admiration of the visitors. The General Electric Company show the new osmium lamp, but it is still, to a certain extent, in the experimental stage. The Sunbeam Lamp Company show a new "reducing" lamp which meets the demand for a lamp the light given by which can be regulated. The Sir Hiram Maxim Electrical Company show various types of glow lamps. Messrs. Oliver & Co. show the "Orillamme" arc lamp, which has a very high efficiency as an energy transforming device, and presents many points of interest. D. Santoni & Co. exhibit "Intense Flame Arc Lamps," and Messrs. Nalder Brothers & Thompson Foster arc lamps, which are quite as good as any of the very numerous midget arc lamps we have seen.

Practically all the makers of storage batteries have exhibits. The Electrical Power Storage Company exhibit many types, from the small batteries required for working the ignition tube of a motor-car petrol engine up to the complete battery of cells in fifty-five glass boxes, which is utilised for lighting the stand. The Hart Accumulator Company, Longstreth's, Ltd. (who make the well-known lithanode cells), Messrs. Pritchett & Gould, and the Tudor Accumulator Company have all excellent exhibits. The Tudor Company show a cell with a capacity of 7,500 ampère hours.

Messrs. Falk, Stadelmann, & Co. show some striking designs for electric fittings. The Simplex Company have a very complete exhibit of their well-known system of conduits. Messrs. Escaré & Denelle, Ltd., show electroliers, brackets, and artistic fittings.

The Temperley Transporter Company show working models of their "patent traveller," travelling tower transporter, and a portable transporter fitted to a ship's derrick. The Bat Electrical Company exhibit their interesting "permutators" for converting alternating current into direct current. These machines should prove of value to householders supplied with alternating current who desire to charge motor-car batteries, etc. They can also be usefully employed for running arc lamps when the frequency of the alternating supply is low. They are very novel, and the theoretical description of their action given to us was most interesting.

The Pearson Automatic Fire Alarm, Ltd., show specimens of their latest fittings. We have tested these practically, and find them quite satisfactory. Messrs. Hunt & Hess show samples of litholite for insulating purposes. This material can be moulded accurately, and is of high dielectric and mechanical strength. It seems to us admirably suited for various electrical purposes. Mr. Leonard Shaw shows a "continuous



rotary" electric copying machine. The blue printing is done by means of an arc lamp, and the rate at which the copier works is 2 ft. per minute. The Dowsing Radiant Heat Company have an excellent exhibit. They show their radiant heat baths which are now extensively used in everyday medical practice, several of their well-known heat radiators, and numerous appliances for electric cooking. For cooking purposes electricity is almost the ideal method of obtaining heat.

Messrs. Lucy & Co., Ltd., of Oxford, amongst other interesting exhibits, show Frahm's speed indicator. It can be adapted so as to tell the frequency of an alternating current, and it can be used as a revolution counter, or a speed indicator. It is a wonderfully neat application of the principle of resonance to a practical instrument. We believe that Professors Ayrlon and Perry patented a somewhat similar instrument in this country many years ago.

On the stall of the St. Pancras Borough Council we picked up a pamphlet entitled "Electricity: Useful Hints." We can recommend this pamphlet to those who like positive assertions stated in what may be politely termed colloquial English. In conclusion, we can recommend all those interested in the applications of electricity to visit the exhibition. Mrs. Deane gives free lectures and demonstrations on electric cooking at 3 p.m. and 8 p.m., and several well-known electrical engineers will give evening lectures.

#### PRIEST'S STALL, ST. ANDREW'S, CATFORD.

THE view shows one of the two priests' stalls fixed in the Church of St. Andrew, Sendhurst-road, Catford, S.E. It was not an easy matter to get good figure-work out of "3-in. stuff," but the photograph shows the success of the experiment. The materials are specially selected Austrian oak lightly fumed, with grey-white gesso applied to the sunk background of the panel. The stalls and screen are being designed in the same key, and the pulpit is fixed. All this woodwork and carving was executed admirably in the studios of Messrs. Daymond & Son, of Westminster.

PHILIP A. ROBSON.

#### SUGGESTED AMENDMENTS TO THE MODEL BUILDING BY-LAWS FOR NEW STREETS AND BUILDINGS.\*

At the request of the President, and in order to give the members an opportunity of discussing some of the suggested amendments to the Local Government Board's Model Code of Building By-laws, the author has prepared the following few notes. For the past eighteen months a special committee, appointed by the Council, has been considering this important subject. As a result of their labours a report was submitted, together with certain amendments and suggestions, to the Local Government Board's Code. This report was considered and approved at a special meeting of the Council, and has been submitted to the Board.

In considering this question the committee had particularly in mind the following objects:

1. To ascertain whether the existing by-laws can be modified so as to lessen the restrictions, which are said to exist, in such a way as not to affect the stability and safety of buildings both in urban and rural districts, at the same time securing that the laws of Public Health may be adhered to.
2. Whether such modifications would make it possible to reduce the cost of the erection of buildings, more especially for the artisan class.
3. If any, and which, by-laws could be altered with advantage to the general public.

The question of the possibility of reducing the cost of erecting cottage property by modifying the by-laws requires very careful consideration as affecting owners, tenants, and the general public. The consequence of such reduction would probably be, on the one

hand, the erection of houses which could let at a less rent than is at present charged for houses of similar accommodation, and, on the other hand, a considerable modification of the by-laws might open the door for the erection of less substantial and unhealthy dwellings. By-laws are framed chiefly for the purpose of securing conditions of health for the individual and the community, stability of property and security from fire, and, in their consideration, these objects should be kept constantly in view. The by-law committee, after careful consideration, have come to the conclusion that modifications can be made without in any way endangering any of the above principles, and have offered, as already stated, to the Local Government Board many suggestions on these lines for their consideration.

The author suggests various additions and amendments to the existing model building by-laws for both urban and rural districts as follows:—

**Interpretation of Terms.**—Many of the larger towns and urban districts in their latest by-laws have provided for the definition of the following terms used in the by-laws, such as "surveyor," "foundation," "topmost story," "lowest story," "ground story," "ground floor," and also definition of fire-resisting materials; these should be included in the Board's Model Code. Owing to the erection of flats and composite buildings a definition is needed to cover such; this is, of course, more particularly felt in large towns.

**Exempted Buildings.**—By-law 2, paragraphs H to L (inclusive).

Considerable expense and difficulty is now

experienced, owing to the necessity under the by-laws of having to submit plans for such buildings as plant-houses, fowl-houses, coal-houses, and similar structures, and it is suggested that these buildings might be erected on permission being obtained from the sanitary authority, so long as the minimum area of open space required under the by-laws is not interfered with, and the sanitary requirements are complied with, without the necessity of submitting plans, provided seven days' notice in writing is given to the local authority before the erection of such a building. At the present time most by-laws require buildings to be of brick, stone, or other incombustible material.

In order to allow of buildings being constructed of other suitable materials than brick or stone, under certain conditions, a by-law providing for the external walls to be constructed of suitable material of adequate strength to secure proper stability, and constructed to be weather-proof, should be included; this would to a very large extent remove, especially in rural districts, the present outcry against the cost of building, and would allow of half-timbered buildings, buildings of wood and corrugated iron, reinforced concrete, and other forms of construction.

The author would here point out that other circumstances have materially added to the cost of buildings, such as the increased cost of materials and labour, and the restrictions as to hours and rules in various trades; rents of cottage property, too, are undoubtedly increased to meet the increased rates and taxes both local and national.



Priest's Stall, St. Andrew's, Catford. Mr. Philip A. Robson, Architect.

\*Being part of a paper by Mr. Albert D. Greston, A.M.Inst.C.E., Borough Engineer and Surveyor, West Bromwich, read at the annual meeting of the Incorporated Association of Municipal and County Engineers, held at Norwich, June 22, 23, and 24.

*With respect to the Level, Width, and the Construction of New Streets.*—In framing by-laws every district has adopted a certain minimum width, according to the individual views of those drafting or having the approval of the by-laws.

After careful consideration the committee adopted the following recommendation:—

That the minimum width of streets for urban districts should be as follows:—

- (a) 40 ft. for side streets.
- (b) 50 ft. for more important streets.
- (c) 60 ft. for streets that are main lines of communication or in continuation with same.

In rural districts no street should be less in width than 36 ft., and all main lines of communication should be 25 ft. from the centre of the road to the forecourt wall. Narrow roads, whether in urban or rural districts, are a mistake, a great inconvenience, and a source of danger to the public, especially under the present conditions of traffic. Enormous sums are constantly being paid to widen streets, and what is a county district to-day may very soon become part of a more populous area. In country districts, if the required distance were kept between the building lines, it would be possible to allow of forecourts being provided, and the streets made narrower than suggested, so that they could be widened at any future date at small expense, and so save expensive street construction in the meantime.

As regards the width of footways and carriageways and the specification for street construction, these should be left to the local authority to determine in the large districts, as is generally done at present in many towns under private Acts, and in small urban and rural districts the model code should be enlarged to provide for a more complete detail of the method of construction so as to leave no loophole of doubt as to what is required.

*With respect to the Structure of Walls.*—Very few by-laws provide for the interpretation of the following terms, and these should precede the clause dealing with building construction—namely, "sand," "lime," "cement," "lime mortar," "cement mortar," "concrete," "plaster," "asphalt," and similar terms; these should be complete both as regards the quality of the material, composition, and other details.

*By-law 14.*—Provides for the erection of new buildings of brick, stone, or other hard and incombustible materials, properly bonded and solidly put together with cement, lime, or cement mortar, and provides for certain exceptions as hollow walls and half-timbered buildings.

Provision should be made for the thickness of material other than brick or stone under this by-law; the model code has no provision for walls constructed of iron or steel framing, this should be included, and also provision made for reinforced concrete, or other similar construction.

All iron or steel-framed buildings should be covered with, embedded, or encased in, concrete or other fire-resisting material.

*By-law 21.*—As regards thickness of cross-walls.

This by-law has a very important bearing on the thickness of external and party walls, inasmuch as the existence of proper cross-walls of the required thickness determines the length, and consequently the thickness, of such external and party-walls.

The author suggests that this by-law be amended so as to provide that a pillar or buttress of a length of not less than one-tenth of the height of such wall, but in no case less than 3 ft. in length be allowed in substitution for the wall carried through from back to front.

*By-law 22.*—As to the thickness of walls of domestic buildings.

This and the following by-laws are very intricate ones, and give more trouble in administration than all the rest of the by-laws. The principal difficulty consists in having laid down hard and fast rules which cannot always be administered without the infliction of apparent hardships on the persons concerned. The principle of the rules appears to be that walls of domestic buildings less than 25 ft. high and 30 ft. long must be 9 in. thick throughout, that if either the height or length is increased the thickness of the walls must accordingly be increased as set forth.

As general rules, the provisions of the by-laws do not appear to be unreasonable, but in practice the application to cottage property sometimes presents difficulties in respect to party and gable walls, both as regards height and length as fixing the thickness.

The difficulties experienced might be very much reduced if the by-law was amended so as to allow of domestic buildings being erected up to 30 ft. in height, and 30 ft. in length, with 9-in. walls; this would allow of three-story buildings.

There is also the question whether some concession might not safely be made in respect to permitting the external walls of sculleries, wash-houses, closets, tool-houses, or ash-places, appurtenant to a domestic building, to be erected only  $4\frac{1}{2}$  in. thick instead of 9 in. as required by this by-law, provided these walls were built with cement-mortar, and subject to certain restrictions, such as the size of such buildings, etc., and provided that the foundations and party-walls were constructed of 9-in. brickwork. This amendment would, in the opinion of the author, be a concession of some value in the erection of cottage property.

*By-law 23.*—Here, again, this by-law should be amended so as to allow greater latitude as regards the height and thickness of walls for warehouse buildings, and a clause inserted dealing with external walls, which may be retaining walls. A clause might also be inserted to provide that, where a wall is constructed of cement-concrete other than ferro-concrete, the thickness should be at least one-fourth greater than that required in the previous by-laws.

*Construction of Chimneys.*—A by-law should be provided to deal with the construction of chimneys, to include any suitable form of construction, such as the Alphons Custodis principle, steel, or other suitable materials.

*With respect to the sufficiency of space about buildings to secure a circulation of air and with respect to ventilation of buildings.*

*By-law 53.*—This by-law should be improved by the addition of the following proviso:—

"Provided that where a scullery, not exceeding 10 ft. 6 in. in height, measured from the floor of such scullery to half-way up the roof, is erected at the back of such dwelling-house, he may cause the distance across such open space between such scullery and the said boundary to be one-fifth less than the distance as prescribed, if thereby no diminution of the minimum aggregate extent of 150 sq. ft. is involved. Provided also that any scullery to be so erected shall not be allowed to extend across the back of such building to an extent of more than three-fifths the width of any habitable room to which such scullery is attached, and provided, also, that such scullery shall leave sufficient light and ventilation for any habitable room."

*By-law 56.*—As regards this by-law, "one-twelfth" should be substituted for "one-tenth" of the floor area for windows where the light is unobstructed, and the top of the window should be not less than 7 ft. from the floor except for rooms in the roof, unless some additional means of ventilation be provided near the top of the room.

Also that provision should be made for ventilation of bathrooms, lavatories, and sculleries, with the exception that "one-fifteenth" should be substituted for "one-twelfth" in such cases. Pantries under staircases should also have proper means of ventilation provided.

Opening skylights for rooms partly or wholly in the roof should be regarded as windows.

*With respect to the Drainage of Buildings.*—In front of the by-law under this heading there should be inserted an interpretation of the following words—namely, "stoneware pipes" (this should be accompanied by a schedule for sizes, etc.), "soil pipes," "ventilating pipes," and other materials; the weight and method of jointing soil pipes and ventilating pipes should also be given.

*By-law 62. Paragraph 2.*—This by-law should be amended so as to provide for drains being laid straight, both in line and gradient, and with watertight joints, and,

where practicable, with a fall of not less than 1 in 36; if the fall is less than 1 in 48, proper means for automatic flushing should be provided.

*Paragraph 3.*—Should be amended so that the joints of the pipe above the ground shall be of molten lead, and this paragraph should be altered so that the provision for piers should only be applied when the drain is above the ground.

*Note.*—By this by-law a new drain shall not be constructed so as to pass under any building unless the precautions contained in this, and the subsequent paragraphs, are observed; but where the drain is already in existence, or has been in existence more than six months, a person may erect a new building without observing any of these precautions, and the by-law to that extent requires amendment.

*Paragraph 4.*—Concrete not necessary in all cases; therefore add "where the nature of the ground requires it."

*Paragraph 5.*—The phrase "highest point" not satisfactory, the requirement should apply to the whole length of pipe, and the distance should be equal to the full diameter of the drain, and in no case be less than 6 in.

*By-law 63.*—Add words to define means of access—say, "by means of a manhole chamber, or vertical shaft, having a diameter of not less than that of the drain."

*By-law 65.*—Provision should be made for rust pocket at the bottom of the ventilating pipe.

*By-law 66.*—Provision should be made for anti-siphonage, and soil pipes should not be used as rain-water pipes, nor rain-water pipes for ventilation purposes.

*With respect to water-closets, earth-closets, privies, ash-pits, cesspools, in connection with buildings.*

*By-law 67.*—The word "earth-closet" should be left out, same as in rural by-laws, and the clause amended, so that water-closets shall not open directly into any room wholly or partly used for human habitation, or as a place of habitual employment for any person in any manufacture, trade, or business.

*By-law 68.*—Windows are not necessary for outside water-closets wholly detached from the building, proper ventilation can be obtained by cutting the doors.

*By-law 69.*—The following words should be added after "adequate capacity," "capable of giving a flush of not less than two gallons." Committee suggest that a three-gallon flush should be provided for.

*By-laws 70 to 91.*—Dealing with ash-pits, privies, and cesspools, the rural model should be adopted instead of the urban, and, as regards ash-pits, the committee suggest a by-law to provide for ash-bins, and recommend that permanent ash-pits be done away with.

There are many by-laws not provided for in the model code, although they are usually to be found in most urban codes, and it would be an advantage if they were included in the model, and many towns have, under private Acts, very useful by-laws which should not be lost sight of in framing a new Building Act.

*As to Giving of Notices, Deposit of Plans, etc.*—As regards the deposit of plans of new buildings, and alterations to existing buildings, proper plans giving the different floors, sections, block plan showing drainage, etc., should be compulsory in all districts, and they should be deposited on tracing linen, or other suitable and durable material other than tracing paper.

In recent discussions on this subject, many speakers have suggested that no plan was necessary, especially in rural districts; this, in the opinion of the author, would be a retrograde step. How would it be possible for a surveyor in a large rural district, with a limited staff, to see that the by-laws were being carried out? He would be at the mercy of the speculative or jerry builder, or liable to be called over the coals by his council for the erection of buildings which did not comply with the by-laws, owing to his lack of knowledge of the builder's intention until too late to interfere.

The author does not believe for one moment that any well-meaning landowner, or respectable firm of architects or surveyors, have any *bond-fide* or real objection to the deposit of such plans as we suggested. Plans



are far more necessary in rural districts than in some of the large cities and towns.

The only alternative to no plans is for the council to provide a large staff of assistants, who would constantly be perambulating the district in examining new buildings, to see that they comply with the by-laws, and would lead, in the opinion of the author, to far more disputes and criticism than the present arrangement.

If plans are disapproved on being submitted to the authority, the author quite agrees that the person depositing them should be informed in writing in what way they are wrong, or do not comply with the by-laws, and so avoid unnecessary friction and annoyance.

Considering the thousands, tens of thousands, or probably, more than hundreds of thousands of plans of buildings which pass through the hands of, and have to be supervised by, the officials of local authorities every year, the small amount of friction which arises is to be wondered at, considering the complex subjects to be dealt with; and it should not be assumed, from the comparatively few cases which come into court, that friction is continually taking place between those responsible for carrying out by-laws and those engaged in the erection of buildings; such is not the case.

In the discussions that have taken place of late, the point has been raised, what is a new building? If the following clause, granted in many private Acts, was adopted in a general Act or building code, much of the difficulty would be removed:—

"From and after the passing of this Act:—The erection of any building; the re-erection, wholly or partially, on the same site of any building, of which any outer wall is pulled down to or within 10 ft. of the surface of the adjoining ground, and of any frame building so far pulled down as to leave only the framework of the ground floor story thereof; the conversion into, or using as, a dwelling-house, of any building, or part of a building, not originally constructed for human habitation; the conversion into one dwelling-house of two or more dwelling-houses, constructed originally as one dwelling-house; the conversion into, or using as, two or more dwelling-houses, of any building constructed originally as one dwelling-house; the conversion of a building which, when originally erected, was legally exempt from the operation of any building by-laws in force within the borough, into a building which, had it been originally erected in its converted form, would have been within the operation of those by-laws; the re-conversion into, or using as, a dwelling-house of any building which has been discontinued as, or appropriated for any purpose other than, a dwelling-house; the conversion into a dwelling-room of any room, or part of a room, used as a shop; the making of any addition to an existing building by raising any part thereof, or making any projection therefrom, but so far as regards such addition only; and the roofing or covering over of an open space between walls or buildings, shall, for all purposes of this Act, be deemed to be the erection of a new building, and of any by-law made thereunder respectively, be deemed to be the erection of a 'new building.'"

A great deal has of late been said as regards the competency or otherwise of those responsible for administering the by-laws, whether they be the disinterested gentlemen who serve their less fortunate fellow ratepayers or the much-abused officials.

As regards the former, the opinion has very freely been expressed that the members of local authorities are actuated by a desire to do their duty in the best manner according to their ability; it is a well-known fact that applies to all districts, be they town or rural, that there is great difficulty in obtaining many of the best members of the community to come forward and give their services freely for the benefit of the many; possibly there is a lack of interest in the work, or apathy for the consideration of others; someone must, therefore, perform what possibly others are better able to carry out.

With reference to the latter gentlemen, this is a matter, after all, which is entirely in the hands of the general public, if the Acts of Parliament and by-laws of the country are to be administered by competent men, and there cannot be two opinions as to the desirability of this.

All officials of local authorities should be appointed subject to the sanction of the Local Government Board, the same as Poor Law officers, and the question of security of tenure and superannuation, of which we have heard so much of late, should be given to all.

Whilst one regrets to hear that there are in some of the smaller districts incompetent officials, one does not have very far to look for the root of the evil; it lies in the miser-

ably small salary offered for the duties of the office, a salary in many cases less than that paid by many of us to our foremen. The reason of this may be that the town cannot afford an adequate salary; if that is so, the author suggests that larger districts should be formed, so that competent men may be engaged at a reasonable salary, and that they should devote their whole time to the duties of their office. Districts might be grouped together for this purpose, as is done for sanitary purposes in many parts of the country.

The author suggests that the present building by-laws should be remodelled, or a universal Building Act adopted, which should be compulsory, and power should be given to each district, subject to the sanction of the Local Government Board, to frame regulations as to the minimum size and strength of material to be used in the construction of buildings, drainage, and other particulars. They should be concise, deal consecutively with the various subjects, follow the same order in which they usually have to be dealt with in building operations, be provided with a full index, marginal notes, explanatory illustrations, and diagrams. In framing these regulations greater latitude should be given to each district, making them vary, according to the requirements of each particular district, they would not then be so cumbersome and unnecessarily lengthy. At the same time definite rules should be laid down, as it would be dangerous to make them too elastic, or they would not be properly enforced.

It would no doubt be necessary in order to provide for some of the by-laws as herein referred to both for urban and rural districts for the Local Government Board to obtain further powers.

Power might also be given to charge fees for the supervision of all buildings on the same lines as is done in London under the Building Acts, and several other towns under private Acts.

In the recent discussions that have taken place it has been suggested that the Institute of British Architects and the Surveyors' Institution could frame such a Code of By-laws as would be acceptable to the Local Government Board, the architects, building owners, and the general public.

The author is of opinion that in the event of experts being asked for further suggestions for the proposed Building Act or amended by-laws, the members of this Association should be consulted in a matter in which they are so deeply interested, as no association is more competent or better able to assist in this matter.

In conclusion, the author has endeavoured to keep clear of the points covered by previous papers, and wishes to express his thanks to those who have so kindly lent him various pamphlets, journals of other associations, reports, by-laws, etc., and, also, how much he appreciates the valuable assistance rendered by his colleagues, both members of the Council and those co-opted in the work of the By-laws Committee. A great deal of time has been spent in considering the details of each by-law by that Committee, and whilst the author has here only referred to the more important alterations, at the same time, there are many minor amendments and suggestions which can be brought forward when the matter is finally discussed, or a revision takes place.

#### THE GLASS TRADE IN THE DAYS OF QUEEN ANNE.

"Nev's Builder's Guide," published in the early years of the XVIIIth century, gives us particulars of the glass trade in the reign of Queen Anne. We read that there were then manufactories of glass in Ratcliffe, Lambeth, Woolwich, Bristol, Staffordshire, and Newcastle-on-Tyne. The Ratcliffe glass before 1691 had been made at the Bear-garden on the Thames. It had the peculiarity of a light blue tinge that was very distinct when placed on white paper. It was then sold for about 9d. per ft., cut into squares ready for use. When set up in its place the cost amounted to about 18d. per ft.

The Lambeth glass had a darker tint, inclining to green. It was sold in London for about 8d. per ft., cut into squares, and when set up in windows with lead was charged about 16d. per ft. The manufac-

ture at Woolwich was but of short continuance, owing to discouragement.

Staffordshire glass had but a small sale, and that made at Bristol, though very good, was hampered with the dullness of the climate.

Newcastle glass had a slight bluish tint, and was often warped and crossed with specks and streaks in it. The glass which carried coal to London afforded a means of conveyance. It used to be said when coals were plentiful glass was cheap, and when they were scarce the price was raised. This was sometimes 20s. per ton and sometimes 40s.

Our home manufactories had serious rivals on the Continent. Dutch glass found its way to England, as well as that made in France and Germany. French glass, at first made at Cherbourg, then at Auxerre, in Burgundy, as well as at Nevers, in Orleans, and St. Gobin, in Picardy. It had a green tinge that was very apparent when laid on white paper. German glass was of two kinds, one sort being of a whitish colour, but marked with streaks or lines, and the other of a greenish tint, also subject to streaks, but so warped as that made in Newcastle. They were imported and sold at as low a price as Newcastle glass.

The process of cutting up a case of glass into the diamond-shaped panes that are made the windows of some of our old mansions and cottages so attractively picturesque involved the more minute labour of cutting some of them in halves and others in quarters and three-quarters to fill up properly. The cost of this labour was from 5s. to 7s. per case. When sold at 25s. 100 ft., according to size. The cost of glazing with Newcastle glass with quarry-banding, soldering, pinning, the casements being included, was usually 5d. or 6d. per ft. in London. In some parts of the country it was a little more. In Rutlandshire and some of the northern counties quarries of Newcastle glass were to be found from 4d. to 5d. per ft. In some of the southern counties the price was 7d. per ft. without the extra cost of the pinning of the casements. These are prosaic details, doubtless, but they bring before us many a lovely lattice garlanded with climbing plants.

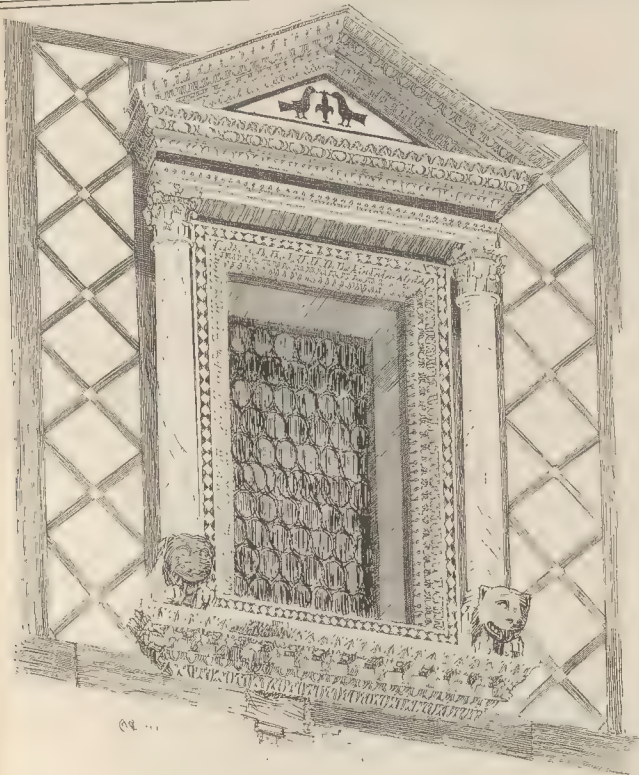
Quarries, or quarrels as they were called, were for the most part 6 in. in length and 4 in. in width. They had other dimensions occasionally, however, of which trade was recognised, each with their range, size, length, breadth, and area. It was unusual to take down quarry glass, so the solder it anew, and set it up again. Two pence per ft. was considered a sufficient price for this process. For quarries at churches, however, there was more "banding" required. Glaziers generally allowed 50 lb. of turned lead to 100 ft. of quarry glass. In William and Mary's time (1700) sheet lead made of old lead was sold for 16s. or 17s. per cwt.

The glaziers of those days were evidently not illiterate. They could set down the dimensions of the glass they required for the panes in decimals; and it was a custom of the trade to make drawings of windows to be glazed, with the height, breadth, number of squares in each light, and number of lights to be fitted, with such accuracy as to secure their requirements being duly executed.

In short, glazing was treated as a manual art, whereby pieces of glass, by the assistance of lead, were so fitted and compacted together by straight or curved lines as to become a suitable for its use as if it were one entire piece, and in some respects still more so, in the case of breakage, when the damage could be repaired at a cheaper rate. James Howell tells us the "hot Venetians" he engaged to assist in the manufacture of glass in England in the XVIIth century were all gentlemen in their own country, being artists.

Looking at the numerous Queen Anne mansions passed down to us—so far removed in their associations from the days when noblemen had the glass in the windows of their castles removed when they were not in residence, and equally distant from ourselves in their staid, scholarly, respect—aspect—it is not without interest to note these scanty particulars of the glass trade and the date of their erection.





Window, Church of San Miniato.

WINDOW, CHURCH OF S. MINIATO  
AT MONTE, FLORENCE.

THE window shown in this sketch is of one in the façade of San Miniato. The front has been restored from time to time. The original work dates from the XIIIth to the XIIIth centuries.

## Fifty Years Ago.

EXPERIMENTS WITH ELECTRIC AND  
OTHER LIGHTS.

EXPERIMENTS took place on the upper part of the Common at Woolwich, in the presence of a select committee, on Monday in last week, when three different kinds of lights, for war and other purposes, were tested. The first was the electric light, which was exhibited by Mr. Inglis; the second the "Drummond Light," exhibited by Sergeant R. P. Jones, of the Royal Sappers and Miners; and the third the "Bude Light," of Mr. Gurney, who also entrusted it to the care of Sergeant Jones. The electric light is reported to have appeared to possess the power of penetrating farthest into darkness, and was the most brilliant; but the Drummond also possessed some advantages. It was more portable, and could be carried by two or three men, each taking a portion of the apparatus, whereas the electric light required a waggon drawn by two horses to convey it from place to place.—*The Builder*, October 6, 1855.

CLUB PREMISES, WILLEHALL.—New premises are in course of erection in Villiers-street for the Willenhall Liberal Club. The building operations are being carried out by Messrs. Micken & Sons to the designs of Mr. Robert Law, architect.

PUBLIC LIBRARY, LEYTON.—The memorial stone of a new public library in Leabridge-road, Leyton, was laid on the 30th ult. Mr. W. Jacques is the architect of the building, the cost of which, exclusive of furniture, will be 3,695.

## Illustrations.

SUNDERLAND MUNICIPAL  
BUILDINGS.

THIS is an addition to and reconstruction of part of the existing Municipal Buildings, and was won by Messrs. Willis & Anderson in an open competition in which Mr. McVicar Anderson was assessor.

The scheme involves the gutting of a portion of the existing buildings, forming a new top-lighted hall, round which the existing and new offices are arranged, the staircases being placed at either end of the hall. The scheme is to cost about 30,000.

## NOS. 27 AND 28, PALL MALL.

THIS building was erected by the Wilkin Son Sword Co., Ltd., who have their show-rooms, offices, board-room, etc., on the ground floor. A wide oak staircase leads from the ground floor to the basement, the front portion of which is used as a show-room. The entrance to the three floors of offices and the three floors of bachelors' chambers above is in Pall Mall, the whole now being occupied by the War Office as offices, and are served by an electric lift made by the Otis Company. All the rooms are warmed by hot water, and hot water is also provided for the lavatories.

The front is executed entirely in Portland stone, roofed with thick Westmorland green slates. The elevation to St. James's-square is in red brick and Portland stone. The red facing bricks, being 18 in. by 2 in. by 4½ in. were specially made for the work.

The contractor for the works was Mr. J. Carmichael, of Wandsworth, and Messrs. J. McCulloch & Co. executed the carving to both fronts. The whole of the work was executed from the designs, and under the superintendence, of Mr. F. E. Williams.

ROYAL ACADEMY STUDENTSHIP  
SKETCHES. 1903-04.

THE first sketch is of an old house in Barford St. Michael, Oxfordshire, and the building is an interesting example of English domestic architecture. The proportions are pleasing.

The west front of Peterborough Cathedral will never lack interest, as it is the finest in England. There is logic, poetry, and music in the conception, and it is not sufficiently appreciated, owing to the finish of the upper part, which is so bad that it almost ruins the beautiful idea below.

Skelton Church, York, is a splendid example of Early English (XIIIth century).

Compton Wyniaties is to me the finest Tudor mansion in England. Everyone who studies domestic architecture ought to see Compton Wyniaties.

Beauchamp Chapel, Warwick, was built in 1464. Although florid and over elaborate, it is suggestive.

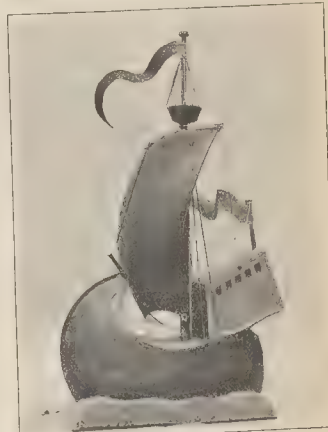
The last sketch is of Chantry, Wells Cathedral (1489).

JAS. B. FULTON.

UNIVERSITY SETTLEMENT HALL,  
EAST MOORS, CARDIFF.

THE members of the Cardiff University Settlement have been doing very good work for some time in the dockers' quarters on the East Moors, at Cardiff. The work, however, has been much handicapped by inadequate accommodation. A generous gift by Lord Tredegar of a site, and a donation of 2,000l. towards the building fund by Mr. H. Woolcott Thompson (of the firm of Messrs. Spiller & Baker, of Cardiff) has made it possible for the Committee of the Settlement to commence their new buildings by the erection of a hall, which was urgently required. Complete plans have also been prepared for covering the rest of the site with the necessary buildings for properly carrying on the work of the Settlement, but these buildings cannot be proceeded with until further funds are available.

In designing the hall, the problem put before the architect was to provide a hall suitable for the various uses of a University Settlement and to accommodate a considerable number of people at a minimum of cost. The hall now built will hold, when fully seated, about 600 people. At present, with temporary stage and retiring rooms occupying the end bay of the hall, it holds 450. The total cost of the structural work has been about 1,800l. The stage and retiring-rooms adjoining the same

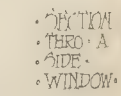


Final, University Settlement Hall, Cardiff.

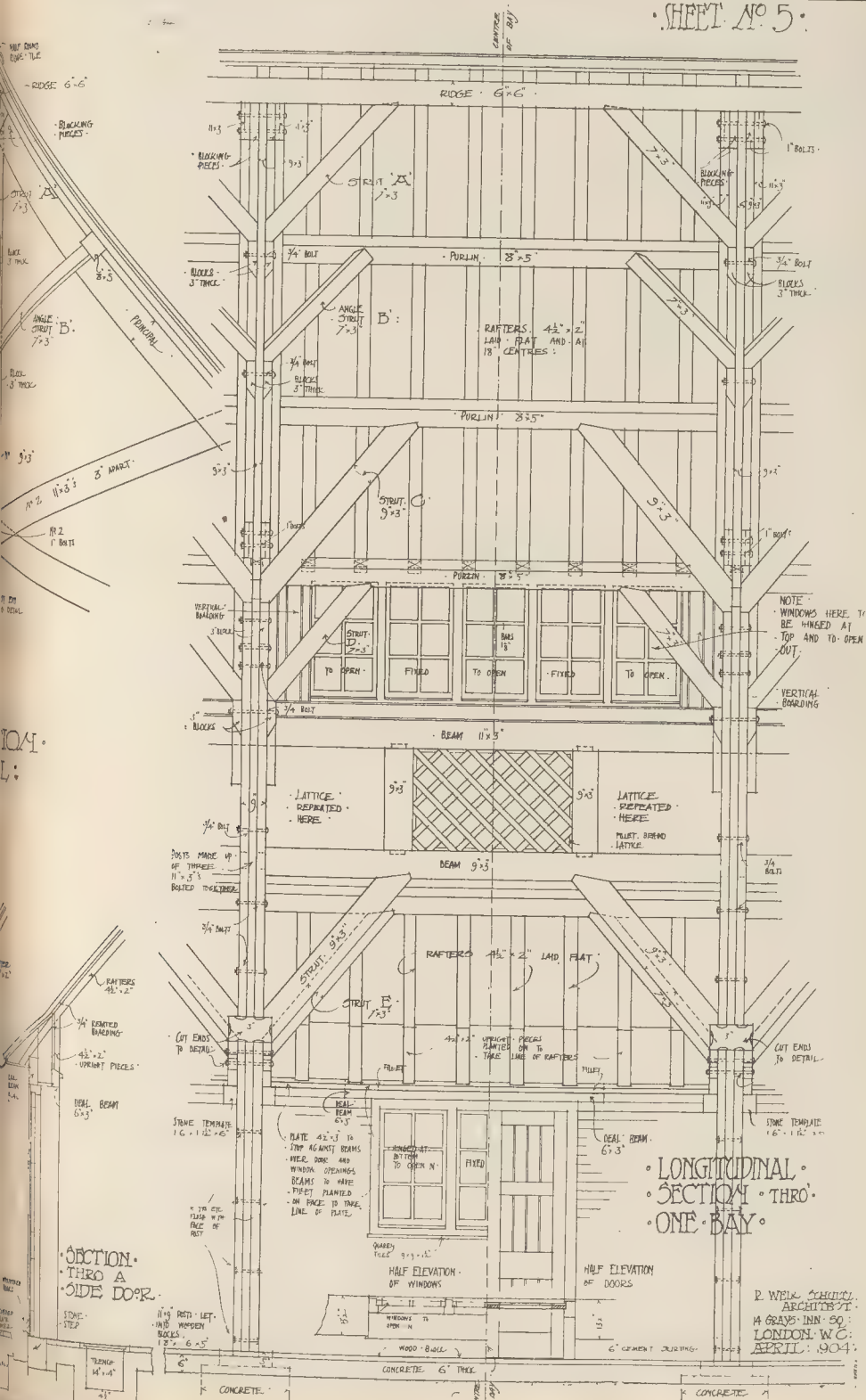
have not yet been erected. The sun above mentioned represents the cost of the hall with the temporary stage erected at the end. It, however, also covers the cost of putting in a drainage system which will be available for the complete scheme and which has been connected to the town's sewers. The hall had to be planned in the



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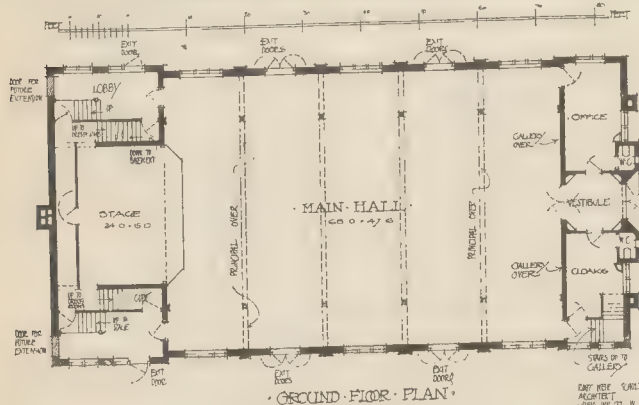


SHEET No 5.



Details of Roof.





University Settlement Hall, Cardiff.

simplest and most economical way, and there was no margin available for any elaborate detail, which, indeed, is not required in the case of this kind. The walls are built of red bricks from Bridgewater, pointed out side and in; the roof is all of deal, constructed out of ordinary scantlings in as simple a manner as possible. It is covered with boarding felt and Bridgewater pan tiles. The floor of the hall is laid with deal-wood blocks. At present the hall is heated by two temporary iron stoves.

The panel in the front gable was modelled and presented to the Settlement by Mr. W. Goscombe John, A.R.A.

The hall is lighted by electricity, the installation having been carried out and presented as a free gift to the Settlement by Mr. Herbert Edwards, electrical engineer, of the firm of Messrs. Edwards & Armstrong, Cardiff and Bristol.

Messrs. W. Thomas & Co., of Cardiff, were the contractors, and Mr. Alfred Richards, of Cardiff, acted as clerk of works. The architect is Mr. Robert Weir Schultz (London).

#### MEMORIAL BAPTISTRY, BUCKLEY CHURCH.

ST. MATTHEW'S, Buckley, in the neighbourhood of Hawarden, built some eighty years ago as one of the several then dependent churches of that extensive parish, has during the incumbency and through the instrumentality of Canon Drew been completely remodelled. The nave, with aisles added, has been entirely rebuilt, and a new chancel in memory of the Right Hon. W. E. Gladstone erected, this having been followed by the forming of a baptistry at the west end in the tower as a memorial of Mrs. Gladstone.

Portland stone and black marble have been used for the pavement, and St. Bees stone for the font; over this is suspended an octagonal oak cover carved and traceried, having as a background a stained-glass window by Mr. H. Holiday.

Above the wood panelling, stained green, the surface of wall and ceiling has been treated in colour, wax medium being employed. The scheme of the decoration has reference, in the lower and upper parts respectively, to the initiatory and complementary rites of baptism and confirmation. Surmounting the dado, the emblem of the net enclosing unfolded fishes is introduced as a band with a label bearing a text, and rising from this are stems and leafage, interspersed with the dove and crown and sacred monograms, leading and growing into a frieze containing medallions, with angels supporting shields charged with symbols of the seven-fold endowment enumerated in the confirmation office.

The decoration was executed by the late Mr. W. F. Lodge, of West Hampstead, from the designs of the architects, Messrs. Douglas & Minshull, Chester, from whose coloured drawing, exhibited in this year's Royal Academy, our illustration is reproduced.

#### ENGINEERING SOCIETIES.

**THE INSTITUTION OF CIVIL ENGINEERS.**—The Council of the Institution of Civil Engineers have, in addition to the medals and prizes given for communications discussed at the meetings of the Institution in the last session, made the following awards in respect of other papers dealt with in 1904-5:—A George Stephenson medal to Capt. H. R. Sankey, R.E. (retired), (London); a Watt medal to Dr. C. Chree, F.R.S. (Richmond); Telford premiums to Messrs. W. E. W. Millington (Oldham), C. E. Stromeier (Manchester), C. W. Hill (London), F. C. Lea (London), W. B. Cole (London), W. C. Popplewell, M.Sc. (Stockport), E. H. Rigby, B.Sc. (Tientsin), and W. O. Leitch, jun. (Tientsin). For students' papers the awards are:—Miller prizes to Messrs. A. B. Potts (Macclesfield), W. M. Hayman (Glasgow), R. E. Bury (Calcutta), T. Lees, jun. (Winnipeg), T. L. Matthews (London), P. J. Risdon (London), F. E. Tudor (Stevenage).

**THE SOCIETY OF ENGINEERS.**—At a meeting of the Society of Engineers held at the Royal United Service Institution, Whitehall, on Monday evening, Mr. Maurice Wilson, Vice-President, in the chair, a paper was read on "Machine Drills for Hard Rock," by Mr. Arthur H. Smith, A.M. Inst.M. and M.E., of which the following is an abstract:—The author first pointed out the immense importance of the subject to mining, civil, and quarry engineers, setting forth the great services the rock drill had rendered in metaliferous mining and quarrying, and instancing some undertakings which would never have reached completion, and others which probably would not have been commenced, without the aid of machine boring. The history of rock drills was next outlined from Trevithick's machine to the steam percussion hammer introduced by Nasmyth, and its subsequent development for boring purposes by the Couch and Fowle patents, which included reciprocation and rotation, and were the direct forerunners of the present standard rock drill of a dozen first-class makers. The author then proceeded to describe hand drills, the first being driven by a crank handle, the blow being effected by the recoil of a compressed spring. The second is a device for grasping a bit, which is automatically lifted, rotated, and replaced after each stroke. Passing on to steam and compressed air actuated rock drills, attention was called to a compressed air hand drill, an evolution of the pneumatic chipping hammer. The author next proceeded to divide the present standard rock drill into two main classes—viz., the tappet valve type and the fluid moved valve type, mentioning, *in passant*, the Darlington valveless type of 1875. After the working of the tappet and air thrown valves had been explained, mention was made of a special tappet drill for 40 ft. quarrying holes, also of a Corliss drill valve gear, and of the compound type of machine. The Leyner drill next received attention. In this machine the loose tool is

struck by a moving piston. Turning to electric drills, the two principles made use of in their construction were stated as the conversion of the rotating motion of a motor into a reciprocating one by means of a flexible live shaft and gearing, the actual striking being due to the recoil of a compressed spring, the second type deriving its reciprocating motion from the attractive power of solenoid coils upon the attractive piston. The Brandt hydraulic arm, next noticed, the author describing it as a large hollow auger pushed forward with heavy pressure, and slowly rotated. He then referred to a novelty in the form of an internal-combustion motor-driven drill, operated by gasoline. Drill mountings and fittings were subsequently discussed, the author dealing with drill clamps, and incidentally with the question of "nicking" and "chucking" with special clamp arrangements. The author then observed that, no paper on rock drills could be complete without a reference to miners' phthisis, considering the finding of the recent Royal Commission on that subject, which was appointed in consequence of the excessive mortality amongst returned Transvaal miners. The author stated that the disease was due to dust, which was effectually allayed by the Leyner and Brandt machines. He then proceeded to describe various systems of spraying and water injection attached to or incorporated with rock drills, and which had the same object in view. He then noticed the novel applications to which rock drills had been put, such as pile and bolt driving, steam hammer work, unstopping blast furnace tapping holes, and even to the flattening out of refrigerated hog bellies in America. The author concluded by reviewing the various types of rock drills and the different forms of power employed to actuate them. He emphasized the point that the business of a rock drill was not simply to cut rock, but to cut that rock as quickly as mechanically possible, and at the lowest cost, not only for actual power consumed, but also taking into consideration the relation of boring speed with its effect on capital and standing charges. For reasons which the author stated, his verdict was in favour of compressed air for actuating machine drills, and for mining work the standard compressed air rock drill arranged with an intermittent water-jet discharge at the drill point to cool the bit and to keep the cutting face clear of debris, thus insuring freedom from dust and quicker boring.

#### COMPETITIONS.

**SCHOOL, DERBY.**—At a meeting on the 2nd inst. of the Sites and Buildings Sub-committee of the Derby Education Committee it was decided to recommend that a first premium of 50*l.* and a second of 20*l.* be awarded respectively to Messrs. Hunter & Woodhouse, of Belper and Derby, and Mr. T. H. Thorpe (Wright & Thorpe), Derby, for competitive plans for a new county school on a site between Clarence-road and Porter-road.

**SCHOOLS, NEWCASTLE-ON-TYNE.**—At a meeting of the new schools sub-committee of the Newcastle Education Committee, the award of the assessor, Mr. Arnold Mitchell, F.R.I.B.A., in regard to the competitive plans for the proposed new schools at Bolam street, Byker, was received. The plans placed first, second, and third in order of merit were those bearing the mottoes "Sun shine," "Open Space," and "Red Dice" respectively. Upon the opening of the sealed envelopes containing the names of the competitors, it was ascertained that Mr. W. H. Knowles, F.R.I.B.A., 27, Grainger-street, Newcastle, was the author of the plans placed first and second. Mr. Knowles thus secured the appointment to carry out the work, and, in addition, receives a premium of 32*l.* for the second set of designs. "Open Space." A premium of 20*l.* is gained by Messrs. Marshall & Tweedy, 17, Eldon-square, Newcastle, the authors of the plans "Red Dice." Altogether twenty-five sets of plans were received, and the education committee, to thank the competitors for the care they have exercised and the trouble they have put themselves to in this competition.



## Books.

*A Treatise on Concrete, Plain and Reinforced.* By FREDERICK W. TAYLOR, M.E., and SANDRO E. THOMPSON, S.B., A.M. Am. Soc. C.E. New York: John Wiley & Sons. London: Chapman & Hall. 1905.

CONSIDERING the large number of papers read and articles written every year on the subject of concrete, and the enormous stores of information available, the task of compiling a comprehensive treatise on this valuable material of construction is exceptionally arduous. But when accomplished in the satisfactory manner evidenced by the work of Messrs. Taylor and Thompson, the result is of incalculable advantage to architects, engineers, and contractors. This treatise has been prepared in a most conscientious manner, numerous British, Continental, and American authorities have been quoted, and chapters by well-known specialists have been included. Further, twelve pages of references to articles in the technical Press are given for the benefit of those who wish to make more extended investigation than that presented in the authors' book, which, nevertheless, comprises nearly 600 pages. As a proof of their desire to avoid inaccuracies, the authors state that each chapter has been submitted for criticism to at least one, and in some cases to two, three, or four specialists, and that advance proofs have been sent for comment to authorities whose names are mentioned in the work.

Among the earlier chapters, dealing with the constituent parts of concrete, there is one by Mr. Spencer Newberry which contains a critical and practical discussion of the "Chemistry of Hydraulic Cements," and later comes one by Mr. William B. Fuller on "Proportioning Concrete," a contribution which well deserves reading if only for the description of the author's method of proportioning the materials by mechanical analysis. This process is thus described by Mr. Fuller:—

"Mechanical analysis consists in separating the grains or grains of a sample of any material, such as broken stone, gravel, sand, or cement, into the various sizes of which it is composed, so that the material may be represented by a curve, the area of whose ordinates is the percentage of the total sample which passes a sieve of the size of the diameter represented by the ordinate from the origin in the diagram."

The objects of mechanical analysis curves as applied to concrete aggregates are (1) to show graphically the sizes and relative sizes of the particles; (2) to indicate what sized particles are needed to make the aggregate more nearly perfect, and (3) to enable the engineer to improve it by the use of a different means for determining best proportions of different aggregates."

The practical value of Mr. Fuller's system is best demonstrated by the fact that the proportions of concrete regularly adopted by him for thin water-tight walls are about 1:3:7; while for similar constructions where the materials are proportioned by rule of thumb methods, 1:2:4, mixtures are generally necessary. Some other methods of proportioning concrete are described, and the succeeding chapter contains a diagram and several tables of quantities for concrete and mortar which will be found useful for estimating materials.

Casual examination of this volume may lead to the erroneous impression that concrete-steel is discussed only in the chapter bearing the title "Reinforced Concrete." This is by no means the case, for in that part of the book devoted to the description of typical structures, a considerable amount of information will be found relative to concrete-steel buildings and other works. A point worthy of notice in connexion with the theory of concrete-steel is suggested by the notes of Professor Turneaure, which indicate that cracks in the concrete are actually produced by tension, and that the tension is thus transferred to the metal. Professor Turneaure tested his beams when moist and applied the load in an upward direction so that the cracks could be readily observed on the outer surface of the concrete. It should be noted that in plain concrete cracks were observed before rupture took place. The conclusion to be drawn from these tests is that initial cracking in reinforced concrete occurs at an elongation practically the same as in plain concrete. In the case of the latter material, however, total

failure takes place at once, while in the other it is a gradual process, many small cracks developing successively, so that at rupture the total elongation is considerably greater. As the authors point out, these results are somewhat at variance with the conclusion reached by M. Considère, who was not able to discover any fine cracks, and therefore drew the inference that, while the elongation of plain concrete was about 0.01 per cent., it could stretch as much as 0.02 per cent. when in combination with steel. Hence, in his formula for beams, M. Considère makes allowance for the resistance of concrete to tension. On the other hand, Professor Turneaure, considering that the presence of cracks seriously affects the tensile strength of the concrete, takes no account of its tensile resistance. This course is one that seems to be worthy of adoption in general practice. It should be noted that both the authorities mentioned agree as to the increased extensibility of reinforced concrete, the only point of difference being whether its tensile strength is or is not destroyed when the stress intensity surpasses that at which plain concrete is ruptured.

After discussing the principles governing the combination of steel and concrete, the action of reinforced beams under load, and the relative advantages of high and low carbon steels, the authors give a series of simple formulae for beam and column design, as well as tables for facilitating calculation.

A chapter on the "Effect of Sea Water upon Concrete and Mortar" is contributed by M. René Felt, the Director of the Laboratory of the Ports et Chaussees, Boulogne. This well-known expert confirms the opinion that no cement has yet been found to give absolute security against the decomposing action of sea water, but the suggestions made in his able discussion of the subject will doubtless be appreciated by dock and harbour engineers. Among other chapters of general interest are those on the effects of frost, the watertightness of concrete, and the protection of steel from fire and rust.

Several chapters are devoted to the description of concrete and concrete-steel structures; this portion of the book being quite as useful in its way as the more theoretical part by which it is preceded.

Various other ramifications of the general subject are discussed, all of them with the same conspicuous ability and painstaking care evidenced by those already mentioned. This treatise constitutes a splendid book of reference for all users of concrete, and thoroughly deserves to have a large sale both in this country and in the United States.

*Standard Steel Construction.* Compiled by HALL & PICKLES. Second Edition. London and Manchester: Sherratt & Hughes. 1905.

The title chosen for this volume may perhaps prove to be a little misleading, for it is not a treatise on steel construction, but an elaborated section book, compiled for the firm mentioned by Messrs. Charles Heathcote & Sons, of Manchester, giving the properties of standard steel sections, and showing their values in different combinations in such a way as to facilitate the work of architects, engineers, and contractors. Part A consists of "Property Tables," in which standard sections of angles, tees, zeds, channels, and joists are catalogued, together with the mathematical properties—practically the same as those published by the Engineering Standards Committee—and with additional information enabling the user to make due allowance for eccentricity of loading in beams and to determine the strength of any section when applied as a strut, under centric or eccentric loads. As the tables are extended to cover built-up girders and stanchions, they constitute a very complete and valuable series. Parts B and C give the safe loads for selected sections of beams and struts, but the loads for other sections can easily be determined by means of the data contained in the property tables. Among the novel features in this book, the most meritorious is the tabulation of reduction factors, relative to shearing stress and eccentric loading upon beams and stanchions, the manner in which these factors are to be used being clearly explained in the preface. An excellent plate at the end of the book shows at a glance the economical values of

different stanchion sections, and makes it easy to select sections of given height capable of carrying any given load within the range of the diagram. Another useful plate, showing the shearing strengths of girder webs, enables the user to determine the shear that a given web will resist without the use of stiffeners. The general arrangement of the tables and the features we have indicated should be widely appreciated by architects and structural engineers, and we heartily welcome this volume as a most complete and carefully compiled work of reference. It certainly is the best section book of the kind ever published in this country.

*Modern Housing in Town and Country.* By JAMES CORNES, member of the Leek (Staffs) Town Council. London: B. T. Batford. 1905.

IN his preface, Mr. Cornes states that for years the "interesting and fascinating" study of the housing problem has engaged his attention, and, "in response to requests," the results of his studies are now published.

In addition to the preface, table of contents, introduction, etc., which run to xviii. pages, there are 196 pages of letterpress and illustrations describing and illustrating houses of various kinds for the "working classes." Four principal types of groups are considered:—1. Block Dwellings and Rowton Houses; 2. Tenements or Cottage Tenements of Two or Three Stories; 3. Cottages and Villages; and 4. Garden Cities. The illustrations constitute the principal feature of the work, and include plans and views of blocks of dwellings erected by public authorities in various parts of the country and of single cottages, pairs, and terraces, erected by private individuals. The cottages erected at the Garden City, Letchworth, furnish material for about one-third of the book. A short but usually adequate description is given in each case, the cost being stated, and in most cases the price per cubic foot. Some of the designs cannot be properly understood as sections are not given; as an example, we may mention the houses erected for the author at Leek, the plans of which do not show how the central bedroom is lighted. The height of the rooms in the tenements at Rotherhithe is said (on page 25) to be 6 ft. 8 in., but surely this is a misprint. Mr. Cornes has compiled a book which cannot fail to prove useful, not only to the members of public bodies, but also to property-owners, architects, and builders, and the publisher has presented the work in an attractive form.

*A Practical Treatise upon Warming Buildings by Hot Water.* By FREDERICK DYE, M.R.I., author of "Steam Heating," etc. London: E. & F. N. Spon. 1905.

MR. DYE has an intimate knowledge of his subject, and, as he also has the ability to write clearly and methodically, the book before us is both useful and interesting. There are three preliminary chapters on "The Laws of Heat," etc., ten chapters on low-pressure apparatus, and three dealing with drying-rooms, high-pressure apparatus, and warming buildings by heated air. Valuable information, chiefly in tabular form, is given in an appendix, and there is also a good index. The chapters on low-pressure heating occupy about two-thirds of the book, and contain full descriptions of the various parts of the apparatus and of the different systems of piping in common use. Due stress is laid on the necessity for safety valves, and there are many valuable hints for the prevention or rectification of defects in circulation. In the paragraphs on the high-pressure system, the disadvantages are not, in our opinion, fully stated, and a chapter might with advantage have been added on some of the more recent developments in heating by hot water. For all ordinary work, however, the book is an excellent guide. It contains 320 pages, and the illustrations (nearly 200 in number) are clear and to the point.

*Practical Plumbers' Work.* Edited by PAUL N. HASLUCK. London: Cassell & Co. 1905.

This little book of 160 pages is, according to the preface, principally from the pen of Mr.



J. Wright Clarke. It contains 298 illustrations, and a good deal of practical information, but it is not by any means a complete treatise on plumbers' work. Nothing is said about hot-water services, and the index contains no reference to waste-pipes, water-closets, baths, or lavatories; there is, indeed, on page 38, an illustration of a simple sink-waste, together with a short description, and on page 63 there is an illustration of a lead soil-pipe and connexions. The book contains very little information about the design of plumber's work, but deals almost exclusively with details of workmanship. It is clearly written, and will be of use to technical students.

*The Rudiments of Practical Mathematics.*  
By A. CONSTEDINE, M.A., and A. FARNES, M.A. London: John Murray. 1905

As a very simple treatise dealing with the measurement of length, area, volume, time, and velocity, this book should be found useful to beginners. Arithmetical, algebraic, and geometrical methods of performing calculations are explained so clearly that the most youthful student will be able to follow the meaning of the authors without difficulty. We are not quite certain, however, that the average schoolboy will understand the statement that the course has been arranged on "heuristic lines." Perhaps the term is intended as an incentive to the practice of the method indicated by the somewhat unusual Anglo-Greek adjective here employed.

*Journal of the British Fire Prevention Committee.* London. 1905.

THIS special issue contains a record of the Commission appointed by the Committee to visit the principal cities of Central Europe on the occasion of the International Fire Service Congress at Buda-Pesth in 1904, and has been compiled by Messrs. Edwin O. Sachs, Horace S. Folker, and Ellis Marsland, who formed part of the Commission. The record is of more interest to fire brigade officers than to architects, although the latter will find some useful notes on theatres and on fire-prevention in buildings.

*Proceedings of the Incorporated Association of Municipal and County Engineers.*  
Vol. XXX. Edited by THOMAS COLE, A.M.Inst.C.E. London: E. & F. N. Spon. 1904.

THIS bulky volume of 674 pages contains reports of the meetings of the Association at Widnes and Runcorn, Aberdeen, Hastings, London, Great Grimsby, Newcastle-on-Tyne, York, Buxton, Newport, and Shrewsbury, and includes papers on tramways, water supply, sewage works, bridges, and other municipal works in these towns, together with a number of folding plates in illustration of the papers. There is not much in the volume of particular interest to architects, but engineers and surveyors will find it both interesting and useful.

*Journal of the Royal Sanitary Institute.*  
Vol. XXV., Part III. London: Offices of the R.S.I., Margaret-street. 1904.

NEARLY the whole of this volume of 630 pages is occupied by the papers read at the Congress in Glasgow and by reports of the discussions thereon. There is an interesting paper on "The Construction of Hospitals," by Mr. Alex. Cullen, F.R.I.B.A., and there are also a number of papers on sewage purification. Mr. James Graham, Inspector of Schools to the West Riding County Council, gives "Some Particulars of Adjustable School Furniture," with illustrations, which are, unfortunately, too small and indistinct to be of much use; the paper contains a good deal of information about Continental schools which had been visited by the author.

#### BOOKS RECEIVED.

REPORT ON BRICKWORK TESTS. Conducted by a sub-committee of the Science Standing Committee of the Royal Institute of British Architects. London: The Royal Institute of British Architects, 9, Conduit-street, W.  
MATRICULATION DIRECTORY. No. XLI. September, 1905. Cambridge: Burlington House. London: Red Lion-square, W.C.

## Correspondence.

### DISTRICT SURVEYORS' FEES.

SIR,—I see that the London County Council contemplate introducing another Building Act next session, and are circulating the various local bodies for suggestions.

Might I be allowed to point out the very inequitable way in which the fees of the district surveyor are calculated under the existing Act? In a small alteration to a large building, or series of buildings if connected, the fees are out of all proportion to the amount of work done. I have known a fee of 7*l.* being claimed for enlarging a window opening! C. J. S.

## The Student's Column.

### STEAM BOILERS AND PIPES.—XIV. CHIMNEYS (continued).

**H**ITHERTO we have written of theoretical velocity, but it must be remembered that for a given head the actual velocity of the cold air and of the hot gases is very much less than that indicated by formulae (13) to (23).

**Practical Velocity or Draught.**—In article XI, we showed that friction in smooth pipes has a very important effect in reducing the flow of air and gases. It will be readily understood that the losses of head and velocity are proportionately higher in the case of chimneys with sooty surfaces, connected with boiler furnaces and flues, presenting still greater resistance to the passage of the air and gases. When the chimneys and flues are of brick the resistance to flow is far more marked.

Formula (5), p. 501, shows that the loss of head in a smooth pipe is governed by the velocity actually prevailing, and by the length and diameter of the pipe.

The same laws govern the loss in the case of a flue, where special importance attaches to the resistances offered by contractions, turns, and bends, and by the condition of the interior surfaces, and to the influence of enlargements of area and changes of the cross-sectional form of the flues.

To obtain figures indicating the loss of head and reduction of velocity from these causes in any particular boiler plant would involve a series of intricate calculations, but even then the results could only be regarded as a very rough estimate of the probable loss under one assumed set of conditions.

The theoretical velocity necessarily varies from time to time with the temperature of the gases and prevailing atmospheric conditions, and the friction varies with the cleanliness of the flues and the management of the boiler furnace.

For these reasons it would be mere waste of time to make elaborate mathematical computations of the losses occurring between the inlet and the outlet of the boiler chimney.

Nevertheless, it is very desirable that a clear idea should be obtained as to the extent to which the head, or motive force, is used up in the acts of forcing air into the boiler furnace, which is the inlet at the foot of a chimney, and of driving it through the boiler flues and up the chimney itself.

In his classical work "Traité de la Chaleur," Péclet discusses this subject at considerable length, and gives formulae for calculating the losses of velocity arising from various causes in boiler furnaces, flues, and chimneys, but in almost every instance he says that the values of the necessary coefficients can only be determined by experience.

The investigations of Daubuisson and others show that the values of the coefficient of contraction governing the flow of air through an opening such as the inlet to a boiler furnace are as follows:—

Circular orifice in thin plates . . . . .	0.56 to 0.79
Short cylindrical mouthpieces (parallel) . . . . .	0.81 „ 0.84
Short cylindrical mouthpieces (rounded) . . . . .	0.92 „ 0.93

Referring to the loss of velocity due to the passage of air between the grate bars and through the layer of fuel, Péclet says that "this determination, by theoretical considerations, is impossible." In practice the loss varies between very wide limits.

Daubuisson states that in his experiments upon curved surfaces he found that seven bends of 45° each reduced the velocity of flow by one-fourth. In a singular circumstance, however, the loss did not appear to increase proportionately with the number of bends.

Daubuisson was unable to establish a general rule applying to this case. Péclet discusses the effect of velocity due to changes of direction of the gases, enlargements of flues, and the subsequent reunion of the gases. Still, he does not give any rules that can be applied without qualification to cases assigned with any approach to accuracy.

With regard to the friction of gases in conduits, it should be pointed out that the conditions appear to be somewhat different from those obtaining in the case of liquids flowing in pipes, and that the coefficient of friction for gases depends upon the nature of the material of which the conduit is made, as well as upon the state of its interior surface.

As the result of numerous experiments Péclet derived the following values for the coefficient of friction (*k*) over smooth surfaces:—

Earthenware chimneys . . . . .	0.002
Iron plate chimneys . . . . .	0.003
Cast-iron chimneys . . . . .	0.0025

The length and sectional area of a chimney, and of the flues in connexion therewith, have also a very marked influence upon the practical velocity of the gases. The total length and mean area can easily be included in a formula, but if the varying dimensions of the conduit were to be taken into account from the inlet to the top of the chimney an interminable number of calculations would have to be performed, and the results would probably not be more reliable than those afforded by the addition of a reasonable allowance to the combined length of the chimney and flues.

This method is, in effect, recommended by Péclet, who says that the actual velocity of discharge from the top of a chimney can be represented by a formula which, in the notation we have adopted hitherto, is

$$V_a = \sqrt{\frac{2gh}{d + 2k(H + l)}}$$

where *h* = head, *d* = diameter, *k* = coefficient of friction, *H* = height of chimney, and *l* = length of flues.

Péclet adds:—"If the flues had a section differing from that of the chimney, and if the air in its movement encountered any resistances whatsoever, this same formula would still represent the velocity of discharge, provided that a suitably determined value be given for *l*; for every resistance of every kind may be represented by that offered by a duct of given diameter, but of suitable length."

The trouble, however, is to determine what length may be suitable to represent the various sources of resistance in a given boiler plant.

Morin adopts a convenient method of calculating values for the several kinds of resistance, but as his theory incorrectly assumes the theoretical velocity of the Laval gases to be

proportionate to  $\sqrt{\frac{D}{d}}$ , the factor

obtained have to be doubled before it is applicable to formula in which the theoretical velocity is correctly shown to be proportionate to  $\sqrt{\frac{D}{d}}$ .

For the purpose of arriving at a simple rule by which the actual velocity (*v<sub>a</sub>*) of the chimney gases may be determined with approximate accuracy, we have proposed the method of Morin so that the result shall be suitable for use with formula (16), p. 540, when the density of the gases is assumed to be approximately half that of the air.

Resistance due to contraction at the inlet to the furnace is represented by the expression  $\left(\frac{1}{r} - 1\right)^2$ , where *r* = the coefficient of contraction.

Taking the value of this coefficient as  $\left(\frac{1}{0.60} - 1\right)^2 = 2.25$ .

Resistance offered by the fire-grate and layer of fuel depends upon the relation of the air spaces in the fuel to the area of the chimney top, and is  $\left(\frac{A}{A_1} - 1\right)^2$ .

where  $A$  = area of the chimney top.  $A_1$  = collective area of air passages through the fuel. In practice the area of these air passages may range from 10 to 60 per cent. of the chimney area.

Taking  $A_1$  at  $(0.1 + 0.6) \div 2 = 0.35$ , we get

$$\left(\frac{1}{0.35} - 1\right)^2 \times 2 = 6.9 \text{ (nearly).}$$

In formula (24), below, we have used the sum of the foregoing results as a constant, taking the value at 8 to avoid unnecessary decimals.

Resistance due to bends, enlargements of area, and the splitting and reunion of the draught can be represented with sufficient accuracy by the expression  $n \left(\frac{1}{d} - 1\right) \times 2$

Making  $n = 0.60$  as before, we have  $n \times 0.88$ ,

where  $n$  = the number of bends and similar causes of resistance or loss.

Friction of the gases over the soot-covered surfaces of square or circular chimneys and flues is given approximately by

$$\left(\frac{2Sf(H+l)}{A}\right),$$

where  $S$  = surface,  $f$  = coefficient of friction,  $H$  = height of the chimney,  $l$  = length of the flues, and  $A$  = mean area of the chimney and flues.

The velocity of discharge is proportional to the sectional area divided by the periphery of a conduit, and, as in circular and square flues and chimneys the surface is always one-fourth of the diameter or side, the term may be written

$$\left(\frac{8f(H+l)}{d}\right) \times 2.$$

Taking the coefficient of friction at 0.01, we get

$$S \times 0.01 \left(\frac{H+l}{d}\right) \times 2 = 0.16 \left(\frac{H+l}{d}\right)$$

Applying the foregoing values to formula (24), we have for the actual velocity of discharge

$$\sqrt{\frac{2gH\left(\frac{D-d}{D}\right)}{1 + \left[8 + 0.88n + 0.16\left(\frac{H+l}{d}\right)\right]}} \left(\frac{D}{d}\right) \quad (24)$$

When the theoretical velocity has already been calculated, or can be found by reference to a table, the actual velocity is found

$$v = v \sqrt{1 + \left[8 + 0.88n + 0.16\left(\frac{H+l}{d}\right)\right]} \quad (25)$$

In these formulae we have made ample allowance for the various causes of loss. Other values can be used to meet special cases, but if the factors be reduced much they will give velocities in excess of those obtained in chimney-shafts working under ordinary conditions.

Practical experience indicates that the actual velocity of the hot gases in boiler chimneys with well-arranged flues, not exceeding in length the height of the chimney, is generally about one-fifth of the theoretical velocity.

Therefore for rough estimates it is convenient to take the value of

$$\left[1 + \left(8 + 0.88n + 0.16\left(\frac{H+l}{d}\right)\right)\right] \text{ at } 25.$$

Then we have

$$v = \sqrt{\frac{2gH\left(\frac{D-d}{D}\right)}{25}} \left(\frac{D}{d}\right)$$

which reduces to

$$v = 0.2 \sqrt{2gH\left(\frac{D-d}{D}\right)} \left(\frac{D}{d}\right) \quad (26)$$

and

$$v = 0.2 \sqrt{2gH\left(\frac{D-d}{D}\right)} \left(\frac{D}{d}\right) \quad (27)$$

When the temperatures of the hot gases and the external air are 585 deg. and 62 F.,

respectively, the value of  $\sqrt{\frac{D-d}{D}}$  is  $\sqrt{0.5} = 1.414$ .

Under this condition formula (26) can be

further simplified by omission of  $\sqrt{\frac{D-d}{D}}$  with a corresponding modification of the factor  $0.2$  to  $(0.2 \times 1.414) = 0.282$ , say  $0.28$ .

Thus

$$v_a = 0.23 \sqrt{2gH},$$

and by reduction we have

$$v_a = 2.26 \sqrt{H} \dots \dots \dots (28)$$

The following example shows the application of formulae (24) and (25).

Example (10).—Required the practical velocity of the hot gases in a chimney 100 ft. high by 3 ft. diameter at the top, connected with boiler flues having a total length of 100 ft. and an average area equal to 4 ft. diameter, with eight bends, one split draught, and two enlargements of area, these sources of loss being equivalent to 11.5 bends, the temperatures of the external air and of the hot gases being 62 deg. and 585 deg. respectively.

By Table XXIII., the weight per cubic foot of air at 62 deg. is 0.0761 lb., and by formula (6) that of the chimney gases at 585 deg. is 0.03805 lb. Substituting these and the other values in formula (24), we have

$$v_a = \sqrt{\frac{61.4 \left(100 \frac{0.0761 - 0.03805}{0.0761}\right)}{1 + \left[8 + (0.88 \times 11.5) + \left(0.16 \frac{100 + 100}{3 + 4} \times 2\right)\right]}} \left(\frac{0.0761}{0.03805}\right) \\ = \sqrt{\frac{61.4 \times 100 \times 0.5}{1 + [8 + (10.12) + (9.14)]}} \quad (2) \\ = \sqrt{\frac{3220}{23.26}} \quad (2) = \sqrt{138.4} \times 2 = 21.3 \text{ feet per second.}$$

Substituting in formula (25) the theoretical velocity as given in Table XXII. and the values of the denominator as already found, we have

$$v_a = 113.4 \div \sqrt{23.26} \\ = 21.3 \text{ ft. per second, as before}$$

The first six columns in Table XXIII. have been calculated in a similar manner by formula (24) for chimneys of various heights, with different values of  $n$  and  $\frac{H+l}{d}$ .

For the purpose of comparison, two columns have been added in which the

TABLE XXIII.—CALCULATED PRACTICAL VELOCITY OF THE HOT GASES IN CHIMNEYS OF VARIOUS HEIGHTS, WITH BOILER FLUES OF DIFFERENT PROPORTIONS, THE TEMPERATURES OF THE HOT GASES AND EXTERNAL AIR BEING 585 DEG. AND 62 DEG. F. RESPECTIVELY.

Height of Chimney in Feet (H).	Practical Velocity ( $V_a$ ) in Feet per Second.						Practical Velocity ( $V_a$ ) in Feet per Second.
	$V_a = \sqrt{\frac{2gH\left(\frac{D-d}{D}\right)}{1 + \left[8 + (0.88n) + \left(0.16\frac{H+l}{d}\right)\right]}} \left(\frac{D}{d}\right)$						
	$n = 24$		$n = 12$		$n = 6$		
	$\frac{H+l}{d} = 100$	$\frac{H+l}{d} = 66$	$\frac{H+l}{d} = 66$	$\frac{H+l}{d} = 59$	$\frac{H+l}{d} = 66$	$\frac{H+l}{d} = 50$	
10	5.2	5.6	6.5	6.8	7.1	7.6	7.1
20	7.4	7.9	9.2	9.6	10.1	10.7	10.1
30	9.1	9.7	11.3	11.9	12.4	13.1	12.3
40	10.6	11.2	13.0	13.6	14.3	15.0	14.2
50	11.8	12.5	14.6	15.3	16.0	17.0	16.0
60	12.9	13.7	16.0	16.7	17.6	18.6	17.6
70	13.9	14.8	17.2	18.1	19.0	20.1	18.9
80	14.4	15.8	18.4	19.1	20.3	21.4	20.2
90	15.8	16.8	19.5	20.5	21.5	22.8	21.4
100	16.1	17.7	20.6	21.5	22.7	24.0	22.6
120	18.3	19.4	22.6	23.8	24.8	26.3	24.8
140	19.7	21.0	24.4	25.5	26.8	28.4	26.7
160	21.1	22.4	26.0	27.3	28.7	30.4	28.5
180	22.4	23.8	27.7	29.1	30.4	32.2	30.3
200	23.6	25.0	29.2	30.6	32.1	34.0	31.9

practical velocity has been obtained by formula (27) from Table XXII. and by formula (28) from the height of the chimneys. The figures in the two last columns differ slightly owing to the omission of numerals beyond the second place of decimals in formula (28).

COUNTY DISTRICT OFFICES, FALKIRK.—The new County District offices at Falkirk were opened recently. The building occupies a position in West Bridge-street, and is built in the Italian Renaissance style from plans prepared by Messrs. A. & W. Black, architects, Falkirk.

## GENERAL BUILDING NEWS.

ESTABLISHED CHURCH, SCOTSTOWN, N.B.—The memorial-stone of a new Established church was laid at Scotstoun recently. The church is situated at the extreme west end of Scotstoun, at the corner of Dumbarton-road and Victoria Drive. The general plan consists of a nave without any aisles or pillars, a circular apse or chancel, east and west transepts with galleries over them, approached from the nave. The length of the church is 106 ft. by a breadth of 32 ft. at the nave and 68 ft. across the transept. The height to the ridge of the roof is 46 ft. The accommodation is for about 900 people, seated in area and transept galleries. The principal feature of the design is the central lantern tower rising about 70 ft. above the ground, or to the apex of the roof 90 ft. It is 33 ft. square internally and 65 ft. in height, and there are eight double windows in the lantern. The architect is Mr. James Chalmers, Glasgow.

METHODIST CHURCH, WHITLEY BAY.—A new Free Methodist church is shortly to be opened at Whitley Bay. Mr. W. H. Knowles, of Newcastle, is the architect, and Mr. W. A. Styan, of Whitley, the contractor for the building.

BAPTIST CHURCH, WELLINGBOROUGH.—This church was opened on the 28th ult. The buildings are designed in a late period of Gothic, freely treated, and are faced with red bricks with white dressings. The church has a tower and spirelet at the corner, rising to a height of about 70 ft. The accommodation is for 432 adults, or a mixed congregation of over 500 persons. Two vestries,

etc., are provided. The contract amount was 2,476*l.*, including boundary walls. Schools are intended to be added in the future. The architects are Messrs. George Baines & Son, Strand, London, W.C., and the builders Messrs. E. Brown & Son, Wellingborough.

WESLEYAN CHURCH AND SCHOOL, GRAVESEND.—The foundation-stones of a new Wesleyan church and school were laid recently at Graysend. The building is being erected of red pressed facing bricks, with Bath stone dressings, and the tower and spire will rise to a height of about 100 ft. from the ground. The building, which has been designed by Messrs. W. J. Morley & Son, architects, of London and Bradford, will consist of nave, transepts, and choir, with vestries for the

minister and for the choir. The organ will be placed in an elevated position at the rear of the choir seats, the latter being in a gallery which rises in the chancel from behind the rostrum. The accommodation will be for 740, 286 being in the gallery, which occupies three sides of the building. The interior woodwork of pews, open wagon-headed roof, etc., will be varnished pitched pine. The rostrum will be of American walnut or mahogany. The transeys and other church windows will be filled with tinted ornamental leaded lights. The entrance vestibule will be laid with Dispeker Venetian marble mosaic. The school premises, fronting into Wilfred-street, comprise an assembly hall 60 ft. by 30 ft., an infants' room, three smaller



classrooms, and a library. There is also a church parlour on the first floor. The contract is in the hands of Mr. A. E. Tong, of Gravesend, and the cost will be about 5,476*l*. The heating is by Mr. A. J. Tait, of Willesden. The premises will be lighted by electricity by Mr. H. Warner, of Gravesend. Mr. W. G. Cooke is acting as clerk of works.

**WESLEYAN CHAPEL, CONSTABLE BURTON.**—A new Wesleyan chapel has been opened at Constable Burton. Built of stone, and roofed with Westmorland slates, it is 27 ft. long, 18 ft. 6 in. wide, and 15 ft. high; lighted by seven Gothic-headed windows with leaded lights, and a three-light window over the porch. The roof is open. The accommodation is for about 150. The work has been carried out under the direction of Mr. Arthur G. Dalzell, architect, Halifax. Mr. Thomas Handley was the builder.

**WESLEYAN CHAPEL, BROCKHOLES, YORKSHIRE.**—A new Wesleyan chapel is in course of construction at Brockholes. When completed the chapel is to have a chancel and nave, giving accommodation for 200 persons. The architect is Mr. E. W. Lockwood, Huddersfield. The estimated cost of the land and the erection is 1,714*l*.

**SCHOOLS, GILLINGHAM.**—The new schools in Napier-road are now completed and in occupation. The buildings are constructed of picked yellow bricks, with red brick quoins to angles, and glazed brown brick dados up to sill level. The roofs are tiled. All floors are of wood block on concrete, except the cloakrooms, lavatories, and corridors, which are paved. The walls and ceilings are plastered with "Strapite" plastering, the lower portion being finished with cement, which is painted, the upper part being distempered. The whole of the joinery is picked pitch-pine, lightly stained and varnished. A bell turret is placed at the south-west angle of the mixed school. Each school has a separate playground, with a south or west aspect, having a natural fall from the schools, and paved with asphalt. Covered play-sheds are provided for against the boundary walls. Each classroom has fresh-air inlets and exhaust ventilators at ceiling level, communicating with the roof ventilators. In winter the rooms will be warmed from the boilers in the basements, the fresh air being passed over the radiators. The central halls are ventilated and heated in a similar manner. Electric light is used for lighting the buildings. The girls' school is placed on the ground floor, and accommodates 300 children. Two entrances are provided for seniors and juniors, leading direct into the central hall through short corridors, off which are placed the cloakrooms, which are lighted from the ends, each having a recessed lavatory. The cloakrooms have gangways between the hanging rails, and separate entrance and exit doors, so that the children can enter and leave the schools without confusion. The central hall, 77 ft. by 18 ft., is lighted from both sides and ends. There are six classrooms, all opening into the hall, and lighted from the left-hand side, each being 20 ft. by 25 ft., and accommodating fifty pupils. The teachers' room, which opens direct into the hall, and overlooks the girls' playground, has a lavatory and water-closet. The book-store adjoins, and a lock-up sink is placed off the cloakrooms. The boys' school is on the upper floor over the girls' school. There are two entrances and staircases for juniors and seniors, the accommodation being the same as that in the girls' school, except that the master's room overlooks the boys' playground. The infants' school accommodates 320 children, and has a central hall 50 ft. by 26 ft., lighted from both ends. Opening into this hall are two babies' rooms, each accommodating sixty babies; and four classrooms, each accommodating fifty infants, all lighted from the left-hand side. The entrances are at either end of the hall, each having a large cloakroom and lavatory. The teachers' room, which overlooks the playground, opens direct into the hall, and has a lavatory. The book-store adjoins, and a lock-up sink is provided in the cloakroom. The total expenditure, including playgrounds, but exclusive of desks, will not exceed 9,800*l*. Mr. H. Harris was the contractor for the work. Mr. J. Hatchard Smith being the architect, and Mr. C. H. Langley, of Gillingham, the clerk of works.

**COUNCIL SCHOOL, HAREWOOD.**—The new St. Peter's Council School, in Bath-street, Hereford, was opened on the 22nd ult. It has been planned on the central hall system, and the whole building is of the hipped roof description, the central hall, besides having side windows, being gabled to allow for the proper lighting and ventilating of the classrooms. All the roofs are roofed with brindled Broseley tiles. The size of the respective rooms in feet are:—Central hall, 50 by 30; three classrooms, 25 by 25; two classrooms, 20 by 20; two classrooms, 25 by 20. The teachers' rooms are 14 by 10. The flooring of the whole building is of pitch-pine wood blocks, with raised galleries for the back row seats in the classrooms. Granolithic has been used in the paving of the outer porches, etc. The heating chamber

is below the assistant masters' room, and was put in by Messrs. John King, Ltd., of Liverpool. The new school has seating accommodation for 400 boys. The walls are formed of a glazed brick brown-tinted dado, above which they are plastered with Adamant plaster. All round the rooms at a convenient height the walls are treated to form a continuous and permanent blackboard. All the classrooms and assembly hall are ceiled to the collars. The walls are coloured with French grey. The lighting of the building will be provided by incandescent light. Provision has been made for cloak and cap room, all the pegs being numbered from one to 200 in both the senior and junior divisions of the school. Compartment partitions for economy of space have been used here. There are two other rooms—the headmaster's room with an adjoining store-room, and an assistant master's room, together with another store-room. The desks are of the dual form and of pitch-pine. The brick work is of local fancy bricks, the windows, with mullions, heads and sills, and the string courses being of a biscuit-coloured terracotta. There is a playground, paved, surrounded on the one side by an unclimbable iron fence, on two other sides by walls, and in front by an ornamental iron railing on a dwarf brick wall. Another addition is an open play shed covered with Broseley tiles. Twyford's latrines have been adopted. Altogether the structure, with its furnishings, will cost about 6,000*l*. Mr. E. W. Wilkes, builder, Hereford, carried out the work from plans prepared by Mr. Noel Barker, architect.

**SCHOOL, CROSSACREEVY, BELFAST.**—The O'Neill Memorial School, Crossacreevy, County Down, has just been opened. The site of the new building occupies an elevated position on the east side of the road from Belfast to Ballygowan. The main schoolroom is 40 ft. long by 25 ft. wide, and the height to the ceiling is 17 ft. The classrooms are 16 ft. long by 13 ft. wide. The lavatory building is 17 ft. long and 9 ft. wide, and in addition to this there are two play-sheds, each 72 ft. long. The ceilings and wainscoting are sheeted in pitch pine and varnished, and the walls plastered smooth and tinted, the angles being rounded to prevent the lodgement of dust. The grates and mantels were supplied by Messrs. Riddells, Ltd.; Mr. Alexander McKibbin carried out the plumbing; the lighting is by acetylene gas, and the apparatus and plant for it were supplied by Messrs. The Sunbeam Acetylene Gas Company, Ltd., the plumbing of which was carried out by Messrs. Lowden & Co. The cathedral lead lights for front were supplied by Mr. W. A. Roberts. The contractor for the entire work was Mr. James Kidd, Belfast, who has carried out the work under the supervision of Mr. S. K. Kierke, O.E., Assistant Principal Surveyor, Board of Works.

**COUNCIL SCHOOL, SEEDLEY.**—A new council school has been erected at Seedley, Salford. Accommodation is provided on three floors for 420 boys, 370 girls, and 380 infants, a total of 1,170 places. Each department is provided with a central hall, around which the classrooms are arranged. The estimated cost of the building was 15,510*l*, and of the furniture about 1,080*l*. The architect is Mr. Henry Lord, and the contractors Messrs. W. Southern & Sons, of Salford.

**WARWICK-ROAD NEW COUNCIL SCHOOLS, WALTHAMSTOW.**—These schools were opened on September 16 last by Councillor Lord. The buildings have been erected on a site purchased by the late School Board, and the various departments are arranged as follows:—A two-floor block to accommodate 320 girls on the ground floor and 320 boys on first floor on the 10 sq. ft. basis; a single floor block provides accommodation for 400 infants on the 9 sq. ft. basis, making a total of 1,040. Each department has two entrances. Provision is made for manual instruction for boys; and a laundry centre for girls in separate buildings. A caretaker's house adjoins the main entrance in Warwick-road, and an additional entrance is provided in Chestnut-avenue. The schools are planned on the central hall system with class-rooms grouped around same. Teachers' rooms, large cloakrooms, lavatories, stores, etc., are also provided. The buildings are faced with Adderley Park red pressed bricks with string courses of white bricks, and Portland stone dressings; the whole are designed economically with a view to securing well lighted and ventilated rooms. There are glazed brick dados 4 ft. high throughout, and the walls of staircases are entirely glazed. Above the dados the walls are plastered with cement. The floors and staircases are of fireproof construction, those of halls and class-rooms are covered with pitch-pine blocks, the galleries being sloped instead of stepped. The lighting throughout is by electricity installed by the Council. The ventilation is on the natural system, with air inlets in walls and Boyle's ventilators on roof, and the heating is on the low-pressure system, supplied by Musgrave & Co. Messrs. H. Knight & Son, of Tottenham, carried out the work at the contract price of 16,722*l*, from the designs prepared by the Committee's architect, Mr. H.

Prosser. A feature in the design are the octagonal turrets rising out of a square base, the stone weatherings falling in an octagon at various heights, and the octagonal of the two-floor block, bearing the County arms, also panels and caps. The entrances, relieve the red brickwork. **TOWNS HALL, WALSALE.** The new town hall and council house at Walsall have just been opened. Mr. J. S. Gibson was the architect for the work, his designs, which were published in our issues for October 6 and 13, 1904, being accepted on May 13, 1905, being accepted in principle. The total cost of the scheme has been estimated at 100,000*l*.

**PROPOSED WORKHOUSE EXTENSION, BAKES.** Plans have been prepared by Mr. Bakes, Architect to the North Bromley Board of Guardians, in conjunction with Mr. Hitchen, Architect to the Local Board, for the extension of the workhouse. The principal building, which will occupy a site at the rear of the existing workhouse, will be two stories in height, providing accommodation for 109 patients. The site of the building will be divided into two parts, a female wing on the one side, and a male wing on the other. Each side, having a right-angle, will give access to the first floor. The central room in the centre, fitted with glass screens, will command the wards on each side. Next to the nurses' room provision is made for two special maternity wards, each 20 ft. by 12 ft. 6 in. in height, and each 20 ft. by 12 ft. 6 in. in width. Male and female day rooms will adjoin these wards on the two sides. Two small rooms, each containing one bed, also arranged for on this floor, with bath and other conveniences. A staircase leads from the administrative block to the 63 ft. long and 24 ft. wide, a twenty-one beds will be placed, the arrangements on the ground floor are almost the same on the first floor, except that here two rooms will be constructed of a size sufficient to accommodate three patients each, these occupying corresponding positions to the maternity wards below. Boyle's system of ventilation will be adopted, and the heating of the four infirmary wards will be effected by means of the improved Linton hospital stoves. The floor of the main ward will be of Hennebique's patent ferro-concrete. In addition to the temporary accommodation of male patients on admission to the workhouse, and a new mortuary, will be erected. A further two-story dormitory is to be constructed as an extension of the main male block, providing accommodation for thirty-four beds. The site of the new buildings will be faced with local stone, and the roofs will be covered with dark blue Westmorland slates, in keeping with the roofs of the existing building. The floor throughout will be of pitch-pine wood blocks, except for the corridors and lavatories, where mosaic work will be used. A large chimney will be erected on a vacant site close to the laundry. It will be of octagonal shape 40 yds. high with a flue 3 ft. in diameter. The estimated expense of the whole of the alterations amounts to 18,857*l*, but this includes the cost of constructing new farm buildings.

**HIPPODROME, MANSFIELD.**—Work has just been commenced on a new hippodrome which is to be erected in this town. The building will be substantially of stone, measuring 100 ft. long by 60 ft. wide, and the walls will be 24 ft. in thickness. It will contain a 40-ft. ring, together with a stage, with proscenium 30 ft. by 25 ft. Accommodation will be provided for 1,000 persons, pit, circle, boxes, promenade, and gallery. A refreshment-room will lead off the promenade. The work has been planned by Mr. E. Bryan Dean, architect, Mansfield, and the cost will be over 3,000*l*.

**MUNICIPAL BUILDINGS, SOUTH SHIELDS.**—The new South Shields Municipal Buildings, of which illustrations were given in our issue for May 20, 1905, were opened on the 27th ult. The work has been carried out at a cost of 48,000*l*, from plans prepared by Mr. Ernest F. Peach, architect, whose designs were accepted in competition. The contractors were Messrs. Robert & Sons, of Manchester.

**HOSPITAL, MOORCROFT BRANCOFT.**—The hospital which is being erected at Moorcroft, under the direction of the South Staffordshire Joint Small-Pox Hospital Board is now nearing completion. It has been built by Messrs. Cave & Sons, of Wolverhampton, from the designs and specifications of Mr. George Green, the Wolverhampton Borough Engineer. The building contract was let for 8,493*l*. Messrs. Dallow & Son, of Black-lea, are laying out the grounds, and are doing the work relating to drainage, sewerage, and water supply, at an estimated cost of 1,000*l*. Electric lighting is being installed by Messrs. Dobbs & Co., of Wolverhampton, are planning the grounds.

**LIBRARY, MORLEY.**—The new Free Library at Morley was laid on



26th ult. The plans have been drawn by Mr. W. E. Putman, the Borough Engineer, and show accommodation on the ground floor for news and magazine room, 48 ft. by 30 ft.; a lending library, 40 ft. by 30 ft.; to accommodate about 20,000 volumes; reference library, 25 ft. by 21 ft. 6 in.; ladies' room, 25 ft. by 21 ft. 6 in.; borrowers' space, 19 ft. by 16 ft.; librarian's room and staff-room, all the rooms being 15 ft. in height. On the first floor will be two rooms, one of which will be used to contain objects of local interest, and the other and larger room as a lecture-room or general museum. On the lower ground floor will be a juveniles' room, 48 ft. by 30 ft. and 12 ft. high. The building, which will be fireproof, is being built of Morley stone. The whole of the doors will be laid with wood blocks on concrete, and the furniture and fittings on the ground floor will be of oak, whilst the wood in the juveniles' room will be of stained deal.

### SANITARY AND ENGINEERING NEWS.

**AYR HARBOUR.**—The architect, Mr. William McVellie, C.E., has issued his decision in the reference between Messrs. Kennedy Brothers, contractors, Glasgow, and the Ayr Harbour Trustees, arising out of the contract for the reconstruction of the North Quay wall of Ayr Harbour. Messrs. Kennedy Brothers claimed a sum of £7,797, 11s. 1d., and the Harbour Trust tendered a sum of 19,464, 10s. 8d. in settlement of the claim. The arbitrator has found in the claimants' favour to the extent of £5,411, 10s. 5d., and disallowed their claim for the balance. The Harbour Trust's counterclaim for 1,660, of penalties was disallowed with expenses.

### FOREIGN.

**SOUTH AFRICA.**—The building boom at Bloemfontein is at an end. Prices are out so fine in the trade that contracts can hardly be obtained, except at unremunerative prices. This recklessness in tendering is accompanied by a decline in work. For a large building about to be commenced in the town the difference between the highest and the lowest tender was about 6,000. The plans of Messrs. Rogers & Ross, architects, have been accepted for the Wesleyan church, Kimberley, the cost of the building being 9,000.

### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Owing to the abolition of the office of Chief Architect to the Transvaal Government, which office was held by Mr. William Bevan, F.R.I.B.A., until quite recently, he has resumed practice in London at 90, Parliament-chambers, Great Smith-street, Westminster, London, S.W. Mr. W. Curtis Green has removed his offices to 14 Gray's Inn-square, W.C. Mr. W. H. Seth-Smith has, from Jan. 24 last, admitted into partnership Mr. William Ernest Monro, who has been associated with him in practice for the past fifteen years. The practice will be carried on in future under the style of Messrs. Seth-Smith & Monro. Mr. Edmund Kirby, of Cookstreet, Liverpool, has taken into partnership his two sons, Mr. Francis Joseph and Mr. Edmund Bertam Kirby. The firm will henceforth be known as Edmund Kirby & Sons.

**APPOINTMENT.**—Mr. A. F. Watson, architect, of Sheffield, has been appointed consulting architect to Northamptonshire County Council Education Committee, and Mr. G. H. Lewin, for nine years works architect of Messrs. Cadbury Bros' works at Bourneville, has been appointed building inspector to the same authority.

**MEMORIAL LYCH-GATE, SALHOUZE, NORFOLK.**—A lych-gate has been erected at Salhouse in memory of the late Rev. Thomas Francis Boddington, M.A. It is of carved oak, roiled with red tiles, and was designed by Mr. Herbert J. Green, of Norwich, the work being carried out by Mr. R. W. Riches, of Postwick.

**DISCOVERIES AT CARSHALTON.**—The discovery of an hitherto unknown fortified British village has, according to the *Daily Graphic*, been made near Carshalton. Some months ago, while the foundations of a new hospital for convalescents, to be erected by the Metropolitan Asylums Board, were being dug at Carshalton-on-the-Hill, several objects of early British manufacture were found, which led to the discovery of earthenware, which had been entirely levelled at some unknown date, and the ground converted into arable land. Recently a portion of the site was excavated for the purpose of ascertaining the history of the settlement, which there is little doubt was the original site of Wallington, the "Waleton," or "walled town," as Wallington is described in the *Domesday*. The area of the oppidum appears to have been about four acres, and from the evidence obtained by Messrs. Collyer & Roberts, who undertook the investigation, it appears that the settlement was occupied until about A.D. 50, when it was abandoned, probably

owing to the Roman invasion. A large number of objects of the neolithic and bronze age date have been discovered, together with internments, both cremated and uncremated. The pottery found is reported to include some very interesting four-handled vessels, and some perforated tiles, hitherto unknown to collectors here. These are believed to have been used for placing cooking pots upon, thus allowing the heat from the fire to have access. A number of loom weights with spindle whorls were discovered, showing that weaving was carried on, while an amber bead, Gaulish pottery, and a foreign stone implement, indicate trade with the Continent.

**BATTERSEA POLYTECHNIC.**—The Technical Day College, University, and other courses, and the day School of Art, were opened on the 18th ult.; and all evening classes on Monday, the 25th ult. During the vacation structural alterations have been made in order to provide further accommodation for drawing classes connected with the building trades, and two new drawing offices are now being completed which will accommodate from forty to fifty students each. Additions have been made to the staff of the secondary day schools, in order to meet the large increase in attendance, owing to the number of London County Council junior and probationer scholarship holders resident in the district, whose scholarships are tenable only at secondary schools. Seventy-two girl scholarship holders have been admitted to the girls' school, pending the erection of new buildings for both boys and girls, is now being held in temporary premises on North Side, Clapham Common. Both the boys' school at the Polytechnic and the girls' school are practically full, and a large number of girls who applied for admission have had to be refused.

**THE PLUMBERS' COMPANY.**—At the quarterly court held at the Guildhall on the 29th ult. Mr. W. D. Garde, M.A., F.S.A. (Architect to the Ecclesiastical Commissioners), was sworn into the office of Master of the Worshipful Company of Plumbers; and Mr. Adrian Pollock (City Remembrancer) and Mr. Charles Hudson, Registered Plumber, into the offices of Warden and Renter Warden respectively, on election for the ensuing year.

**SOUTH AFRICAN WAR MEMORIAL, ETON COLLEGE.**—For the war memorial in the chapel at Eton three large tapestries have been hung against the east wall. The central piece, above the altar, is the "Adoration" subject by Sir Edward Burne-Jones which formerly was hung on the south wall. It is now flanked on either side by new tapestries, worked in the looms at Merton Abbey, and containing figures of angels after those of the Burne-Jones windows in Salisbury Cathedral. The new tapestries are lengthened with a design of scroll and foliage work carrying shields of the coat-arms of Eton and the Universities. An inscription is as follows:—"Hæc Mertonensi textrina imagines militum suorum memores posuerunt Etonenses—MCCCXCVII."

**MUNICIPAL TRADING, LEICESTER.**—The half-yearly report of the several departments for supply show net profits of 30,785, 1s. 5d. derived from the gas, 7,584, 5s. 5d. from the water, and 5,967, 6s. 7d. from the electric lighting undertakings of the borough. The net profit in respect of water supply is carried to the special fund of the Derwent Valley scheme for bringing water to Leicester, Derby, Nottingham, and Sheffield; and the other profits will be applied in relief of the rates.

**ANTIQUARIAN DISCOVERIES AT MELROSE.**—Various discoveries have just been made during the excavations at the Roman camp at Newstead, near Melrose. The existence of this camp has been known to antiquaries for many years, but lack of funds hitherto prevented any researches being undertaken. The work has, however, been proceeding for some time, and has resulted in revealing various relics of the Roman occupation. At a depth of 12 ft. a perfectly preserved Roman altar, 4 ft. in height and of square formation, was found. The altar is made of stone, and on the top is a small, circular-ridged indentation. One side is covered by accurately chiselled Roman characters, which are interpreted thus:—"To the great and mighty Jupiter, Carolus, Centurion of the 20th Legion, the valiant and victorious, cheerfully, willingly, and deservedly paid his vow." Proceeding with the sinking, the workmen, on getting to a depth of about 30 ft., struck the top of a stone which, when removed, revealed the top of a well. A little to the south of the well two walls of masonry have been laid bare. These walls, running parallel, are about 4 ft. high and 2 ft. apart, and it is assumed that they enclosed a drain or water-pipe. The excavations are being undertaken under the auspices of the Antiquarian Society of Scotland.—*Times*.

**QUEEN VICTORIA MEMORIAL IN YORK MINSTER.**—A memorial to Queen Victoria has been unveiled in the Lady Chapel of York Minster. The memorial, which takes the form of a triptych, represents the scene at Bethlehem when Christ was born. Mr. G. F. Bodley, R.A., is responsible for the designs, and Mr. L. A. Turner, the sculptor, has executed the work. Each of the three panels, carved in

Bath stone, is 5 ft. 6 in. high and 3 ft. 3 in. wide, the relief projection from back to front being about 18 in.

**THE LONDON BUILDING ACTS.**—The General Purposes Committee of Paddington Borough Council reported at the Council meeting on Tuesday that they had considered the London Building Acts Amendment Bill, and were of opinion that a new Building Act for London, codifying the present laws with such amendments as may be deemed desirable therein, should be formulated, but before any such Bill is drafted the whole question should be reported upon by a Royal Commission. The discussion upon the matter was adjourned.

**CLERGY AND ARTISTS' ASSOCIATION.**—The seventh Exhibition of the Clergy and Artists' Association will be opened on Thursday, October 19, in the Laing Art Gallery, Newcastle-on-Tyne, lent by the authorities. The Exhibition will include painting, sculpture, stained glass, wall decoration, cartoons, embroidery, etc., and will be open for three months. Mr. Reginald Hallward will give an address on art at the opening of the Exhibition.

**ARCHITECTS' BENEVOLENT SOCIETY.**—In response to the special appeal made on behalf of the Architects' Benevolent Society by its President (Mr. John Belcher, A.R.A.) Mr. Walter Emden has offered to contribute 50l. provided nine other gentlemen will give the same amount. The President and Council will be glad to hear from gentlemen willing to support Mr. Emden's offer, as the Society, we are informed, is greatly in need of funds.

### CAPITAL AND LABOUR.

**THE LONDON BUILDING TRADE.**—We have pleasure in stating that a satisfactory agreement, by which all points of difference have been settled, has been come to between the London Master Builders' Association and all the trades except the mill-sawyers and the plasterers, and that in the case of these two trades negotiations are being carried on. Next week we may be able to give further particulars.

### Legal.

#### APPLICATION UNDER THE LANDS CLAUSES AND SETTLED LANDS ACTS.

IN the Vacation Court, on Wednesday, Mr. Justice Bray had before him the case of *ex parte* the Governors of Christ's Hospital and St. Bartholomew's Hospital; and *in re* the Lands Clauses Acts; and *in re* the Settled Lands Acts, on a petition for payment of money out of court.

Mr. Mulligan, K.C., in support of the petition, said it was an application for payment out of court of the sum of 71,460l. under the Lands Clauses Acts and the Settled Lands Acts. The money was paid into court by St. Bartholomew's Hospital. Large sums had been paid into court to the credit of Christ's Hospital, an Act of Parliament enabled the Hospital to sell the land, and it was specially mentioned that the money was to be expended in buildings or invested. On a former occasion a sum of 150,000l. was paid out of court for purposes for which it was then needed. Since that time another small sum had been paid out of court, and his application was that this sum of 71,460l. should be paid to the treasurer of Christ's Hospital on the same terms that the money was paid out in 1902. Counsel had got a certificate from the Board of Education, and as far as he (counsel) could see everything appeared to be in perfect order. His submission was that the Hospital could either expend the money in the erection of buildings or re-invest it as many times as they liked.

Mr. Bowman, representing St. Bartholomew's Hospital, objected to paying the costs of this petition. His clients had already paid for certain re-investments in land, and he submitted that it would be reasonable that they should be dismissed from the proceedings and the amount carried to the account of Christ's Hospital. He understood that some of the money was to be expended in the erection of a girls' school.

In the result, his lordship made an order for the payment out of court of the sum asked for.

#### OCCUPATION OF UNDERGROUND ROOMS.

ON Tuesday last, at the Kensington Petty Sessions, Mr. W. H. Collbran, "Coombe," Inner Park-road, Wimbledon, answered to three summonses taken out against him by the Kensington Borough Council for unlawfully suffering to be occupied the underground rooms at the premises 1-8, 9-16, and 17-28, Sussex Mansions, Sussex-place, W. The mansions are in three blocks of flats, occupied by tenants, and the underground rooms are occupied by caretakers when



the flats are empty, porters at the service of the tenants at other times.

Mr. Collbran said he built the flats, and the underground rooms had been occupied by porters and caretakers for the last ten years.

The Chairman: "Ten years!"

Much correspondence had been going on lately between Mr. Collbran and the Borough Council, with the result that the Public Health Committee visited the underground rooms, and then directed these proceedings to be taken. The Inspector reported that in the block Nos. 1-3 the ceiling of the underground room was below the level of the pavement, whereas the section of the Act required that it be 3 ft. above. The area in front was closed.

Mr. Collbran at once admitted that the rooms did not comply with the Act, but gave as his defence that the rooms were used in conjunction with those above. "If the flats did not exist," he said, "there would not be rooms underneath."

Mr. Chambers Leete: If that point were good, it would be an answer to the summons. But these rooms form no part of the letting to the tenant, although it is true that with the letting of a suite of rooms defendant agrees to render certain services and gives the services of the porter. The rooms in question, however, are not let to the tenants.

Mr. Collbran: "The porters are servants of the tenants."

Mr. Collbran, in explaining to the Bench, said that before he commenced to build the flats he submitted the plans to the District Surveyor, and no fault was found with them. It would have been easy enough to have remedied any fault before he started to build, but now, although he wished to meet the views of the Council, he found it impossible as he had no more available space, and so his hands were tied. He pointed out that there had never been a case of illness in these rooms, although they had been occupied for so long.

Mr. Leete asked for an adjournment. He said the defendant had written to the Public Health Committee making a certain suggestion, and the letter would be dealt with at the Borough Council meeting.

Adjourned for a fortnight.

## PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.\*

18,980 of 1904.—W. H. DELVE: Household Fire Grates and the like.

This relates to a device for use in connexion with household fire grates, the object being to provide a contrivance which, when placed in the back of the grate, shall provide an air heating-chamber whereby hot air may be passed to the room for heating purposes. This device comprises a front plate provided with a suitable number of openings, having its top part preferably curving over and formed with side pieces, so that when placed in position against the back of the grate a more or less enclosed receptacle is formed, having an open bottom, through which air passing through the bars of the grate may enter, and in this chamber the air is heated, and may then pass through the openings in the front for heating the room.

21,743 of 1904.—C. D. HUNTER: Stair Treads and the like.

This invention relates to stair treads and the like, and has for its object to make the tread non-slipping. According to the invention the steps, which are made of stone, artificial or otherwise, have grooves conveniently undercut formed in the tread, these grooves being filled with lead or other suitable material. It is preferable to make the grooves parallel to each other and to the edge of the step.

23,670 of 1904.—E. J. OWEN: Domestic Fire Grates and the like.

This relates to a device for use in assisting the production of a bright fire, the said device consisting of a casting with a hollow or concave back, a projecting convex front or face tapering from its base to its apex, with a flat, narrow face at the back, forming a flange on its two sides and apex continuously. Open spaces are provided with undercut or bevelled edges at the back, the said back and base being at a suitable angle. The device is placed in a domestic fire grate or the like.

23,762 of 1904.—A. PASS: Machines for Planing Mitres and the like.

A machine for planing mitres and the like, consisting in the combination of a base board provided with guide faces, top and bottom guide rails attached to end brackets and to the junction of the guide faces, a plane with grooved sides adapted to reciprocate in the said rails, and means for operating the plane, consisting of a level handle pivoted to the plane and having a toothed sector adapted to engage with a fixed rack.

\* All these applications are in the stage in which opposition to the grant of patents upon them can be made.

1,902 of 1905.—J. WENDLER: Revolving Doors.

This relates to a rotating door, the leaves of which, carried by a rotating ceiling and adapted to revolve normally about a common central axis, can each be swung upon a vertical side axis, characterised by the fact that two adjacent leaves consist of two single leaves in order to firstly prevent the leaves from jamming together when the rotating door is opened, and secondly to enable the rotating door to be used also as a swing door, the said two single leaves of the doors being kept locked by arms rotating on pins, entering grooves in the upper edges of the leaves and forming a cross, and which bear at their free ends against a vertical adjustable sleeve, so that by lifting the sleeve all the leaves of the doors can be simultaneously released.

4,951 of 1905.—E. PRESTON: Machines for Punching Roofing and like Slates.

This relates to a slate-punching machine having a tubular head having a vertical hole, which hole has a groove at one side terminating in or passing into an inclined slot in the said head, and the combination with the said grooves and slotted tubular head of a plain or cylindrical punch, carrying spindle with projecting pins for engaging with and working in the inclined slot of the tubular head.

7,232 of 1905.—E. H. COX: Composition for Cleansing and Renovating the Polished or Painted Surfaces of Wood, Stone, or other Materials.

This relates to a composition for cleansing and renovating the polished or similarly treated surfaces of wood and the like, consisting of 11 per cent. of sulphuric acid, 11 per cent. of salt, 49 per cent. of water, 6 per cent. of glycerine, 22 per cent. of adhesive thickening substance, and 1 per cent. of aromatic volatile oil. In making the composition the salt should be first dissolved in water, then the acid added, and stirred until the solution is thoroughly mixed. The solution is then allowed to stand for a few hours. The adhesive substance, glycerine, and aromatic oil are then added, and the whole thoroughly mixed.

13,545 of 1905.—F. HARRIS: Fixed or Portable Shelves or Work Boards for use at Potteries and other places.

This relates to the construction of portable or fixed rectangular, square, or other desired shape of shelves or work boards of various sizes, consisting of a wood framing having a single sheet or piece, or two or more sheets or pieces, of perforated zinc or other like suitable metal screwed against one of its sides to extend from one end to the other end, and from one side edge to the opposite side edge of same.

13,671 of 1905.—G. L. MOUCHEL: Reinforced Concrete Structures.

This relates to means for anchoring a metal bar to the concrete in which it is embedded, comprising straps or links adapted to be passed partially round the bar and projecting into the concrete, and secured to the bar by cotter pins passing through a hole or holes in the straps.

24,028 of 1904.—L. WEILANDT: Boundary Stones or Posts.

This relates to a boundary stone or post constructed with its foot, or lower part, in the form of a screw, by means of which it can be readily inserted in position by screwing into the ground without having first to dig a large hole for that purpose. The underside of the foot of the boundary stone or post may be formed with a central recess, adapted to receive a small ball of glass, earthenware, or other hard material for the purpose of facilitating the centring of the boundary stone or post and its more convenient adjustment in position.

631 of 1905.—L. B. DAVIS: Device for Packing or Joining Tubes or Pipes.

This relates to means for making a fluid-tight joint between a tube and its plates, in combination with a ferrule, for use with a conical seating, consisting of a cylindrical body bored to fit the tube, a screw thread upon said body, one end of which body is reduced in diameter to a comparatively thin substance, splits or cuts in said thin end, a ductile metal located in said splits, and means for rotating or otherwise thrusting forward the said ferrule.

676 of 1905.—JOHN RUSCOE & Co., Ltd., and E. PASS: Means for Connecting Branch Service Pipes with Mains.

This relates to a stop-tap ferrule, consisting of a plug screwed for connecting to the main, and internally screw-threaded, terminating in a valve seat, a tube having a gland for a spindle, a screwed union joint connecting the plug and tube together, fluid-tight, a branch formed on the tube to connect to the branch pipe, internal screw threads formed in the tube above the outlet of the branch, a screw valve carried on the valve spindle adapted to screw down on the valve seat in the plug, and up in the screw tube to govern the supply of fluid through the branch, and enable the said branch to be used full bore.

2,357 of 1905 G. RICHMAN: Storage Pipes and the like.

This relates to a safety storage pipe, characterised by the arrangement of shutters, provided with adjustable and automatically revolving valve chains, which, when the pipe is full, prevent the overflow opening, so arranged that the flood water does not rise above the level of the overflow tank, and so enable the drain water to flow away freely, but the flood water in the outlet channel rises above this level, the valve will prevent the drain water from falling down into its closed position, whilst the shutter permits of the drain water flowing automatically as soon as the condition allows of it.

## SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Sept. 20.—By J. DAZIEL (at Darnley). Glencorn, Dumfries.—The farms of Glencorn and Lower Glencorn, 135 acres, for sale.

Sept. 23.—By COOKS BROS. (at Leeds). Hengywyth Farm, Montgomery.—Freehold, 100 acres, for sale, for £1,500.

Sept. 25.—By C. R. HARRIS (at London). Shepherd's Bush.—230, Goldsmiths' C. 674 yrs., for £1,000.

Acton.—2, Stanley-rd. (laundry), u.s. 614 yrs., for £10,000.

By F. DODD. Hackney.—71, Amhurst-rd., u.s. 644 yrs., for £1,750.

29, Doves Park-rd., u.s. 60 yrs., for £1,000.

By NICHOLAS, DEAN. Staplehurst, Kent.—"Medlock" (holdings), 64 acres, for sale.

By A. SAVILL & SONS. Kennardington, Kent.—The Manor Farm Estate, 607 a. 0 r. 29 p. 10 in., for sale.

Sept. 26.—By BROWNE & TAYLOR. Paddington.—29, Lushill-rd., u.s. 57 yrs., for £1,000.

By J. DODD. Canning Town.—50, 52, and 54, Woodman-st., for sale, for £81,18s.

By LEWIS & STAIN. Wood Green.—5 and 10, Selborne-rd., u.s. 78 yrs., for £1,000.

By CHARLES WATKINS. Hadley, Middlesex.—10 and 11, Cockstern-rd., u.s. 98 yrs., for £1,000.

New Southgate.—10, St. Paul's-rd., u.s. 41 yrs., for £550.

37, Friern Barnet-rd., u.s. 48 yrs., for £1,000.

Friern Barnet.—1 and 2, Addison-villas, for sale.

By FARRER, WATKINS. Canonbury.—80, Clapham-rd., u.s. 42 yrs., for £1,000.

Finsbury Park.—25, Elm-rd., u.s. 71½ yrs., for £1,000.

Highgate.—3, Liddard-rd., for sale, for £1,000.

11, Lansdowne-ter., u.s. 70 yrs., for £1,000.

Crouch End.—37, Woodlark, u.s. 78 yrs., for £1,000.

21, er. 48s. Hornsey.—39 to 57 (odd), Camphor-rd., u.s. 67 yrs., for £1,000.

By NICHOLAS, GREAVES & Co. (at Shepherd's Bush). 600 a. 0 r. 20 p. 10 in., for sale.

By J. KIRROW & SONS (at Lambeth). Egloskerry, Cornwall.—"Trethick Farm," 235 a. 0 r. 19 p. 10 in., for sale.

North Hill, Cornwall.—"Lyther Farm," 184 a. 2 r. 17 p. 10 in., for sale.

Linkinhorne, Cornwall.—"Pleasant's Yolland Farm" and "Ley Mill Cottage," 87 a. 2 r. 11 p. 10 in., for sale.

St. Ives, Cornwall.—"Cargibbet Farm," 63 a. 1 r. 24 p. 10 in., for sale.

St. Ives, Cornwall.—"Newstones Farm," 83 a. 8 r. 11 p. 10 in., for sale.

Liskeard, Cornwall.—"Woodhill" and "Old Trewoy Farm," 157 a. 8 r. 15 p. 10 in., for sale.

Sept. 27.—By J. DAVEY & Co. Old Charlton, Kent.—56, Wellington-rd., u.s. 88 yrs., for £1,000.

By DYER, SON, & HILTON. Brixton.—414, Brixton-rd. (h), u.s. 20 yrs., for £1,000.

19, Canterbury-rd., u.s. 60 yrs., for £1,000.

By E. & S. SMITH. King's Cross.—39, 41, and 43, Collier-st., for sale, for £1,000.

104 and 110, King's Cross-rd., u.s. 144 yrs., for £1,000.

By MADDISON, MELES, & MADDISON (at Yarmouth). Potter Higham, Norfolk.—"The Bower Farm," 92 acres, for sale.

Sept. 28.—By C. C. & T. MOORE. Forest Gate.—20, 22, 24, and 26, Clare-rd., u.s. 71 yrs., for £1,000.

Limehouse.—54, Abchurch-lane, u.s. 64 yrs., for £1,000.

By STICKSON & SONS. Shepherd's Bush.—12, Friarville-gate, u.s. 64 yrs., for £1,000.

Walworth.—40, Farnley-rd., u.s. 67 yrs., for £1,000.

192, South-st., u.s. 47 yrs., for £1,000.

Dulwich.—58, Dulwich-rd., u.s. 72 yrs., for £1,000.

Holloway.—80 and 91, Colyton-st., u.s. 65 yrs., for £1,000.

81, Thorpe-rd., u.s. 48 yrs., for £1,000.



By RUTTERS. Kington—18A, Pembroke-pl. (studios), f., y. 1251. ....	21,025
By TESSIDDER & CO. Dartmouth, Beds.—"Westleigh" and 1½ acres, f. p. ....	800
By VASLEY & LOCKING. Luton—28, Friar-ch., f., s. r. 421. ....	568
By CLAPHAM—Larkhall-ls., f.g. rents 161, rever- sion 57 yrs. ....	568
By FOSTER & CRANFIELD (at Eatham). Eatham, Cheshire.—The Poppy-Turvey Rail- way (as a going concern) ....	110
Sept. 29.—By FISHER, STANHOPE, & DRAKE. Stoke Newington—31, Manor-rd., u. 65 yrs., g. r. 94, s. r. 502. ....	505
By HORNBLLOWER & FLOWER. Sutton, Surrey.—Benthill Wood-rd., "Oak Lodge," L. ....	1,050
By F. VASLEY & SON. Stoke Newington.—29, Queen Elizabeth's- walk, u. 70 yrs., g. r. 71, 10s., s. r. 551. ....	450
By VENTON, BULL, & COOPER. Yarley, Hunts.—The Broadway, a block of freehold land, 15 1/2 a. 22 p. ....	850
Hockney—88, 90, 92 to 100 (even), Fritchard's- rd. (s.), y. r. 4081. 16s. ....	4,495
Fritchard's-rd. (rear of), storehouse and premises, also factory, saw mills, etc., f., v. r. 1171. 16s. ....	1,800
Wharfedale, "London Wharf," f., y. r. 1001. ....	2,000
1 and 1½, Wharfedale, f., s. r. 901. ....	1,400
1 and 2 (even), Wharfedale, f., s. r. 1871. 4s. ....	1,510
Wharfedale, freehold storehouse, workshops, yard, and stabling, w. r. 1641. 18s. ....	1,010
1 to 5, Ad-phi. L., w. r. 1871. 16s. ....	900
Ad-phi. L., 16, rents 18s., reversal in 54 yrs. ....	900

## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESTROYED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the Editor, who reserves the right to reject if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## MEETINGS.

FRIDAY, OCTOBER 6. Architectural Association.—Annual General Meeting: President's Address and Distribution of Prizes. 7.30 p.m. Royal Sanitary Institute.—Dr. A. Wellesley Harris on "Biometrical Statistics." 7 p.m. SATURDAY, OCTOBER 7. Incorporated British Institute of Certified Carpenters. Mr. H. Adams on "Timber and Brains." 6 p.m. Sanitary Inspectors' Association (South-Eastern Centre). Visit to the Garden City, Letchworth. MONDAY, OCTOBER 9. Liverpool Architectural Society.—Opening Address by the President, Mr. Philip C. Thicknesse. 6 p.m. TUESDAY, OCTOBER 10. Royal Institute of Public Health (Harben Lectures).— Professor Thomas Oliver, M.A., on "Some of the causes caused by the Air we Breathe in the Home Factory, and the Mine, including a Description of Calculus Disease or Compressed Air Illness." L. 6 p.m. WEDNESDAY, OCTOBER 11. Royal Sanitary Institute.—Dr. E. J. Steegmann on "Elementary Physics." L. 7 p.m. THURSDAY, OCTOBER 12. Royal Institute of British Architects (Newcastle-on- Tyne Meeting).—Reception by the Mayor and Mayoress of Newcastle at the Barras Bridge Assembly Rooms. 8.30 p.m. Royal Institute of Public Health.—Harben Lecture, by Professor T. Oliver, M.A., 6 p.m. Royal Sanitary Institute.—Dr. E. J. Steegmann on "Elementary Physics." L. 7 p.m. FRIEDLAND Electric Railway.—By permission of the L.M.S. a visit has been arranged to the Electric Generating Station, Lote-road, Chelsea. 2.30 p.m. FRIDAY, OCTOBER 13. Royal Institute of British Architects.—9.30 a.m.: visit to Tyne-mouth Priory. 1.30 p.m.: Luncheon; the Institute will be entertained by the Northern Architectural Association at the Barras Bridge Assembly	
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Rooms. In the afternoon visits to places of interest:  
The Castle and Black Gate (under the guidance of Mr. J. Oliver Heslop, M.A., F.S.A.), the Cathedral, the Guildhall, the Laing Art Gallery. 7.30 p.m.: The Annual Dinner at the Old Assembly Rooms.  
Royal Sanitary Institute.—Dr. E. J. Steegmann on  
"Elementary Chemistry." 7 p.m.

SATURDAY, OCTOBER 14.  
Royal Institute of British Architects.—Visit to Durham Cathedral (under the guidance of Mr. C. Hodgson Fowler, M.A.) and to Durham Abbey (under the guidance of Mr. C. C. Hodges, F.S.A.). [The Edinburgh Architectural Association will entertain at lunch on Monday, 16th, members who desire to extend their Northern Visit to Edinburgh and inspect the Goodyear Exhibition of Architectural Refinements.]

## PRICES CURRENT OF MATERIALS.

\* \* \* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	£ s. d.
Hard Stooks. ....	1 8 0 per 1000 alongside, in river.
Rough Stooks and Facing Stooks. ....	1 4 0 " " " "
Shippers. ....	2 0 0 " " " "
Pietions. ....	1 7 0 " " at railway depot.
Bed Wire Cuts. ....	1 14 0 " " " "
Best Fareham Red Best Red Pressed Kilburn Facing Best Blue Pressed Staffordshire ...	3 12 0 " " " " 5 0 0 " " " " 4 2 6 " " " " 4 7 6 " " " "
Do. Bullnose Best Stourbridge Fire Bricks. ....	4 0 0 " " " "
GLAZED BRICKS. Best White and Ivory Glazed Stretchers. ....	12 0 0 " " " " 11 0 0 " " " "
Quoins, Bullnose, and Flats. ....	16 0 0 " " " "
Double Stretchers Double Headers. ....	19 0 0 " " " " 16 0 0 " " " "
One Side and two Ends. ....	19 0 0 " " " "
Two Sides and one End. ....	20 0 0 " " " "
Spalls, Cham- fered, Squints Best Dipped Salt Glazed Stretch- ers, and Headers	20 0 0 " " " " 12 0 0 " " " "
Quoins, Bullnose, and Flats. ....	14 0 0 " " " "
Double Stretchers Double Headers. ....	15 0 0 " " " " 14 0 0 " " " "
One Side and two Ends. ....	15 0 0 " " " "
Two Sides and one End. ....	15 0 0 " " " "
Spalls, Cham- fered, Squints Second Quality White and Dipped Salt Glazed. ....	14 0 0 " " " " 2 0 0 " " less than best.
Thames and Pit Sand. ....	7 0 per yard, delivered.
London Ballast. ....	5 9 " " " "
Best Portland Cement. ....	27 0 per ton, " "
Best Ground Blue Lias Lime	20 0 " " " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime. .... 12s. 6d. per yard, delivered.

Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dep.

## STONE.

BATH STONE—delivered on road wag- ons, Paddington Depot. ....	s. d. 1 6½ per ft. cube.
Nine Elms Depot. ....	1 8½ " " "
PORTLAND STONE (20 ft. average). Brown Whitbed, delivered on road wagons, Paddington depot, Nine Elms depot, or Fimlico Wharf. ....	2 1 " " "
White Basebed, delivered on road wagons, Paddington depot, Nine Elms depot, or Fimlico Wharf. ....	2 2½ " " "
Ancestor in blocks. ....	1 10 per ft. cube, deld. rly. depot.
Greenhill. ....	1 10 " " " "
Darley Dale in blocks. ....	2 4 " " " "
Red Corshill. ....	2 2 " " " "
Rosebarn Red Freestone. ....	2 0 " " " "
Red Mansfield. ....	2 4 " " " "
YORK STONE—Robin Hood Quality. Scrapped random blocks 2 10 " " "	
6 in. sawn two sides landings to sizes (under 40 ft. super.) 2 3 per ft. super. ....	
6 in. rubbed two sides ditto, ditto. ....	2 6 " " "
8 in. sawn two sides slabs (random sizes) 0 11½ " " "	
2 in. to 2½ in. sawn one side slabs (random sizes) 0 7½ " " "	
1½ in. to 2 in. ditto, ditto 0 6 " " "	
HARD YONG. Scrapped random blocks 3 0 per ft. cube, ....	
6 in. sawn two sides, landings to sizes (under 40 ft. super.) 2 8 per ft. super. ....	
6 in. rubbed two sides ditto. ....	3 0 " " "
8 in. sawn two sides (slabs random sizes) 1 2 " " "	
2 in. self-faced random slabs. ....	0 5 " " "

## STONE (continued).

YORK STONE—Robin Hood Quality (continued).	
Hopton Wood (Hard Bed) in blocks 2 6 per ft. cube, deld. rly. depot. ....	
" " " 6 in. sawn both sides landings 2 7 per ft. super. deld. rly. depot. ....	
" " " 8 in. sawn both sides random slabs. ....	1 0 " " "
" " " 2 in. do. 0 6½ " " "	

## SLATES.

£ s. d.	£ s. d.
20 x 10 best blue Bangor 13 2 6 per 1000 of 1200 at r. d.	
20 x 12 " " 13 17 6 " " "	
20 x 10 first quality " 13 0 0 " " "	
20 x 12 " " 13 15 0 " " "	
16 x 8 " " 7 5 0 " " "	
20 x 10 best " 12 13 6 " " "	
madoc " 6 12 6 " " "	
16 x 8 " " 15 17 6 " " "	
20 x 10 best Eureka " 13 5 0 " " "	
16 x 8 " " 10 5 0 " " "	
20 x 10 p.c. permanent " 11 12 6 " " "	
16 x 8 " " 9 2 6 " " "	
16 x 8 " " 6 12 6 " " "	

## TILES.

£ s. d.	£ s. d.
Best plain red roofing tiles. 48 0 per 1000 at rly. depot.	
Hip and Valley tiles. 3 7 per doz. " "	
Best Brocely tiles. 30 0 per 1000 " "	
Do. Ornamental tiles. 52 6 " " "	
Hip and Valley tiles. 4 0 per doz. " "	
Best Kelson red, brown, or brindled do. (Edwards) 60 6 per 1000 " "	
Do. Ornamental do. 30 0 " " "	
Hip tiles. 4 0 per doz. " "	
Valley tiles. 3 0 " " "	
Best Red or Mottled Stafford- shire do. (Peaks) 51 9 per 1000 " "	
Do. Ornamental do. 54 6 " " "	
Hip tiles. 4 1 per doz. " "	
Valley tiles. 3 8 " " "	
Best "Rosemary" brand plain tiles. 48 0 per 1000 " "	
Best Ornamental tiles. 50 0 " " "	
Hip tiles. 4 0 per doz. " "	
Valley tiles. 3 8 " " "	
Best "Hartshill" brand plain tiles, sand faced. 50 4 per 1000 " "	
Do. pressed. 47 6 " " "	
Do. Ornamental do. 50 0 " " "	
Hip tiles. 4 0 per doz. " "	
Valley tiles. 3 6 " " "	

## WOOD.

At per standard.	At per standard.
Denials: best 3 in. by 11 in. and 4 in. 13 10 0 15 0 0	
Do. 3 in. by 9 in. 13 0 0 14 0 0	
Denials: best 3 in. by 9 in. 13 0 0 14 0 0	
Denials: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in. 11 0 0 12 0 0	
Denials: best 2½ in. by 6 in. and 3 in. 10 0 0 11 0 0	
Denials: seconds. 1 0 0 less than best.	
Denials: seconds. 0 10 0 " " "	
Denials: 3 in. by 2 in. and 3 in. by 6 in. 10 0 0 10 0 0	
Denials: 2 in. by 4 in. and 2 in. by 6 in. 8 10 0 9 10 0	
Foreign Sawm Boards— 1 in. and 1½ in. by 7 in. ....	0 10 0 more than battens.
2 in. ....	1 0 0 " "
At per load of 50 ft.	
For timber: best middling Danzig or Memel (average specification) 4 10 0 5 0 0	
Seconds. ....	4 0 0 4 10 0
Small timber (8 in. to 10 in.) ...	3 12 6 3 15 0
Small timber (6 in. to 8 in.) ...	3 0 0 3 10 0
Swedish balks. ....	3 0 0 3 0 0
Pitch-pine timber (30 ft. average) 3 5 0 3 15 0	
JOINERS' WOOD. At per standard.	
White Sea: first yellow deals, 3 in. by 11 in. ....	24 0 0 25 0 0
3 in. by 9 in. ....	23 0 0 23 0 0
Battens, 2½ in. and 3 in. by 7 in. 11 in. ....	16 10 0 18 0 0
Second yellow deals, 3 in. by 11 in. ....	15 10 0 16 0 0
3 in. by 9 in. ....	13 10 0 14 0 0
Third yellow deals, 3 in. by 11 in. and 9 in. ....	13 10 0 15 0 0
Battens, 2½ in. and 3 in. by 7 in. 11 in. ....	11 0 0 12 0 0
Petersburg: first yellow deals, 3 in. by 11 in. ....	21 0 0 22 10 0
Do. 3 in. by 9 in. ....	18 0 0 19 10 0
Battens. ....	13 10 0 14 10 0
Second yellow deals, 3 in. by 11 in. Do. 3 in. by 9 in. ....	16 0 0 17 0 0 14 10 0 15 0 0
Battens. ....	11 0 0 12 10 0
Third yellow deals, 3 in. by 11 in. ....	13 0 0 14 0 0
Do. 3 in. by 9 in. ....	12 10 0 13 0 0
Battens. ....	10 0 0 11 0 0
White Sea and Petersburg— First white deals, 3 in. by 11 in. ....	14 10 0 15 10 0
3 in. by 9 in. ....	13 10 0 14 10 0
Battens. ....	11 0 0 12 0 0
Second white deals, 3 in. by 11 in. 3 in. by 9 in. ....	13 10 0 14 10 0 12 10 0 13 10 0
" " battens. ....	10 0 0 11 0 0
Pitch-pine: deals. ....	16 10 0 17 0 0
Under 3 in. thick extra. ....	20 0 0 21 0 0
Yellow Pine—First, regular sizes 44 0 0 upwards.	
Oddments. ....	32 0 0 " "
Seconds, regular sizes. ....	33 0 0 " "
Yellow Pine oddments. ....	28 0 0 " "
Kauri Pine—Planks, per ft. cube. 0 3 6 0 5 0	
Danzig and Stettin Oak Logs— Large, per ft. cube. ....	0 3 0 0 3 6
Small. ....	0 2 6 0 3 2
Wainscot Oak Logs, per ft. cube. 0 5 0 0 5 6	



## COMPETITION AND CONTRACTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.
*MORTUARY, CORONER'S COURT, ETC.	Deptford Borough Council.....	(See advt. in this issue)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Verandah and Alterations to Station, Brixham	Great Western Railway Company	Engineer, North-road Station, Plymouth
150 Street Barriers	Cardiff Watch Committee	J. L. Whistley, Town Clerk, Town Hall, Cardiff
Painting and Repairing Prisoners' Van	do.	do.
Engineering Laboratory, Queen's College, Belfast	Board of Public Works	St-phens & Sons, 18, Donegal-square, N. Belfast
Heating, Lighting, Water, Queen's College, Belfast	do.	do.
Pumping Machinery at Waterworks Pumping Station	Bedford Corporation	N. Greenhalghs, Borough Surveyor, Town Hall, Bedford
Houses, Oakley-street, Glos.	Great Western Railway Co.	Engineer, Gloucester Station
Houses, Pandy, Mon.	do.	do.
Road Metal	Bedlingtonshire U.D.C.	J. E. Johnston, Surveyor, Bedlington
Tar Macadamizing of Wilbraham-road, Chorlton	Manchester Corporation	Surveyor to Withington Committee, Town Hall, West Didsbury
Painting Baths, Markets, etc.	Safford Corporation	W. Blackshaw, Borough Engineer, Borough Hall, Safford
Wiring and Installation of Subway, etc.	Leeds Guardians	T. Wynn & Sons, Architects, 84, Albion-street, Leeds
Painting, etc., Central Police Court, Pilgrim-street	Newcastle-on-Tyne, Finance Com.	City Property Surveyor's Office, Town Hall, Newcastle
Paint, etc., Children's Home, Church-rd., Waverley	Toxteth Park Guardians	do.
1,000 yds. 8-in. Cast-iron Mains, Alderley Edge	Wilmslow & Alderley Edge Gas Co.	W. Severs, Engineer, Gasworks, Wilmslow
Pulp Warehouse, etc., Darwen Mill	Darwen Paper Mill Co.	Engineer's Office, Darwen Mill, Darwen
S. Aisle, Chancel Seats, etc., All Souls', Netherton	do.	H. Foxall, Architect, 15, Lowther-street, Carlisle
250 tons Guernsey Granite	Guldford Town Council	B. J. Lunn, Architect, 26, High-street, Guildford
Mortuary Building at Shalford	Saxmundham U.D.C.	P. F. Mackenzie Richards, Engineer, 63, Victoria-st., Westminster
Slaking a Bore-hole	Shelford Education Committee	E. J. Touch, A.R.I.B.A., 14, Upper King-street, Norwich
School, Pentney	Blackness Improvement Trust	W. M. Scott, Architect, Linnithgow
Ironmongery for Repair, etc.	Bristol Corporation	Peter Addis, City Valuer, Council House, Bristol
Stone Pier (70 yds.) at Blackness	do.	Council Office, Lower Kipling, Thornton
Repairing Portion of City Estates	Bham, Teme, Euse Dist. Drain Bd.	J. D. Watson, Engineer, Tyburn, near Birmingham
Paving, etc., Ashby-d-road, Thornton, Bradford	Hendon U.D.C.	Council's Engineer, Council Office, Hendon, N.W.
1,500 Lineal yds. of Iron Fencing, Salford	do.	do.
*ROAD MAKING AND PAVING WORKS	Mr. R. P. Elworthy	W. Barrows, Deepway, Tiverton
*SUP. OF SHINGLE & FIXING WOOD FENCING	Gelliger Parish Council	Parochial Offices, Hengrove
Taking Down & Rebuilding Farmhouse at Halberton	Commissioners of H.M. Works, etc.	H.M. Office of Works, Storey's-gate, S.W.
Recreation Ground at Baskford	Nottingham Water Committee	Water Engineer, St. Peter's Church-side Nottingham
*NEW POST-OFFICE, ENFIELD	Birmingham Education Committee	J. A. Palmer, Sec., Education Dep., Edmund-st., Birmingham
250 tons Guernsey Granite Chippings	Dover Town Council	Town Clerk, Castle Hill House, Dover
1,000 tons of Broken Guernsey Granite	do.	do.
250 tons Guernsey Granite Chippings	Barnsley Town Council	J. H. Taylor, Borough Surveyor, Manor House Offices, Barnsley
Revolving Sewage Sprinklers, etc., Lundiane	Burslem Corporation	A. Brember, Borough Electrical Engineer, Burslem
Lighting of St. John's Market by Arc Lamps	do.	J. B. Williams, Architect, The Monk Hall, Burslem
Alterations, etc., to Schools, Farthingstone	Southend Corporation	E. J. Elford, Borough Surveyor, Southend-on-Sea
Making-up Streets	Lincoln Waterworks Committee	N. McK. Barron, C.E., Corporation Office, Lincoln
Raw and Clear Water Tanks (Contract No. 2)	do.	do.
Cast-iron Pipes and Castings (Contract No. 3)	Londonderry County Council	Surveyor, County Court House, Londonderry
Steam Road Roller, Road Sleeping-Van, & Water Cart	Barking Town U.D.C.	C. F. Dawson, Surveyor, Public Office, Barking
Private Street Works at Park, etc., Avenues	Dublin, Wicklow, Wexford Rly. Co.	M. F. Keogh, Sec., Westland-row Station, Dublin
1,000 tons of Bull-head Steel Rails	do.	do.
650 tons of Bull-head Cast Iron Chairs	do.	do.
15,000 Rectangular Sleepers	Lambeth Borough Council	Council's Engineer, 346, Kennington-road, S.W.
*UNDEGRADED CONVEN. WATER-LOO-ED, S.E.	E. Suffolk County Education Com.	G. W. Leighton, Architect, Prince's-street, Ipswich
Enlargement of Claydon School Buildings	Wentley U.D.C.	C. R. W. Chapman, Surveyor, Public Office, Walsby
Sewers, etc.	Highworth E.D.C.	Bessley, Son, & Nichols, Engrs., 11, Victoria-st., Westminster, S.W.
Storm-water Shed, Stratton St. Margaret	Sheerness U.D.C.	Vincent H. Stallon, Council Office, Trinity-road, Sheerness
Road Materials	do.	Major Roberts, Westow, Kirkham Abbey, York
Rep., Paddocks, Bink Bonny Farm, Norton, Malton	do.	do.
Detached Scullery	H. Budgen, F.R.I.B.A., 95, St. Mary-street, Cardiff	do.
Westlevan Chapel and Schools, etc., Penarth	J. Robinson, Surveyor, Union Office, Darlington	do.
*NEW INFIRMARY & WORKHOUSE, SLOUGH	C. Smith & Son, Architects, 164, Friar-street, Reading	do.

Those marked with an asterisk (\*) are advertised in this number.

Competition, iv.

Contracts, iv. vi. vii. x.

Public Appointments, ix.

WOOD (continued).				JOISTS, GIRDERS, &c.				METALS (continued).			
JOINERS' WOOD (continued).				In London, or delivered				Sheet Iron, Galvanised, flat			
Dry Walnut Oak, per ft. sup. as	£ s. d.	£ s. d.		Railway Vans, per ton.	£ s. d.	£ s. d.		best quality	Per ton, in London	£ s. d.	
inch	0 8 0	0 9 0		sections	6 5 0	7 0 0		Ordinary sizes to 20 g.	16 0 0		
2 in. do.	0 0 7	—		Compound Girders, ordinary	7 1 0	8 15 0		" " 22 g. and 24 g.	18 0 0		
2 in. Mahogany—Boudrias, Tasseo, per ft. sup. as inch	0 0 0	0 1 0		Steel Compound Stanchions	9 7 6	10 17 6		" " 26 g.	18 0 0		
Selected, Figure, per ft. sup. as inch	0 1 1	0 2 6		Angles, Tees and Channels, ordinary sections	7 15 0	8 15 0		Ordinary sizes 6 ft. to 8 ft. 20 g.	18 0 0		
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0		Flitch Plates	8 0 0	8 10 0		" " 22 g. and 24 g.	18 0 0		
Tank, per load	17 0 0	22 0 0		Cast Iron Columns and Stanchions including ordinary patterns	6 17 6	8 0 0		Best Soft Steel Sheets, 22 g. & 24 g.	18 0 0		
American Whitewood Planks, per ft. cube	0 4 0	0 5 0		IRON—				Best Soft Steel Sheets, 6 ft. by 2 ft. 6 in. to 3 ft. by 20 g. and thicker	11 5 0		
Prepared Flooring, etc.—				Common Bars	7 10 0	8 0 0		Cut nails, 3 in. to 6 in.	9 3 0		
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6		Staffordshire Crown Bars, good merchant quality	8 0 0	10 0 0		(Under 6 in., usual trade extras)			
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0		Staffordshire "Marked Bars"	10 0 0	12 0 0		LEAD, &c. Per ton, in London			
1 1/2 in. by 7 in. yellow, planed and matched	0 16 0	1 0 0		Mild Steel Bars	8 10 0	9 0 0		Sheet—Sheet, English, 5 lb. and up	0 0 0		
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6		Hoop Iron, best price	16 15 0	9 5 0		Pipe in coil	17 0 0		
1 in. by 7 in. white, planed and matched	0 12 6	0 15 11		" " Galvanised	16 15 0	9 5 0		Soil pipe	20 0 0		
1 1/2 in. by 7 in. white, planed and matched	0 15 0	0 16 8		(And upwards, according to size and gauge.)				Compo pipe	20 0 0		
3 in. by 7 in. yellow, matched and beaded or V-jointed lds.	0 11 0	0 13 6		Sheet Iron, Black—				Zinc—Sheet—	20 15 0		
1 in. by 7 in. do. do.	0 14 0	0 18 0		Ordinary sizes to 20 g.	9 5 0	10 0 0		Vinille Montagne	30 10 0		
1 in. by 7 in. white do. do.	0 10 0	0 11 6		" " 24 g.	10 0 0	11 0 0		Silesia	30 10 0		
1 in. by 7 in. do. do.	0 12 9	0 15 0		" " 26 g.	12 0 0	13 0 0		Copper—			
6 in. at 6d. to 9d. per square less than 7 in.				Sheet Iron, Galvanised, flat, ordinary quality—				Strong Sheet	per lb.	0 11 11	
				Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	13 0 0	14 0 0		Thin	0 11 11		
				Ordinary sizes to 22 g. and 24 g.	13 10 0	14 10 0		Copper nails	0 11 11		





**RICHMOND (Surrey).**—For erecting a public elementary school in Darell-road, for the Town Council Mr. E. J. Willet Allen, architect, 24, Ladbroke-gardens, W. Quantities by Messrs. Pinks & Watson, Parliament Mansions, Victoria-street, Westminster, S.W.:

	Extra for Glazed Brick Dadoes.			Extra for tarpaving Play Ground.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.
W. Gibson & Co. ....	11,454	0	0	444	0	0	12,132	0	0
Marriott & Salter .....	10,923	0	0	378	10	4	11,830	7	2
F. G. Lawrence .....	11,109	15	8	332	0	0	11,771	6	6
W. Wallis .....	11,022	0	0	427	0	0	11,749	0	0
J. & C. Bowyer .....	10,697	0	0	545	0	0	11,441	0	0
W. H. Hyde .....	10,620	0	0	604	0	0	11,463	0	0
R. Elvy .....	10,644	0	0	533	2	4	11,377	2	4
J. W. Brookings .....	10,471	0	0	455	0	0	11,180	0	0
Speckley & Smith .....	10,480	0	0	120	0	0	11,150	0	0
J. & M. Patrick .....	10,375	0	0	412	0	0	11,056	0	0
Higgs & Outhwaite .....	10,350	0	0	546	0	0	11,030	0	0
W. Johnson & Co., Ltd. ....	10,335	0	0	378	0	0	10,992	0	0
W. J. Renshaw .....	10,239	0	0	600	0	0	10,854	0	0
McC. E. Pitt .....	9,762	0	0	427	0	0	10,834	0	0
W. Smith & Sons .....	9,828	0	0	198	0	0	10,339	0	0
S. N. Steele & Son, Richmond ..	9,650	0	0	120	0	0	10,300	0	0
G. H. Gibson .....	9,835	0	0	412	0	0	10,114	0	0

**SALTASH.**—For supply of stones and gravel, for the Urban District Council. Mr. W. W. Harvey, Surveyor, Saltash:—

	Stones per Ton.	Gravel per s. d.
Hoare & Son, Trevollard, s. d.	2 3	2 3
St. Stephens-by-Saltash 4 6	2 3	2 3

**SOYLAND.**—For 4,000 yds. super of concrete and bitumen sheeting, for the completion of Blackhouse reservoir, for the Urban District Council. Messrs. R. R. Renshaw & Son, engineers, Commercial-street, Halifax. Quantities by engineers:—

G. M. Callender & Co., Ltd., Victoria-street, Westminster*	£2,269 3
--	----------

**UXBRIDGE.**—For square brick water tower, for the Urban District Council. Mr. F. S. Courtney, engineer, 25, Victoria-street, S.W.:—

W. J. Taylor & Co. ....	£2,024 12 0
J. Riley .....	1,817 2 1
S. Wood .....	1,708 4 11
W. H. Randall & Son .....	1,600 15 6
Pathick Bros. ....	1,590 9 0
Davies, Ball, & Co. ....	1,686 0 0
A. E. Nunn .....	1,547 15 6
F. Deacon & Son .....	1,546 0 0
A. E. Rigby .....	1,525 0 0
J. & W. Drake .....	1,501 11 0
J. Ward & Son .....	1,472 0 0
H. E. Willis .....	1,462 9 5
A. H. Ball & Co. ....	1,442 17 7
Smith & Co. ....	1,394 13 2
J. W. Dean, Ltd. ....	1,356 5 4
G. Cheswas .....	1,310 0 0
Climbers Bros. ....	1,270 0 0
C. H. Hunt & Son .....	1,247 0 0
G. H. Gibson .....	1,223 0 0
Radford & Greaves, Derby* ..	1,068 1 0

(Circular Steel Water Tank.)

Somerville & Co. ....	2,672 10 4
The Baronfield Ironworks, Ltd. ....	2,343 0 0
S. Wood .....	2,146 18 3
The Whessoe Foundry Co., Ltd. ....	2,107 0 0
Newton, Chambers, & Co., Ltd. ....	2,092 18 0
W. R. Renshaw & Co., Ltd. ....	2,065 0 0
Westwood & Wrights .....	2,029 10 0
Smith & Co. ....	1,975 10 0
T. Davies, Ltd. ....	1,950 14 11
Hewitt & Kellett .....	1,898 0 0
T. Watson, jun. ....	1,857 0 0
G. H. Hughes .....	1,804 9 6
A. H. Ball & Co. ....	1,775 1 0
T. Pigott & Co. ....	1,735 0 0
Davies, Ball, & Co. ....	1,751 0 0
Biggs, Wall, & Co. ....	1,713 13 10
A. E. Rigby .....	1,707 0 0
A. E. Nunn .....	1,693 7 9
Pathick Bros. ....	1,662 0 0
Ashmore, Benson, Pease, & Co., Ltd. ....	1,640 8 0
J. Riley .....	1,638 17 9
J. W. Dean, Ltd. ....	1,584 10 0
G. Sands & Son, Nottingham* ..	1,488 3 0
J. Fraser & Son, Ltd. ....	966 0 0
J. Musgrave & Sons, Ltd. ....	890 0 0
R. Dempster & Son* ..	838 10 0

[† Informal.]

**STARBECK.**—For erecting a gardener's cottage at the Crossways, for Mr. W. Johnson. Messrs. Adkin & Hill, architects, 10, 11, and 12, Prudential-buildings, Bradford:—

Mason: C. A. Nettleton, Bilton, Harrogate* ..	£148 0 0
Joiners: Clapham & Taylor, 4, Mowbray-square, Harrogate* ..	78 0 0
Plumber: G. Thompson, Harrogate* ..	46 0 0
Slater: W. H. Temple, Holmdale, Harkon-road, Knareborough* ..	32 9 0
Plasterers: Coleman Bros., Knareborough* ..	19 0 0
Painters: Lythe & Clarkson, Back Chetnam, Mount Harrogate* ..	54 0 0

**STEVENAGE.**—For roadworks from Fisher's Green-road to Bromes-green, for Stevenage Urban District Council. Mr. John Gillespie, Surveyor:—

Wilkinson Bros. ....	£3,663 16 9
G. Bell .....	2,875 15 6
Fry Bros. ....	2,715 15 6
T. Fyfe & Sons .....	2,635 0 0
T. Adams .....	2,589 0 0
T. Watson .....	2,506 0 0
E. T. Bloomfield .....	2,546 19 11
G. W. Killingback & Co. ....	2,377 0 0
H. Foster, 23, 369 0 0	
W. & C. French, 2,110 0 0	
H. Williams, 2,100 0 0	
S. Redhouse & Sons .....	2,017 0 0
J. Jackson, 1,831 13 2	
T. Gibbons .....	1,666 0 0
H. Arnold & Son, Doncaster* ..	1,638 0 0

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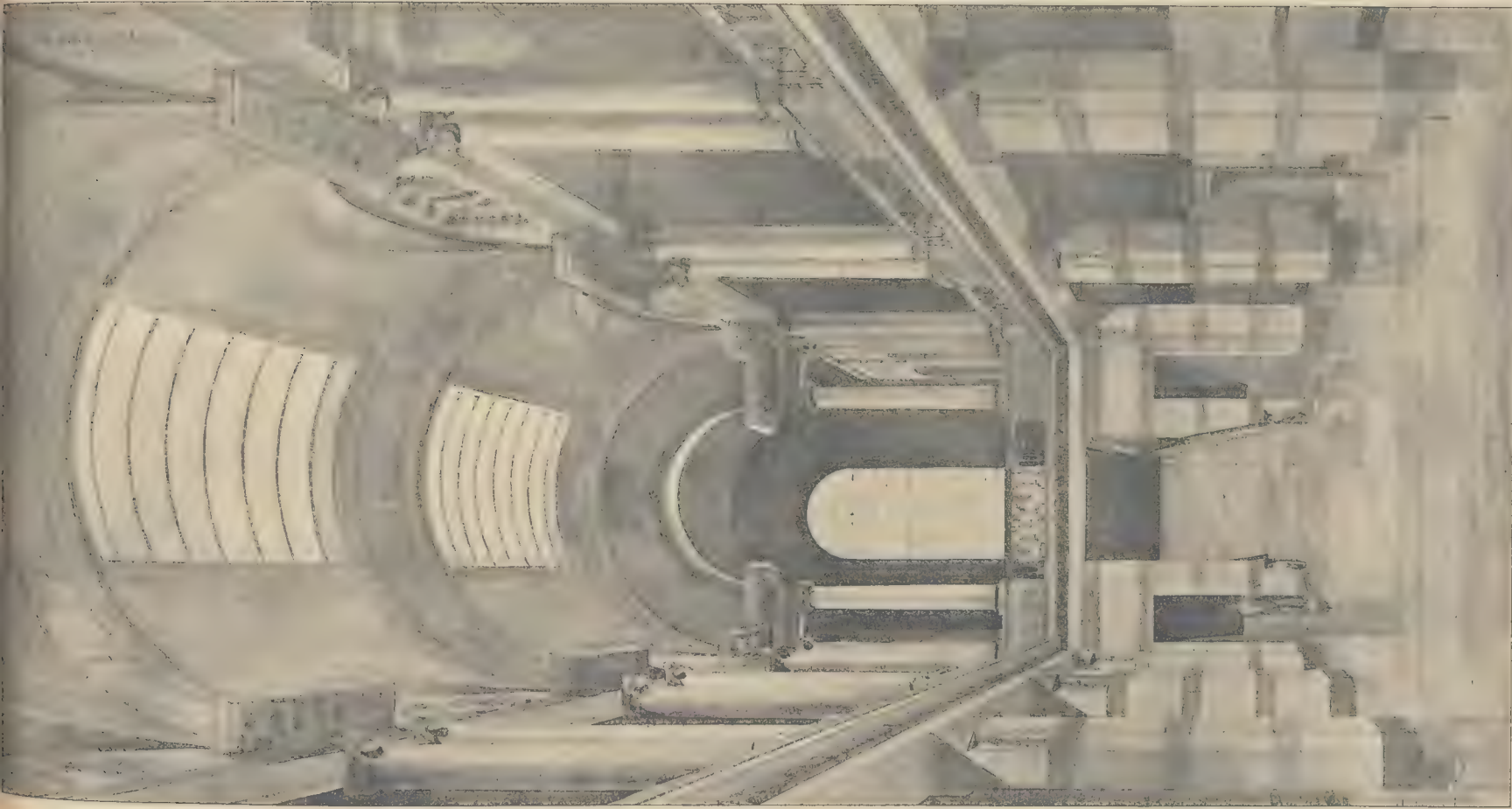
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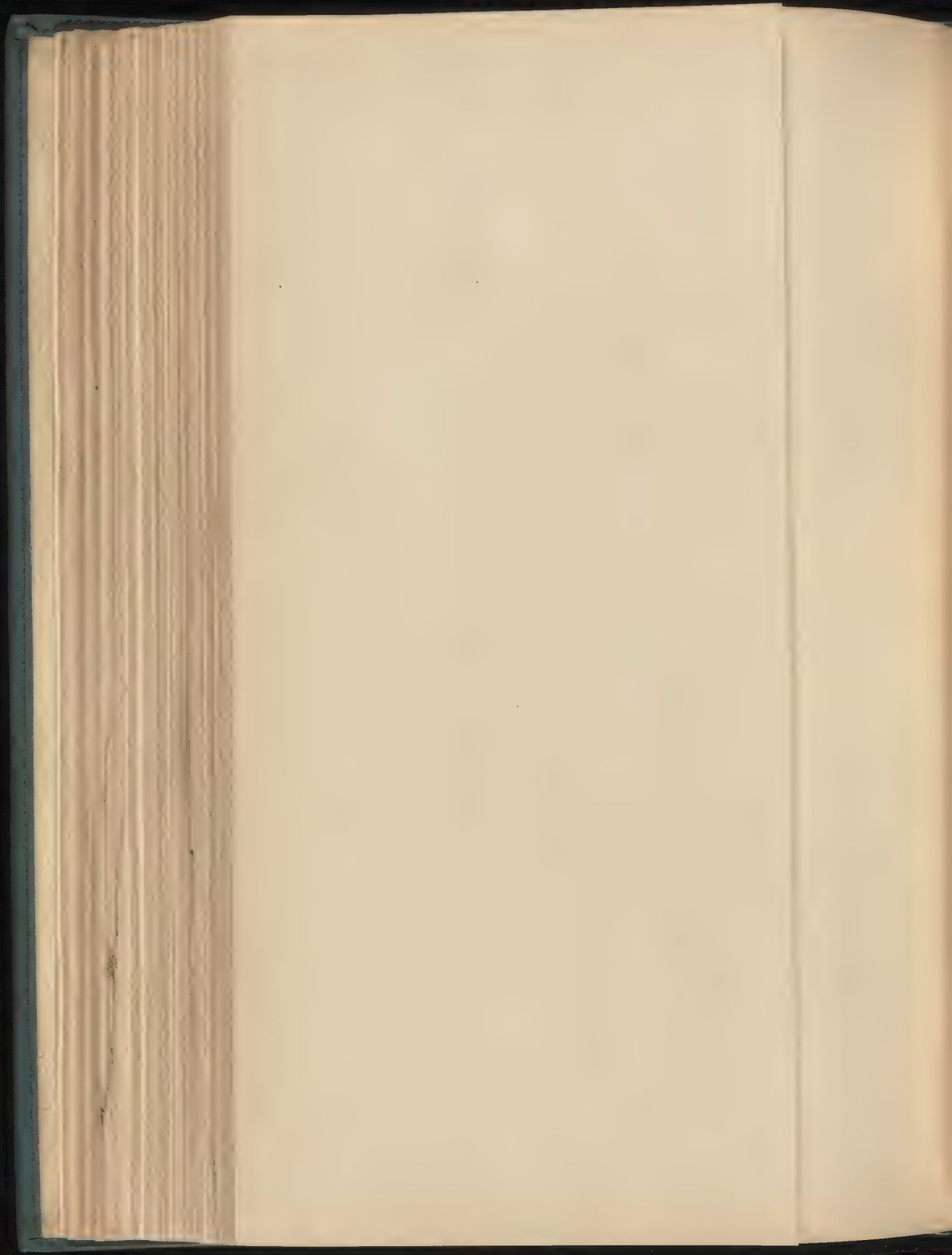
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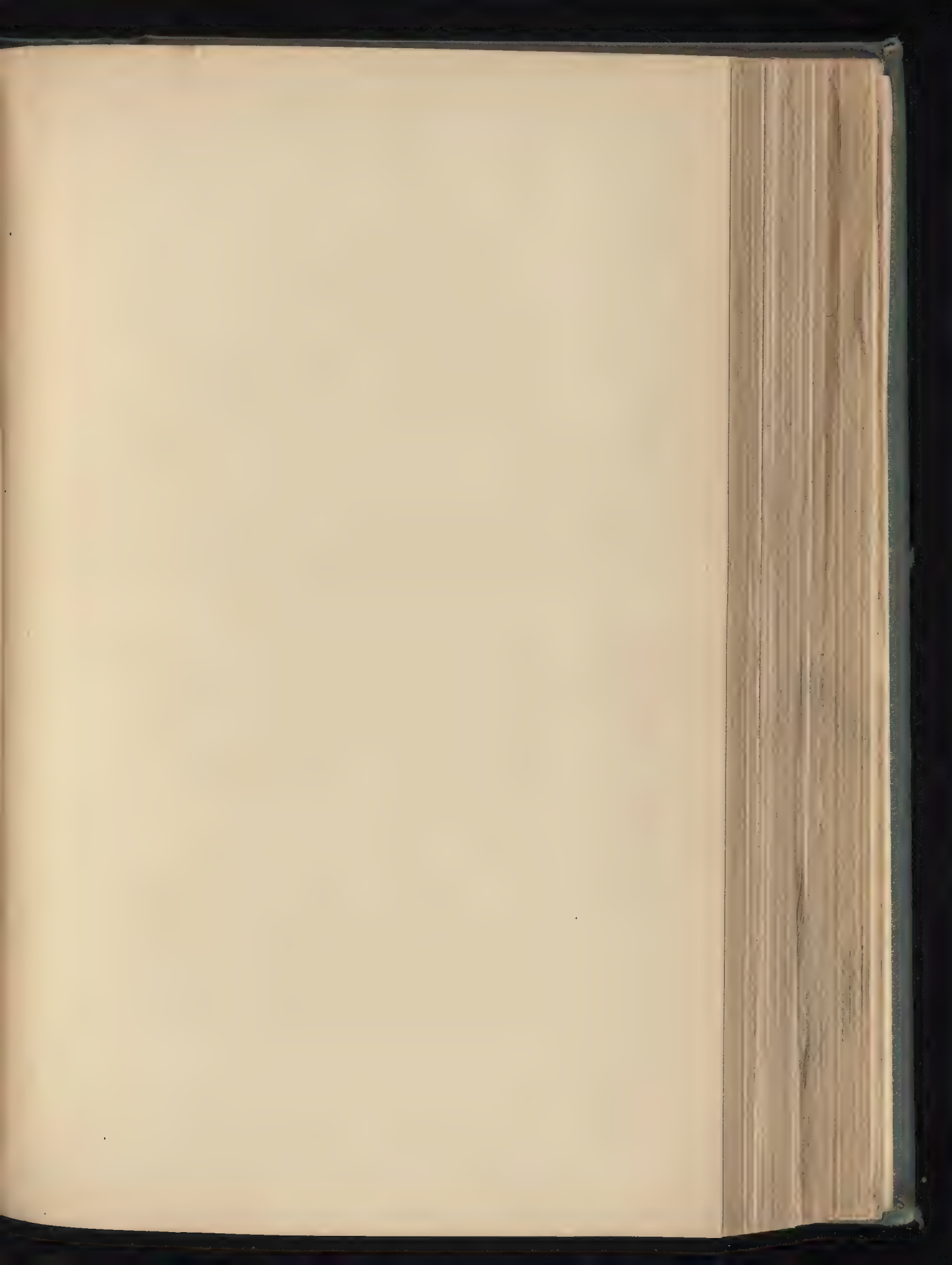




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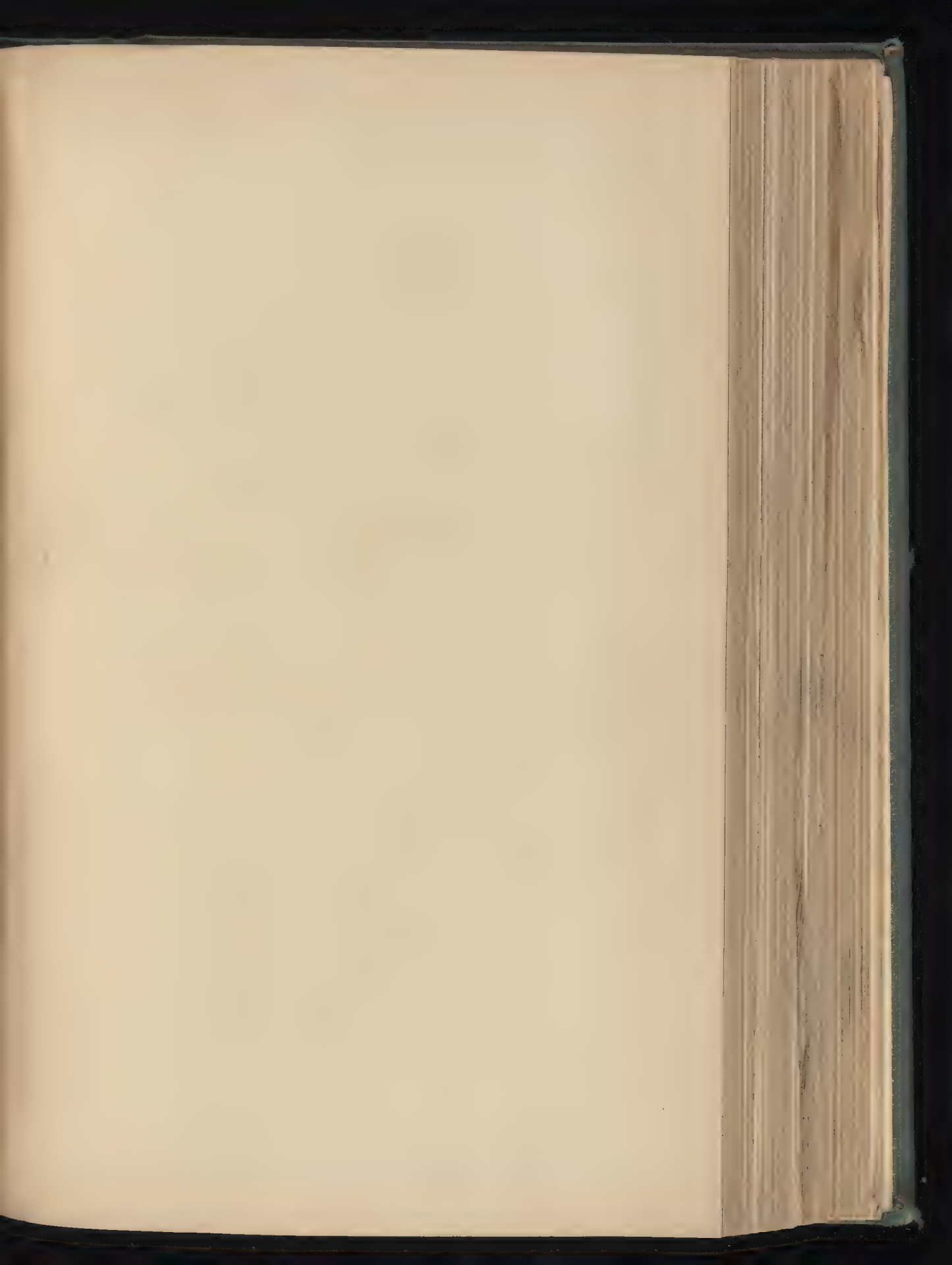




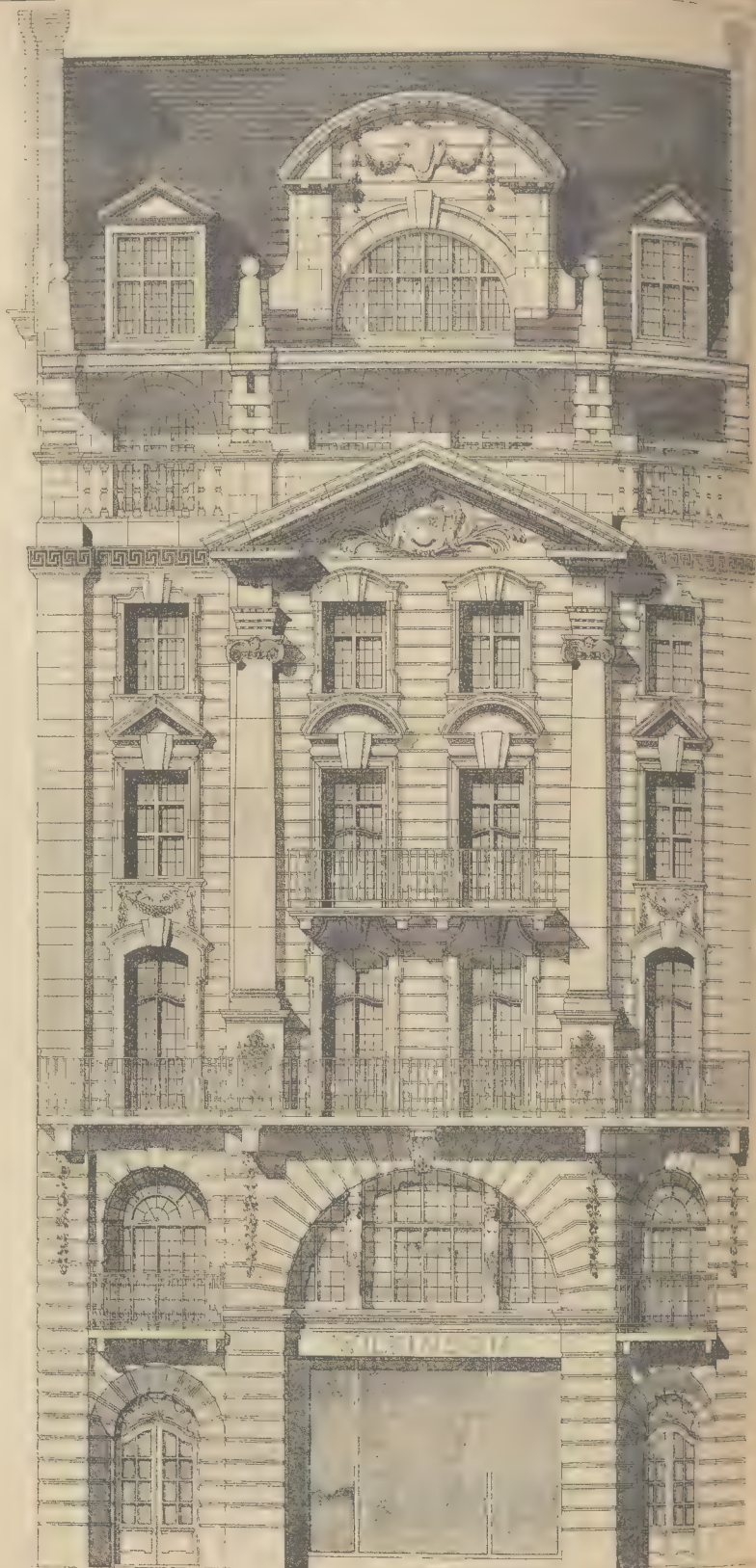


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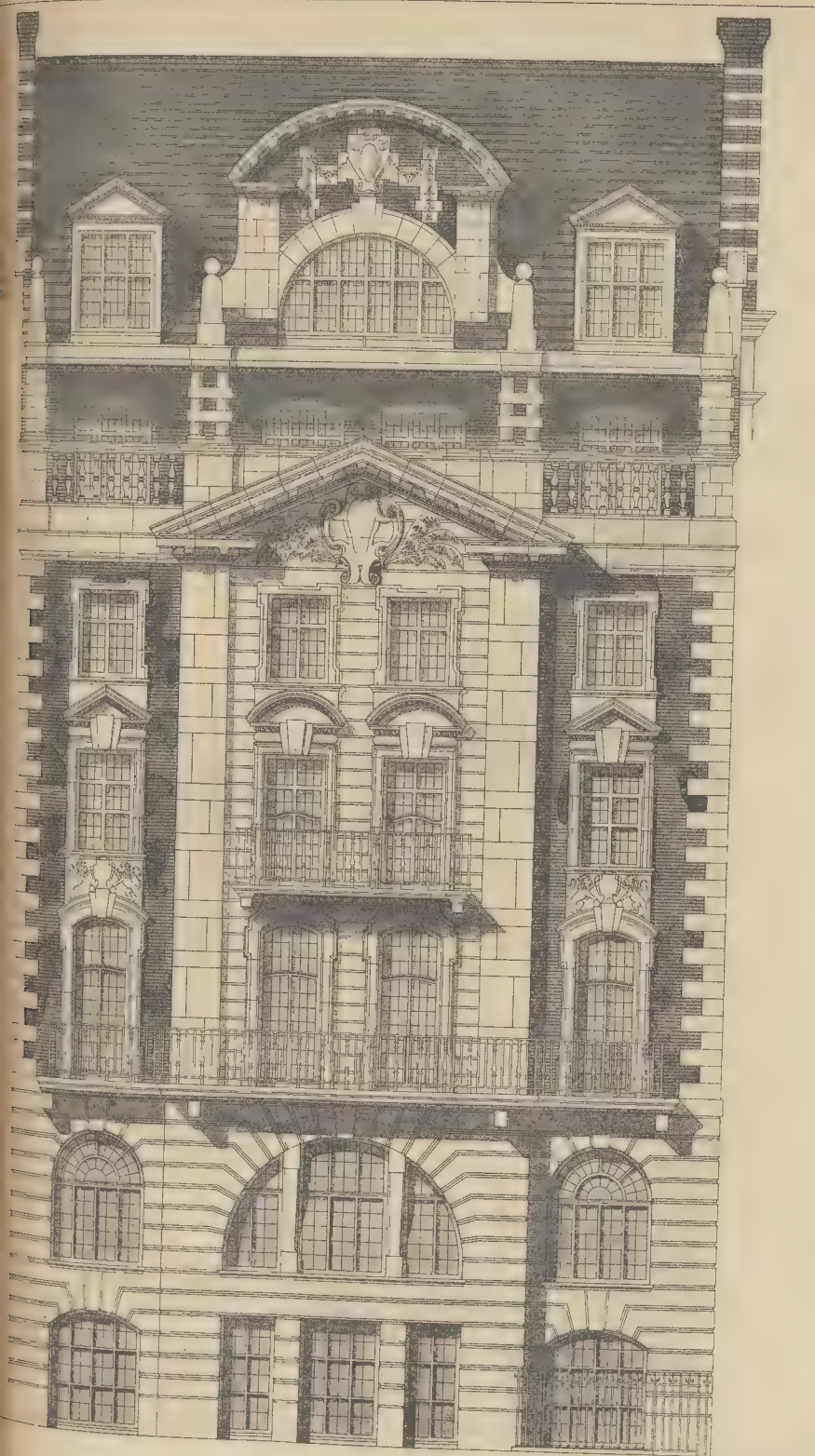






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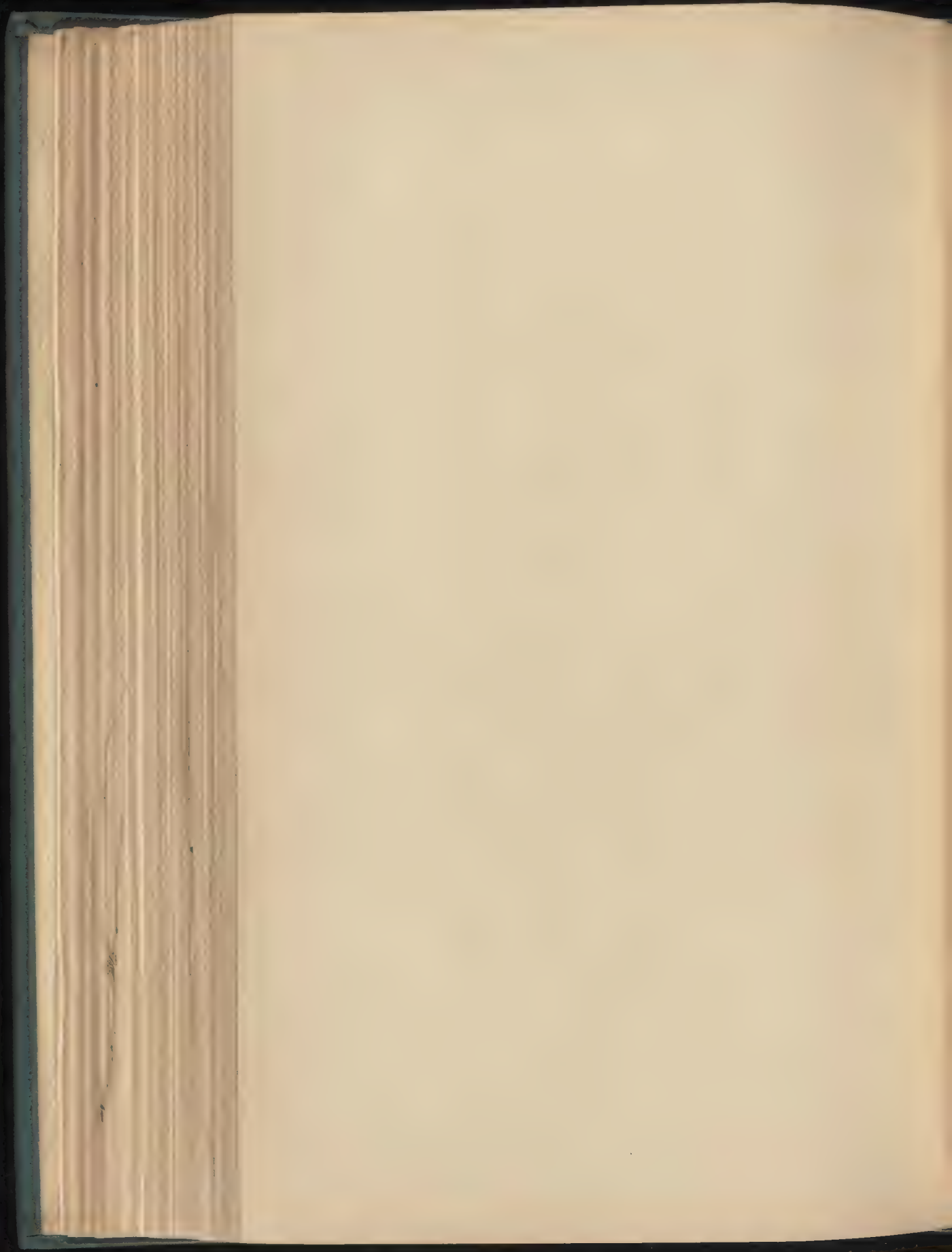




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# The Builder.

VOL. LXXXIX.—No. 3271.

OCTOBER 14, 1905.

## ILLUSTRATIONS.

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First Premiated Design for Artisans' Dwellings, Paris.....	By M. Adolphe A. Rey.
1. View of One of the Pavilions.	
2. Plan of Ground Floor and One of the Upper Floors.	
Ames House and Welbeck Restaurant.....	Professor Beresford Pite, F.R.I.B.A., Architect.

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### The Sea Wall and Works for Raising the City of Galveston, U.S.A.



NE of the most noteworthy engineering structures in the United States is represented by the concrete sea wall recently completed for the protection

of Galveston from a repetition of the disaster of 1900, when the greater part of the city was destroyed by the sea during a violent West Indian hurricane.

Galveston is the chief commercial city in the State of Texas, and is next to New Orleans in point of importance among the seaports of the Southern States. Unfortunately, it is built upon a low sandy spit forming the termination of that remarkable series of alluvial bars which extend along the Gulf of Mexico in almost unbroken line from the mouth of the Rio Grande northwards, enclosing long narrow lagoons something like those to be found behind the Chesil Bank, and on the landward side of the spit forming the site of "Bungalow Town" at Shoreham, in this country.

The city of Galveston is connected with the mainland by three railway viaducts and a highway bridge. It provides excellent accommodation for shipping, and its only drawback, until the building of the sea wall, was the ever-present risk of inundation by the sea. At first the work to which we refer comprised only the project of the Galveston

county authorities for the construction of a sea wall, nearly 3.5 miles in length, along the south-eastern shore and round the eastern extremity of Galveston Island, with an apron of granite blocks in front and a wide backing of earth behind. In accordance with this scheme, the sea wall would have extended from the eastern end of the city to the Government reservation on the Gulf of Mexico, but it was hoped that the United States Government would decide to continue the wall along the reservation. This hope has been more than fulfilled, for the national Government have already extended the sea wall for a length of one mile, and propose to continue it to a point beyond the end of the reservation, making the ultimate length of the coast protection works about 6 miles. Moreover, the Government will raise the level of the land behind this extension of the wall.

The original intention of the county authorities was simply to back the wall with an ample width of earth, but subsequently it was decided by a commission that all the low-lying area behind that work should be levelled up, and the State Government of Texas agreed to make a contribution towards the additional expenditure involved. The quarter in question has an area of about 2 square miles, and the average depth of the filling will be between 7 ft. and 8 ft. In some places, however, as much as 20 ft. of material will have to be deposited to bring the ground up to the required level.

Fig. 1 is a plan of Galveston Bay

showing the situation of the city with respect to the mainland and the coast line before the alterations effected by recent encroachments. Fig. 2 is a plan giving fuller details of the city, and on which are indicated the positions of the new sea wall, the Government military reservation and jetties, the contractors' temporary canal, and the area to be raised by the deposition of fresh material. This plan also indicates the former coast line and some extensive blocks of buildings that were wiped out by the disastrous flood of 1900.

From the foregoing statement it will be seen that the important works to which attention is invited in this article consist of three parts:—

- (1) The Galveston County Sea Wall.
- (2) The Government Sea Wall Extension and Re-leveling Works.
- (3) The Re-leveling of Galveston City.

We shall now deal briefly with each of these portions of the whole undertaking, commencing with the works recently completed.

(1) *The Galveston County Sea Wall.*—This work commences at the landward end of the Government Jetty (see Fig. 2), running in a straight line for a distance of 1,225 ft., taking a curve with a radius of 573 ft. for 347 ft., then following a straight course, parallel with the transverse streets of the city, for 1,686 ft., and next following straight lines with the lengths of 2,849 ft., 5,302 ft., and 5,659 ft. respectively, these three sections being demarked by two angles, one of 12 deg. 37 min., and the other of 5 deg. 11½ min. To provide for the construction of the wall, the authorities secured a right of





Fig. 1.

way, 150 ft. wide, through land that was formerly covered by blocks of houses and other buildings. Owing to the effect of the flood, the present line of mean high water is within 50 ft. or 100 ft. of the seaward boundary of the right of way, and all the land lying outside the sea wall has become quite valueless. Before the commencement of building operations a series of twenty-nine borings was made, at different points, with a 6 in. diameter tube and a sand pump. By means of these it was found that fine sand existed to a depth of about 26 ft. below mean low water level. Below this comes a stratum of soft blue clay, which is about 15 ft. thick for more than half-way along the line of the wall, and somewhat thinner for the remaining length. Hard red clay underlies the latter stratum, and was entered at depths ranging from 34 ft. to 46 ft. below mean low water level. As shown in Fig. 3, the sea wall is built on a pile foundation, and the outer face has a curved profile. The toe is protected by a granite apron extending seawards for a distance of 27 ft. The back of the wall is vertical, and behind it was to have been an earthen embankment, 100 ft. wide at the base and 70 ft. wide at the top, where a carriageway and footpaths provide a pleasant seaside drive and promenade. This embankment is now to be merged into the general scheme of re-leveling. The thickness of the wall is 16 ft. at the base and 5 ft. at the top, its height being 16 ft. or 17 ft., measured from mean low water level.

The details of construction are shown more clearly in Fig. 4, which is a typical

cross-section of the wall. Cylindrical piles of diameter ranging from 12 in. to 16 in. were used for the foundations, the piles being of pine from which the bark had not been removed. The average length was 44 ft., reduced to 40 ft. in places where the red clay was entered. The piles were driven in four rows, 4 ft. apart centre to centre longitudinally, the centres of the piles in each transverse row being separated by spaces of 4 ft., 4 ft. 6 in., and 4 ft. 6 in., commencing at the front. At the back of the front longitudinal row of piles a double line of sheet piling, 24 ft. deep, was driven and secured by 8 in. spikes to horizontal stringers of 4 in. by 12 in. pine planks notched into the back of each round pile. The stringers are held in position by ½ in. diameter bolts and nuts, being butted together at the joints, and each end bolted to the circular pile. The first line of sheet piles consists of 6 in. by 12-in. pine baulks, and the second line of 3 in. by 12 in. planks of the same material, driven so as to break joint with the front layer. In sinking piles through the sand the water-jet method was used, and in driving them through the blue and red clay steam pile-drivers were employed, this type of machine having a hammer weighing nearly 3 tons, and driving the piles 2 in. at each blow. The pile-driving machines were placed on rough timber tracks so that they could be moved forward with a minimum amount of labour as the work progressed. In the execution of the work the cylindrical piles were driven in advance of the sheet piling, which was put in position by a following set of plant. After the

piles had been driven to refuges, they were sawn off to a height of 2 ft. above mean low water level, leaving a clear projection of 1 ft. above the surface of the shore, which was excavated and dressed to the required level in preparation for the building of the sea wall.

Inspection of Fig. 4 will show that the wall really consists of two parts, the base and the wall proper. The base is a rectangular section, measuring 2 ft. wide by 3 ft. high, its upper surface having a rebate 4 ft. wide by 6 in. deep at the front, and a groove of the same dimensions at the centre, to afford a key for the upper portion of concrete work, while not entirely preventing independent movement of the two parts. As shown in the drawing the projecting heads of the piles are enclosed in the concrete of the base. For aiding the rapid construction of the base the contractors provided a portable mixing platform, running on rails parallel with the longitudinal axis of the wall, and on this was placed a portable concrete mixer fitted with hoisting apparatus and moving on rails perpendicular to the axis of the wall. Cement and other materials were conveyed to the site by a temporary railway and wheeled in barrows up inclines to the platform. This installation provided for the deposition of the concrete across the full width of the base, and as the platform could be moved forward and backward without much trouble the concrete of the base was easily laid in successive courses 6 in. thick. The moulds were of very simple construction, and as the sides were backed with the sand of the shore no caulking of the joints was required. About 100 ft. of the base was completed daily in the manner described, twenty men being engaged in preparing the ground and erecting the moulds, and thirty men in preparing and depositing the concrete. As will be readily understood the rapidity of construction depends very much upon the tidal range and the levels of the site at different points, but the average quantity of concrete laid amounted to about 140 cubic yds. daily.

The wall proper has a width of 16 ft. and a height of 13 ft. above the base, the profile of the front being a two-centred curve, the first arc struck with radius of 9.5 ft., and the other with radius of 25.8 ft. To some extent the wall may be regarded as an example of concrete-steel construction, inasmuch as corrugated steel bars 10 ft. long by 1½ in. square, spaced 3.5 ft. apart longitudinally, are embedded in the concrete at an angle of 30 deg. with the vertical. These bars are for the purpose of reinforcing the curved front of the wall, and are 15 in. from the surface about the middle of their length. While the base is a continuous structure, the upper portion of the wall was built in sections each 50 ft. long, connected by tongue and grooved joints, the grooves measuring 13 ft. in height by 1 ft. 6 in. wide by 6 in. deep. The 50-ft. sections were built alternately. That is to say, seven sections with a groove at each end were moulded at intervals of 50 ft. apart, each pair being allowed to harden for fully ten days before the formation of

a tongued section in the intermediate space. This mode of construction permitted one-half of the total wall length to shrink before the remainder was added, and thus reduced the space between consecutive sections to a minimum—in fact, leaving no more clearance than that absolutely required for subsequent expansion under the influence of the sun.

The contractors' plant for the upper portion of the wall consisted of two mixing platforms at different levels, a stationary concrete mixer, and two steam derricks, the whole mounted on railway trucks running on four lines of rail at the back of the wall. One of the derricks was used for raising materials from trucks brought alongside by means of the temporary railway, and the other for depositing the mixed concrete in the moulds. On the upper platform a hopper in two compartments was fixed for feeding the concrete mixer on the lower platform, one compartment being filled while the other was discharging its contents into the mixer. The moulds consisted of vertical shuttering at the back of the wall, and curved ribs with lagging on the curved front, the inner surfaces being finished smooth, and the joints carefully caulked with hemp. The latter precautions were the more necessary as a wet mixture of concrete was employed. All the concrete used on the works was mixed rather wet; the specification requiring, however, that no more water should be added than the concrete would bear without quaking while being rammed. The proportions adopted were—one barrel of Portland cement (380 lb.), 9 cubic ft. of sand, and 22.5 cubic ft. of broken stone. The stone used was granite crushed at the quarries whence came the blocks for the protective apron, and it was specified that all stones should be small enough to pass through a 2½-in. diameter ring.

To provide for the passage of water from the backing to the shore, 36-in. arched culverts were formed in the concrete at intervals of 500 ft., and 6-in. vitrified drain-pipes were fixed at intervals of 300 ft. for draining the roadway on the top of the embankment. The apron in front of the wall consists of rough blocks of red granite, about 50 per cent. of them weighing 200 lb. each, and 20 per cent. 1,000 lb. or more, the minimum weight permitted by the specification being 18 lb. The stones were deposited at random on the sandy beach so as to form a protection 27 ft. wide and 3 ft. deep after settlement. By placing the largest blocks at the top and filling the interstices with smaller stones a surface was formed which offers comparatively little resistance to the action of the waves.

Some idea of the magnitude of the sea wall may be formed from the following approximate list of quantities:—

Sand excavation	105,000 cubic yds.
Concrete	192,110 " "
Granite blocks	50,000 " "
Cylindrical piles	17,500 " "
Sheet piling and stringers	3,870,000 ft. super.

The works were executed from the designs of Mr. G. W. Boschke, C.E., of Galveston, the contractors being Messrs. O'Rourke & Co., of Denver, and the contract price about 240,000.

(2) *The Government Sea Wall Extension and Re-leveling Works.*—This section of the operations in hand for the protection of Galveston includes the extension of the new sea wall for a further distance of about 2½ miles, making the total length of the protective works nearly 6 miles. The amount appropriated by the United States Government for the purpose was about 118,000. The extension along the front of the Government military reservation is indicated in Fig. 2. Owing to the fact that the area at the back of the wall will be generally raised to a higher level, no provision was made in the contract for an earthen embankment as in the case of the Galveston city wall. Hence the lower cost per mile of the Government extension. As the constructive features of this section of the wall are identical with those already described, no detailed account is here necessary.

(3) *The Re-leveling of Galveston City.*—In finally deciding upon this project the authorities had in view the desirability of raising the low-lying area of the city so that even during the most severe storms the streets should be free from the dangerous floods experienced in the past, and concurrently of providing for the flow of rain water and sewage without having recourse to a mechanical system of drainage. The district in question, with the area of 2 square miles, lies considerably lower than the business quarter of the city, and suffered very heavily from the storm of 1900. One serious problem presented, after the decision had been made to raise the grade, was to find a suitable source of supply for the filling material, of which fully 12,000,000 cubic yds. were required. To excavate so huge a quantity from the district on the western side of the city would have been very unwise, because that is the only direction in which future extensions can be made, and if the material were to be brought from any considerable distance the cost of transport would have been a heavy item. Again, any attempt

to raise the necessary amount of material from the bottom of the Gulf of Mexico within a practicable distance from the site might have involved the serious risk of ultimate interference with the stability of the new sea wall. After considering the question of dredging from the waterways inside Galveston Island, the authorities came to the conclusion that this course could not be recommended in view of the hindrance that would be caused to navigation, and finally they selected as the source of the material required the areas indicated on Fig. 2, between the Government jetties on either side of Bolivar Channel.

The task of raising from the bed of the sea a sufficient quantity of sand to cover 2 square miles of land to a mean depth of more than 2 yds. would be a large undertaking under any circumstances. In the present case its onerous character was increased by the fact that the site of the material was situated at a distance of at least 4 miles from the dumping ground, and consequently that ordinary methods of hydraulic dredging were not applicable. As only two out of 200 contracting firms accepted invitations to tender for the work, we have additional evidence that the difficulties involved were of no mean order. Of the two offers received, one was at the rate of 1s. 2½d. per cubic yard, and the other was based on the unit price of 9½d. per cubic yard. The latter, submitted by Messrs. Goedhart & Bates, of New York, was duly accepted, the contract price being \$16,150., including the transference of nearly 12 million cubic yds. of sand, and all incidental works, which involve the moving of an additional quantity of some 3 million cubic yds. of material within the city boundaries.

The successful conduct and completion of the re-leveling works are largely assured by the extensive practical experience of the contractors. Mr. P. C. Goedhart, who is also associated with

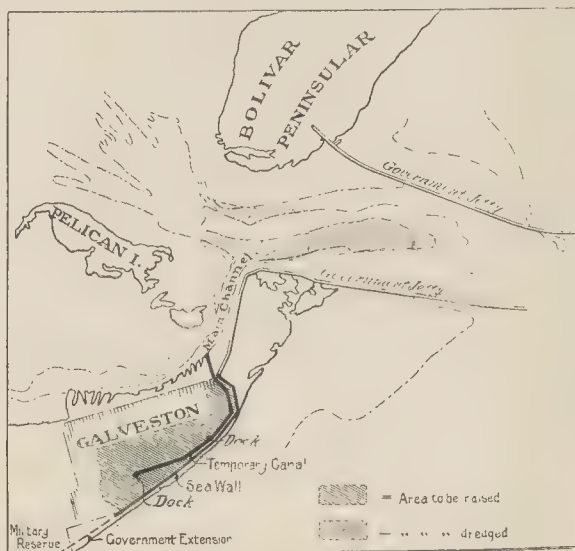


Fig. 2.



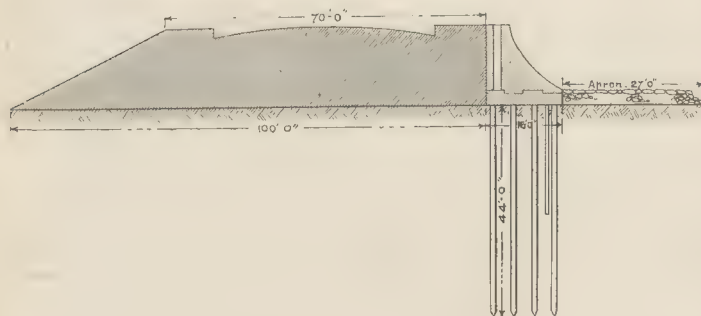


Fig. 3.

the firm of Goedhart Bros., of Düsseldorf, Germany, has been engaged in some of the largest dredging works in the world, among which may be mentioned the Dortmund-Ems Canal and the Amsterdam-Rhine Canal. Mr. Lindon W. Bates has been occupied for many years upon important contracts, including the Chicago Drainage Canal, and is the inventor of a system of hydraulic dredging which has been applied to harbour improvements in the United States, Belgium, Russia, Egypt, Australia, and India. Mr. Bates is also the author of a new scheme for the construction of the Panama Canal, to which reference was made in our issue of June 3.

Described briefly, the plan proposed by the contractors for the execution of the Galveston works was to excavate sand from the Bolivar Channel by means of hydraulic dredgers, and to transport the material in these vessels, by way of a temporary canal through the city, to selected points whence it would be distributed over the area to be covered. This programme, having been accepted by the authorities, is now in course of realisation, and the contractors' canal was completed by the end of March last. Its course is indicated in Fig. 2, by which it will be seen that the temporary waterway commences in the inner deep water channel, and, after passing the Government jetty, pursues a course more or less parallel with the new sea wall, diverging at the end to an approximately central position in the area to be re-levelled. The length of the canal is nearly 3.5 miles, or practically the same as that of the sea wall. The canal is 100 ft. wide at the bottom, the average depth of water is 20 ft., and the maximum width at the water line is 200 ft. Two docks are provided, at the points indicated on Fig. 2, for the purpose of enabling the dredging vessels to turn in readiness for the outward journey after the discharge of cargo. The work of making the canal was entrusted to a sub-contractor at the rate of 3½d. per cubic yard. Hydraulic dredgers were employed for removing the material, which consisted of fine sand, and, except that required for banking the channel, was deposited at the back of

the new sea wall or spread over the low-lying area on either side of the canal. About 1,500,000 cubic yds. of sand were removed during the execution of this work, and an equal quantity at least will be necessary for filling up the canal after its purpose has been achieved.

For the first part of its course the canal traverses a closely-built portion of the city, where several large buildings had to be demolished before the excavation could proceed. Beyond the second angle, shown in Fig. 2, its course passes through a residential district, where many of the houses have been washed away by the storm of 1900, and as architects and builders have since evinced very little inclination to tempt Providence by building on this area the canal contractors experienced very few serious obstacles. The four hydraulic dredgers employed for the removal of sand from the Bolivar Channel are of a type quite new to the United States, but already familiar to European engineers. One of these vessels was built in Holland, and the other three, of larger size, were built in Germany. All four hoppers crossed the Atlantic at some risk, as the design of these vessels does not make them at all suitable or safe for ocean navigation. As a matter of fact, one dredger was lost at sea and had to be replaced. It is stated that no attempt was made to build the dredgers in the United States, as no shipbuilding firm in that country had ever constructed or could guarantee such craft. Hence we see an additional reason why the European experience and connexions of the contractors were of such extreme value in the realisation of this great scheme. Each of the three larger vessels has a hopper with the capacity of about 1,500 cubic yds., filled by means of a 33-in. centrifugal pump, while sand is discharged by a second pump of the same size through pipes capable of delivering the material at any required point within a radius of nearly a mile in length. The fourth dredger is of smaller size and has a hopper capable of containing 500 cubic yds., with two 22-in. centrifugal pumps, one for filling and the other for discharging sand. All the dredgers are built with

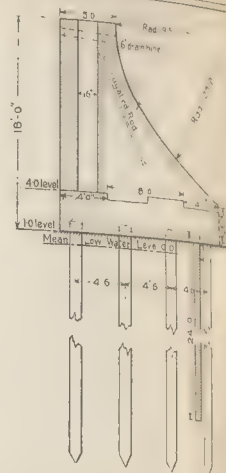


Fig. 4.

hinged bottom openings an arrangement that will considerably facilitate the filling of the contractors' canal when the time comes for that operation.

The capacity of the three larger vessels is each from 10,000 to 12,000 cubic yds. per day of twenty-four hours, and the capacity of the fourth is about 5,000 cubic yds. in the same period of time, making the collective capacity of the fleet about 37,000 cubic yds. a day. Taking this as a basis it will be seen that the actual work of excavation and transport could be performed well within a year, providing no hindrances were encountered. But there is a good deal to be done in addition to the mere shifting of material, and it would scarcely be possible to form a reliable estimate as to the actual date of completion at the present moment.

Excavation is now being conducted at the largest of the three areas shown in Fig. 2, and the result will be a material improvement of the main entrance channel to Galveston Harbour. In discharging and distributing the sand over the area to be raised, the work is being conducted in such a way that water contained in the sand will gravitate back to the canal, thus obviating the necessity for a system of drainage pipes. The final gradient of the land will have a slope of 1 in 1,500 from the top of the new sea wall. Fully 2,000 buildings will have to be raised to the new ground level of the city. Many of them will be pulled down and rebuilt, but some of the more important structures will be lifted bodily and provided with new foundations. Sewers, gas and water pipes, electric light and telegraph cables, and other conduits have also to be adjusted to the new level, and the same applies to street and other railway tracks in the area affected. When all is done the city will still be founded on nothing better than a spit of fine sand forming a small part of the extensive barrier built up along the Gulf of Mexico by the contest between alluvium-bearing rivers and the ocean. The splendid harbour provided by nature on the landward side of the island was the only reason for the establishment of an important commercial

centre on so unstable a basis, and we hope that the determined efforts now being made to overcome the disadvantages of the site will have the effect of placing Galveston beyond the reach of any further disaster. So far as it is possible to judge, this will certainly be the case unless in the totally unexpected event of a reversal of those great natural forces which ages ago raised the sandy shores of the island above the surface of the sea.

## NOTES.

**A Proposed Municipal Concert Hall.** We observe that in the current number of the *Nineteenth Century* Captain Verney goes at length into the proposal for a Municipal Concert Hall for London (which he has since brought up before the London County Council), meaning of course a Concert Hall largely supported out of public funds, as is the case with opera-houses and concert halls in many cities abroad. He suggests that the demolition of St. James's Hall is a real loss, and leaves a gap to be filled in the provision of another concert hall, and that there is thus a reasonable opportunity for the new departure that he suggests. We are entirely in favour of the idea, but may point out that there are two practical considerations to be kept in mind. 1st, that the hall should not be too large. There is a constant tendency to increase the size of concert halls, the result of which is that they become too large for the proper enjoyment of music. The Albert Hall is far too large; the Queen's Hall is too large for soloists, though it is very good acoustically for its size. St. James's Hall was quite large enough, and any increase on that size is, from a musical point of view, a mistake. 2nd, that the orchestra should be properly planned under special advice. Architects as a rule know nothing about the requirements of an orchestra; the Queen's Hall orchestra is a flagrant instance of bad planning; larger than necessary for a band only, not large enough for a band and chorus, and with the organ disposed in the most unsatisfactory manner possible for its effect. We might also suggest that if such a hall were built, some attempt should be made at a thoughtful and severe scheme of suitable decoration, instead of allowing some firm of decorators to bedizen it with a kind of lacquer of gilding and cupids. Captain Verney's proposal, we regret to say, was defeated at the meeting of the Council, but it does not follow that we have heard the last of it; and if the idea is to be taken up at all, the points we have mentioned cannot be too soon enforced.

**The Roads.** A PROPOS of our Note last week on the treatment of the roads, it may be noted that the Cuckfield Rural District Council are about to experiment on the highway with a view to providing dustless and mudless roads. The system to be tried is one which dispenses with all binding material, a granite road being rolled and shaped up, and then topped with granite chippings, some of them tarred. This road, it is estimated, will cost 27l. per

mile more than those now in use, and as the cost of the roads in the various counties varies between 80l. and 150l. a mile, it will be seen that ratepayers may expect to be called upon for an additional twenty-five per cent. or so. Iron roads made up with no binding material will prove extremely trying to the feet of horses when going above a slow pace. The societies interested in horses should carefully watch these experiments on the roads—in some instances the material used is too soft, and increases the draught, in others it is far too unyielding and hard, and it should be made certain that the living means of traction will not be made sufferers by the mechanical substitute before any universal scheme is adopted.

**Foreign Cement: a Warning.**

MANY people who have faith in the efficacy of Acts of Parliament entertain the belief that all foreign goods must be marked with the name of the country whence they emanate. Foreigners are far more serpentine in their wisdom—a fact of which one more proof is given by the information that has recently reached us concerning the tactics of some Belgian cement manufacturers. It is a very general practice in all parts of the world to employ the word "Portland" as an adjective, and to this there can be no possible objection. When admiration for the English language leads foreign cement makers to describe their products as "Portland cement," and to add such qualifications as "Castle Brand," "special quality," "trade mark," and the like, it is really time to make a protest. This is still more necessary in view of the fact that except in cases where the full names or full initials of the English importer are stated the Commissioners of Customs decline to carry out the obvious intention of the Merchandise Marks Act that all foreign products shall bear the name of the country where they have been made. Belgian cement manufacturers know this idiosyncrasy, and several of them are trading upon it with undoubted ability. We all know the loopholes that exist in many Acts of Parliament, and also that the official mind is far too ready to discover and widen such outlets. If the Customs authorities are justified in the present instance the Act should certainly be amended at once. But we cannot understand why they should ever have become conscientious objectors in a way that could only injure British industries and benefit fraudulent foreigners.

**The Metropolitan Railway Chimney.**

GENERAL satisfaction will be felt by residents in the North-West of London that the Willesden District Council have laid informations relative to the smoke shaft at Neasden, with the result that the responsible persons have been fined 38l. and have to pay a like number of guineas for costs. It was urged by the defence that an expert brought from America had so far been unsuccessful in stopping the emission of black smoke from the offending chimney. Further steps are now being taken, and we hope they will assume the form of improved furnace construction, for the existing

unsuitability of this detail is most probably the originating cause of the nuisance. To burn bituminous coal under water-tube boilers, as used at Neasden, without an undue production of smoke, specially designed furnaces are absolutely necessary. The most successful type yet introduced is that adopted at Kensington, and described on p. 279 of our present volume.

**Ayr "Auld Brig."**

We do not know why the Ayr Town Council should have thought it advisable or in accordance with the fitness of things to submit the reports of various more or less eminent professional civil engineers to the head of a contracting firm in the person of Sir William Arrol. It is quite true that Sir William has had much valuable experience as a constructor and erector of steel bridges, including foundation and masonry work, but surely a great slight was put upon purely professional men by the reference of their reports to a contractor for adjudication. Architects would not like their schemes handed over in a similar way to builders, nor physicians their prescriptions or diagnoses to a dispensing chemist. The award given relative to the "Auld Brig of Ayr" was to the effect that none of the proposals made would remove the difficulty of the reconstruction. This seems to us a somewhat ambiguous and irrelevant expression, and it is very satisfactory to find that, on the motion of Mr. Treasurer Tait, the Council agreed that operations on the bridge should be delayed for a period of four months to allow the public an opportunity of providing the means for restoration, and the experts consulted an opportunity of satisfying the Council that the methods proposed for the restoration and preservation of the structure would be such as to ensure permanency.

**The Society for the Protection of Ancient Buildings.** IN reference to the same subject, it is to be regretted that a body with such useful objects in view as the Society for the Protection of Ancient Buildings does not manage its business with more *savoir-faire*. In the *Times* of the 6th inst. was inserted a letter from the Secretary on the subject of the Auld Brig of Ayr. As noted above, the Town Council some time ago obtained the advice of several engineers on the matter of this bridge, and gave full consideration to their reports. The Secretary of the above Society appears to be quite ignorant of these facts, for after stating that his Society instructed an engineer to report on the bridge, and that his report was in favour of retaining it, he goes on to say that as the repair will cost less than a new bridge "it seems impossible that the Town Council can come to any other decision than to retain Burns's bridge." The Town Council practically came to this decision two or three weeks ago, and at their meeting this week ratified it in spite of Sir W. Arrol's adverse opinion; and the suggestion that the Council may still be of opinion that a new bridge should be built is unfair to a municipal body which has shown itself open to outside suggestion and advice. With the best intentions in the world, the Society for



the Protection of Ancient Buildings has, from time to time, by want of tact, minimised the general value of its work in more than one instance.

The Royal  
Agricultural  
Society.

THE Report of the special committee of the Royal Agricultural Society which was appointed to consider the present position of this important body was adopted at a meeting of the Council last week. Two only of the recommendations of the committee come within the province of this journal—the proposal to sell Park Royal, and to sell Harewood House, Hanover-square, or to let part of it. The purchase of Park Royal has been unfortunate, and it is clear that agricultural shows near London will not pay. But it does not appear very prudent to be in a hurry to part with the Park Royal Estate. The original vendor has, after a lapse of time, an option of repurchase, and it is obvious that in time the property must become of value as building land. As regards Harewood House, it is probable that offices could be found at less cost in other parts of London, and that a remunerative “deal” might be made in respect of Harewood House, which has an admirable West End position. But whether the sale of Park Royal now or some years hence and the vacating of Harewood House will set the Society on its legs is not a matter for discussion here. What we have to take note of is the intention of the Society to dispose of its present property—a step of some importance and interest to Londoners, and one which is momentous in the history of the Society itself, for it is in a clearly critical state. This move may, if part of other businesslike plans, prove the salvation of the Society, or it may be not more in the result than another movement towards a final though perhaps still distant crash.

Harewood  
House,  
Hanover-square.

HAREWOOD House, referred to in the preceding Note, was built at the time of the laying out of the square in 1718-9; the original elevations, one being that in Harewood-place, may be seen in the earlier views of the square published by Sutton Nicholls in 1720 (first state) and 1754, by Overton in 1727, and by others. The brothers Adam designed in or after 1776 the present two fronts, with pilasters, a rounded bay, stables, etc., for the Duke of Roxburghe, and redecorated the interior. After the death, in 1804, of the Duke of Roxburghe, the house was purchased by Edward, first Earl of Harewood. Adam's drawings stated that the new fronts were to be covered with the “Liardet” stucco, the invention of which formed the subject of a leading case—*Liardet v. Johnson*—the brothers Adam being virtually the plaintiffs. The west front, as altered by them, is depicted in an aquatint published in 1800 by T. Malton.

Bishopsteignton  
Chapel  
Competition.

THE Trustees for a new Wesleyan chapel at Bishopsteignton advertised, it appears, in the western daily papers inviting architects to compete for a new Wesleyan Chapel and Schools. An

architect who wrote for particulars received only the following in reply:—

“Teignmouth, October 5, 1905.

“DEAR SIR,—In reply to yours to hand the Trustees propose to erect a chapel to seat 150 and school for eighty, with two classrooms and the usual water-closets, etc., in the village of Bishopsteignton, and invite suitable designs and plans for same.

“Plans to be sent to [address given] on or before December 1, 1905.”

This appears to be all the information it was thought necessary to give; no plan of the site was sent, no cost mentioned, and of course no mention of a professional assessor. If the Trustees were so unacquainted with the necessary method of procedure in such a case, surely they should have taken some expert advice before advertising a competition.

The  
Leicester  
Galleries.

At the Leicester Galleries there is in the large room a very good collection of landscapes by Mr. Weedon, one of the best of our contemporary water-colour artists, who keeps up the best English traditions of pure water-colour style. There is no conventionalism in these works, none of the over-finish which robs water-colour of its best qualities of breadth and aerial effect. The fine character of the skies in many of these works is particularly noticeable, as in “Moorland, North Wales” (9); “Bosham, Sussex” (25); “The Borders of the New Forest” (33); “The White Cottage” (20); and others. Like one or two other water-colour artists of the same school—Collier and Wimperis, for instance—Mr. Weedon has a predilection for subjects with a flat landscape and a large expanse of sky, in the treatment of which there is so much scope for the free and broad washes of colour which represent the most characteristic quality of water-colour painting. “Bringing down Sheep from the Hills, Argyllshire” (47), one of the finest in the collection, shows a remarkable effect in the treatment of the mountain partially veiled in passing clouds; “Mountain and Mist” (57) is another very powerful work of the same character; and in “An Autumn Day on the Moors” (55) the succession of distances, fading off into a mere faint silhouette in the most distant hill, is beautifully managed. Every drawing is worth looking at, but among some others which pleased us especially are “An April Evening” (11); “Cader Idris” (31); and the small dark landscape, grand in effect in spite of its small size, called “A Sussex Common” (34). In the adjoining room is a collection of drawings by Mr. Reginald Barratt, chiefly of Venice, some of them not new to us. Mr. Barratt is an artist who has the faculty of painting architectural subjects so as to convey the full delicacy and minuteness of detail without ever lapsing into hardness or mechanical effect—a very unusual attainment. Possibly the warm glow which suffuses all his Venetian scenes is a little exaggerated; but there is no doubt as to the treatment of the architecture, both as to colour and texture. Nothing could be more true, for instance, than the treatment of the marble and brick in the Palazzo Samudio (1); of “The Bronze Flagstaff” (7) and of the bronze horses in front of St. Mark's (15); on the excellence of this

latter drawing we have commented on a previous occasion. The collection includes some subjects of Moorish architecture, the best of which is the interior of the mosque at Cordova (27). A study “On a Venetian Canal” (30), among the best things, also a small drawing of a most delightful Dutch mill at Vollandam. In the same room is a collection of landscapes by Mr. Alfred Powell. These are very good; in “Moorland, Cwm-y-bell” (39) the hills are very carefully drawn and modelled; but a comparison between these and Mr. Weedon's drawings illustrates the difference between well-executed conventional water-colour and that free and broad handling in which every touch tells.

The Society  
of 25.

THE Society of 25 London  
Painters, the formation of

which was noted in our columns a few weeks ago, is holding its first exhibition at the Dowdeswell Galleries. It is not very easy to understand on what principle or with what special motive the Society was formed. Most of the members seem to belong to what we may call the camp of the irreconcilables—those who are detractors of the ordinary methods of art; but then how are we to account for the presence of Mr. Melton Fisher and one or two others whose work is more in the regular paths? There is a good deal of eccentricity in the collection; a good deal of powerful work which has a beauty of its own, and a good deal in which beauty is entirely wanted. Mr. Hornel, who seems to be a follower of that wrong-headed painter, Monticelli, paints a picture of children and flowers which looks like a piece of drugget, or like a kind of inlay in which background and foreground are on the same plane. He seems to have a following; to our eyes it is a diseased form of art. Mr. Hill's “Harlech” (3), showing a hill and castle against a golden evening sky, is a fine composition of a defiant originality; the distance on the right does not separate itself sufficiently from the foreground. Mr. Alfred Withers's brown landscapes we have always admired for their power of composition, in spite of the absence of Nature's colour; “Le Pont du Massacre, Chartres” (9) is a good example, and his painting “The Mill of Muids” (11), a picture in foreground, is at all events forcible as a realistic representation. Mr. Hughes Stanton's “Evening, Studland, Dorset” (10) is a really fine landscape in a less defiant style; and Mr. Bertram Priestman's “An Old Mill” (40) is also a fine work. Some others which we do not care to particularise are positively ugly; and even in regard to such a free and clever sketch as Mr. Priestman's “A Rough Sea” (54), one may ask—is it a thing to exhibit? It is very good as a painter's memorandum, but it has no claim to be a picture, and there are others of which the same may be said. Mr. Cecil Rea's “A Nocturne” (71) is good colour, and colour is so rare in the collection that one may be thankful for that, but the drawing of the left leg of the figure is surely very unsatisfactory, or the attitude very strained and unnatural. Mr. Dudley Hardy's two little interiors with figures (2 and 78).



rather Dutch style, are very good. But if this exhibition is to be taken as a sample of what the 25 have to give us, we can hardly see that it justifies its separate existence. It is in fact a little too much like a second edition of the New English Art Club.

Mr. Jeffcock's Exhibition.  
The exhibition of water-colour drawings by Mr. C. A. C. Jeffcock, at the Modern Gallery in Bond-street, is an interesting one; the small drawings—mostly landscape sketches, are in a free and broad style and give evidence of being direct and honest transcripts from Nature. Some of those on the Norfolk coast—"View of West Runton" (5), which has a very fine sky, and "A Sunny Morning Towards Overstrand" (10), give the character of that part of the coast very truly. Among others of the best are "Cloud Effect, Barmouth Estuary" (8); "Birch Trees" (53); "Cromer from the Shore" (57); "Rolling Clouds" (62); and one (82) which, though not so named, is evidently the old round church tower of Sidestrand, now near the edge of the cliff which has for years been falling away, and will presently carry the old tower down with it. If Mr. Jeffcock is on that part of the coast again, he should try what he can make of Happisburgh with its grandly placed church—a landmark for many miles.

#### THE ARCHITECTURAL ASSOCIATION.

The annual general meeting of the Architectural Association was held on Friday at Rutton-street, Westminster, S.W., Mr. E. Guy Dawber, President, in the chair.

The minutes of last meeting having been read and confirmed, and a long list of nominations having been read, the following gentlemen were elected members—i.e., Mr. F. H. Atkinson (London), and Mr. H. S. Sawyer (Winchester).

Mr. H. Tanner, jun., hon. secretary, read the letter of the scrutineers appointed to examine the votes received in reference to the substitution of the word "Council" for "Committee" wherever it occurs in the by-laws; 149 voting papers were received, seven were rejected as invalid, 137 were in favour of the alteration, and five against it.

On the proposal of the President, Mr. J. J. Barnett was elected a member by acclamation. The Chairman remarked that now, with one exception, all the members of the Council of the Royal Institute of British Architects were members of the Association, and that that exception once was a member. He hoped he would soon rejoin.

It was announced that the following resolutions had taken place, i.e., Messrs. P. L. Forbes, R. G. Elwes, A. C. R. McEwen, and W. E. Monro.

Mr. A. Maryon Watson, hon. secretary, announced a visit to Letchworth Garden City on October 14; and a visit to the Victoria and Albert Museum on October 21, by kind permission of Sir Aston Webb, R.A. Members to meet at the clerk of works's office in Cromwell-road at 2 p.m.

Mr. Tanner announced a Camera and Cycling Club meeting on October 17, when a paper will be read by Mr. Ernest Marriage on the "Sculptures of Chertsey," at 7.30 p.m.

A meeting of the Discussion Section will be held on October 25. Papers by Messrs. H. F. Waring and C. H. Wainwright on "Assessment and Lead Lights," at 7.30 p.m.

#### Distribution of Prizes, etc.

The President then distributed the prizes, medals, etc., as follows:—

A travelling studentship, value 25l., and silver medal, P. H. Keys; Architectural Union Company's prize, value 10l., H. H. Whittington; A.A. scholarship, value 5l. 6s., C. R. Davy.

#### Studio.

Travelling studentship, value 15l. Not awarded. Division I.—Prize for study of old work, volume of A.A. sketch book; T. Bradcock, drawings and sketches of ornament, volume of A.A. sketch book; T. Bradcock, perspective, volume of A.A. sketch book; P. K. Kippes, design, volume of A.A. sketch book, and hon. mention in Andrew Oliver prize. Division II.—T. L. Dale, design, volume of A.A. sketch book; V. G. Santo, ornament, volume of A.A. sketch book; B. E. Atkinson, H. D. Ward, commendations.

#### School of Design.

Elementary Class.—A. L. Snow, prize value 3 guineas and bronze medal; 2. R. J. Casement, certificate. Advanced Class.—D. G. Round, prize, value 2l. 12s. 6d., bronze medal, and pass for modelling class; Alick Horsnell, prize, value 2l. 12s. 6d., bronze medal, and pass for modelling class for advanced class of design (eng.).

Order of Merit. Lectures. Division I.: Greek and Roman Orders.—1. G. H. Yeoman, book prize; 2. A. H. Brownrigg, R. J. Hill, P. May. Elementary Construction.—1. C. R. Davy, book prize; 2. G. H. Yeoman; 3. A. J. Perrin. English Architecture.—1. C. R. Davy, book prize; 2. P. May; 3. L. L. Jeeves. Medieval and Renaissance.—1. A. H. Brownrigg, book prize; 2. W. H. E. Roberts; 3. L. Jeeves. Elementary Physics.—1. C. R. Davy, book prize; 2. J. S. Cable; 3. W. E. Woodin. Geometry.—1. J. B. Heald, book prize; 2. G. H. Yeoman; 3. E. F. Morgan. Lectures. Division II.: Water.—1. T. S. Attlee, book prize; 2. V. G. Santo; 3. W. A. Wilson. Construction.—1. V. G. Santo, book prize; 2. G. L. Alexander; 3. S. H. J. Murch. Drainage and Water Supply.—1. I. T. Sifton, book prize; 2. S. H. J. Murch; 3. T. S. Attlee. Ventilation, Lighting, and Heating.—1. I. T. Sifton, book prize; 2. S. H. J. Murch; 3. V. G. Santo. Professional Practice.—1. S. H. J. Murch; 2. I. T. Sifton, book prize; 2. V. G. Santo; 3. J. R. Hobson. Land Surveying and Levelling.—1. J. F. Schneider, book prize; 2. B. Oliver; 3. J. H. Dahl.

#### Day School.

First Year.—E. Stanley Hall, book prize for first place in history and construction tests; V. C. Batalha-Reis, volume of A.A. sketch book for first place in freehand drawing tests; S. R. Adams, book prize for best work in studio during the whole session; W. J. Jones, master's prize for essay. Drawings selected for presentation to school portfolio.—V. C. Batalha-Reis, E. Stanley Hall, S. R. Adams. Second Year.—W. W. Scott-Moncrieff, travelling studentship, value 15l., for studio work during session 1904-05, holiday work during three vacations, and general progress; T. F. W. Grant, extra studentship, value 5l., for general excellence in studio and holiday work; T. F. W. Grant, end of session test, special prize offered by Mr. Hugh P. G. Maule, design for "A Village Hall" (award made by Mr. Guy Dawber); A. G. Blackford, H. I. Merriman, W. W. Scott-Moncrieff, bracketed second; A. N. Peckham, third; H. I. Merriman, prize for studio and excellence in draughtsmanship; R. O. Coulson, hon. mention. Drawings selected for presentation to school portfolio; W. W. Scott-Moncrieff, T. F. W. Grant, H. I. Merriman, R. O. Coulson.

#### Evening Continuation School.

A. Welford, book prize; J. K. Ground, book prize; G. St. J. Makin, book prize.

#### President's Address.

The President then delivered the following address:—

Gentlemen,—A year has passed since I had the honour of addressing you from this chair—a year that has not been without its effect upon our Association, as it marks the first session in our new premises, and puts the seal of success upon our endeavours.

Before proceeding further, I must sincerely thank you for the honour conferred upon me in being chosen as your president for a second year. The office is no light one, and the responsibilities and anxieties are great, yet it is a labour of love, and one that I feel sure no one amongst us who has the welfare of the Architectural Association at heart would wish to shirk. I would also take this opportunity of very cordially thanking my colleagues on the council and the secretary and his staff for their kindly help and consideration, without which it would have been very difficult for me to have carried through the work of the past session.

To the retiring hon. secretary, Mr. Louis Ambler, our thanks are due for the unremitting attention and zeal he has shown in the services of the Association, and also to Mr. Francis Hooper, our hon. treasurer, who retires from the editorship of *A.A. Journal*, a post which he has so ably filled since March, 1903.

I hardly think that the general body of members realise the amount of business and work that has to be done in connexion with the Association. This has largely and inevitably increased with the carrying out of our educational programme, and is being dealt with in a manner most creditable to all concerned.

#### The New Premises.

A year ago we congratulated ourselves upon entering into these new buildings, and I ventured to predict a brilliant future for the Architectural Association on this important turning point in its career. This is being amply justified, for not only are we well established in our new home, but our membership is still increasing and our various schools and classes are in a sound and healthy condition. All this is particularly pleasing, but we may congratulate ourselves yet further, for the burden of debt that hung around us a year ago in connexion with these undertakings is being rapidly cleared away, so much so that the Association may look forward in a short time to being free from any pecuniary liabilities.

At the commencement of last session we were not in a position to ascertain our exact indebtedness as the various accounts were not then obtainable, but we now know the cost, including all legal and incidental expenses in connexion with the new premises, has been 10,240l. 9s. 10d.

As you know, a generous friend made an offer of 1,000l. provided our debt was cleared off by the end of last session, and although we were unable to do that, I had the privilege of announcing at our annual dinner in May last that this conditional offer had been converted into a gift, and it gives me further pleasure to tell you that we have received this 1,000l., and that our generous friend is Mrs. Arthur Cates. It was a kind and graceful act on her part, and I feel sure the Association will join with me in giving our most sincere and hearty thanks to Mrs. Cates for her donation. In addition to this, since last October we have had promised and actually collected no less than 1,961l. 19s. 11d., including a grant of 527l. 1s. 3d. from our General Fund, reducing our indebtedness at the present moment to the comparatively small amount of 1,019l. 12s. 10d.

Gentlemen, this is a record to be proud of, and one that is worthy of the energy and perseverance of the Architectural Association. It speaks most eloquently for the *esprit de corps* that exists in our profession, for it was no light matter for a body such as this, without either official or State recognition, not only to embark on such a scheme, but to attempt to raise so great a sum of money.

All anxiety, therefore, as to the Association continuing its work under a burden of debt may be dismissed from our minds, and to no one, I feel sure, will this be more gratifying than to our old friend and past-president, Mr. W. Howard Seth-Smith, to whose initiative and enthusiasm the scheme was very largely due. It is not my intention during the forthcoming session to make any further appeals, as I am convinced the members of the Architectural Association will themselves see that so small an amount is cleared off.

#### Deceased Members.

During the past year we have lost by death an unusually large number of members, no less than fifteen, amongst them being two past-presidents, Mr. Thos. Blashill and Mr. John Norton, who, with Mr. C. B. Arding, our oldest member, and Mr. C. Forster Hayward, had all belonged to the Association for upwards of half a century; also Mr. J. K. Colling, who was hon. secretary as far back as 1850. Only a few weeks ago, the profession deplored the loss of Mr. Alfred Waterhouse, who had been a member since 1866. He was one of our most distinguished members, who took a deep interest in our work and progress to the close of his life. We have also lost Mr. John Leaning, our former lecturer on quantity surveying, and Mr. W. Aston Jones, who was one of the assistant masters in the day school, and Mr. Francis W. Bedford, whose untimely end we all regret, as he was an architect of culture and wide views, and one putting his mark upon the work of the day.

#### Successes of Members.

But, although this is a sad record, on the other hand we have much that is pleasurable to dwell upon. First and foremost, we all delight in the honour that has been so worthily bestowed on our past-president, Sir Aston Webb, R.A., about



whom in this room it would be quite unnecessary for me to speak.

Mr. John Murray, one of our vice-presidents, has been appointed Surveyor to the Crown, so that all who meet him in his official capacity can look forward to sympathetic treatment at his hands. Hardly a week passes but the professional journals announce the success of one or other of our members, and it would not be an exaggeration to say that, with few exceptions, nearly all of those who are doing good and thoughtful work are either members of the Architectural Association or have been in the past. Notable amongst those who have gained distinction during the past year are Messrs. Lanchester & Rickards, Messrs. W. A. Pite & Balfour, Mr. Hare, Mr. Arnold Mitchell, and Messrs. Warwick & Hall, and others too numerous to mention.

#### The Day School.

The success of the day school, under Mr. Maule and his assistants, has been phenomenal, and the work that is being carried on there is a source of real gratification. The opportunity students have of obtaining a grounding in the rudiments of their work, a direction in the right path of learning, is of incalculable benefit, and it would, indeed, be a great advantage to those whose future lives are cast in the provinces if they also could reap the benefit of these classes and undergo a systematic training before returning to take up their labours in the country. It would enable them not only to enjoy the companionship of their fellow-students, but to gain knowledge that would never be forgotten.

#### The Board of Architectural Education.

The Board of Architectural Education, as you know, have, within the last few months, formulated a syllabus and report upon architectural training, which doubtless will be adopted by all the recognised institutions throughout the country.

I cannot sufficiently express my opinion that this is by far the most important step towards the advancement of architectural education that has ever been taken, and it must be a source of great satisfaction to all interested in the practice of architecture, and particularly to the founders of the day school.

The Association has readily acquiesced in the recommendations of the Board, whose syllabus, agreeing very nearly with that followed in the day school has been adopted, so that our own system of training now co-ordinates very closely with others, yet maintaining absolutely its individuality as a school, which is the primary object of the Association. Sir Aston Webb and Mr. Basil Champneys have been appointed visitors, a selection that is particularly pleasing, and can but result in the prosperity of the school, as both are in sympathy with our ideas and methods.

The council of the Royal Institute of British Architects, on the recommendation of the Board of Examiners, has resolved that the drawings done by students in the day school during the first and second years may be submitted by candidates for the intermediate examination instead of the usual testimonies of study, and eventually we hope that our students who have completed the four years' course in the day and evening schools may be exempted from passing the intermediate examination on the same lines as at Liverpool and elsewhere.

And here I would wish again to express the thanks of the Association to the Royal Institute of British Architects for their generous annual donation and great interest in our educational work.

#### Classes, etc., of the Association.

Last session we established an evening continuation school, under the mastership of Mr. T. Frank Green, for the purpose of enabling more of those students who had passed through the two years' course and had entered offices, to carry on their work without intermission. The experiment was thoroughly successful, though, naturally, the numbers were limited. This session, however, we expect to do much better and to make this course, which is so indispensably an adjunct to office training, one of our most important ones. Now, I venture to think that is a good deal to have accomplished in one year, and is gratifying

evidence that the educational work of the Association is recognised as a very important factor in the architectural training of the country.

The studio work—the real foundation work of the Association—has also done well under our old friend Mr. Lewis, but several of the other classes have not met with the support they should. This is to be regretted when it is considered how essential it is for students to study the use of ornament, the drawing and proper disposal of which is most important to architects. Some day I trust the Association may be able to establish a class for drawing and modelling from the life, which is an invaluable aid to learning proportion.

The advanced and elementary classes of design also have not been so well attended, although the quality of the work done was extremely good. The cause may be that either the subjects set are too large and discourage students at the outset, so that they give up altogether, or, perhaps, that so much time has to be given up to the preparation of the institute testimonies of study that all leisure is occupied.

I feel that it would be better that such subjects should be selected as could easily be dealt with by students in the time at their disposal, and that they should be set by the visitors who will eventually criticise the designs. These classes are of such great value in enabling students to benefit by the help and advice of some of the best architects of the day that it seems a pity more do not take advantage of these opportunities, and I hope that the changes indicated, which will be carried into effect this session, will result in a return to the time when these classes were very popular.

It is a matter for regret that only one competitor came forward for the Association travelling studentship, as this makes it dull both for the Association and the student. It is such an admirable prize, and the work that has to be done is evidence of such all-round knowledge and efficiency, that I trust in future it will be better competed for.

The whole teaching of the Association is becoming so widely known that it is already a recognised practice for students from New Zealand, Australia, and the other colonies who come over to this country to become members in order to further their education.

#### The Old and the New Association.

On the other hand, it has not been possible to do all these things without some few detractors, and there are critics who decry our work and say that the Association has no right to launch out into these large educational schemes. They urge that the old feeling of comradeship is being swamped under this new régime, and that we are becoming merely an educational machine, quite different from the original idea of its founders.

Well, gentlemen, to some extent, perhaps, this may be so, and when the Association numbered some few hundreds unquestionably this idea of mutual help and teaching carried on by its own members was admirable and worked well. There can be no doubt that it tended to bind the students of those early days together, and fostered a sense of good fellowship that, in some degree, may be absent to-day. But every other profession is pushing forward on the road of knowledge and giving greater educational facilities for its students. It is not, therefore, a time for architecture, which has so lagged behind in the past, to stand still and see other institutions outrival it in the field of education.

With our membership nearly 2,000, the Association had to face the altered condition of things, and if it meant to hold its own as an architectural training ground the establishment of a systematic and definite curriculum, as now taught in our schools and in the studio, appears only the natural outcome and development of the original classes. But, on the other hand, the danger to guard against in all education is in making the training stereotyped and cut and dried, and, as a consequence, turning out large bodies of students whose ideas and methods are formulated into one set channel and whose after-work must, therefore, suffer from a cramped and too academic training. It cannot be sufficiently understood that the scheme of education established by the Association

forms only the basis on which the student himself builds the superstructure of his own individuality. It would be a mistake to think of the student's work plain and simple, and in giving him all these courses, and that then his architectural training is complete. Such an idea is the most unfortunate, and utterly at variance with the aims of the Association.

#### Efforts and Studies of Students.

It is essential that students should realise that it must be upon their own efforts and independent studies that they rely in the future, and that it is the independence of outlook and thought which has given the strength and character to our national architecture, of which we are so rightly proud.

Many of the greatest architects of the past generations, and, indeed, of this, have had no special training or facilities, but have relied upon their own efforts, on self-education, travel, and observation, combined with a keen artistic insight and conception, and I would earnestly impress upon all our members would pass through our classes and schools not to relax for one single moment their exertions and work in after years.

It seems to me that with the establishment of these schools of architecture throughout the country during the past few years a heavy responsibility rests upon the masters who have the training and supervision of those who pass under their hands, and that unless a student has a distinct aptitude and real love for the art of architecture, unless, in fact, it is the be-all and the end-all of his life, that the duty of those in authority should be to discourage his going further with it. How many there are who find after years of hard work and keen disappointment that they have chosen the wrong career.

#### Architecture—Art and Business of.

Architecture is the noblest of all the arts, just as it is the mother of them all, unless one is prepared to sacrifice everything in pursuance of that art it is better not to attempt to follow it.

An architect to a great extent must combine two qualities—qualities that are generally considered impossible to find together in one individual—the artistic and secure temperament of the artist, with the order and common sense methods of the manager.

The latter must be ever present to restrain those flights into the realms of unreality in which the former may be tempted to indulge. Success in most occupations depends largely on efficient organisation and management—that is to say, on a close relation of one part to the rest. In architecture this is especially true. It is an art which is dependent for its expression on the ability of the artist to work and obtain his results through co-operation with his employer. Indeed, architecture is, to a certain extent, more capable of being judged by common-sense methods than any other art. This is doubtless the reason why common-sense people of other professions often think they would make better architects than those they employ! The general public are more apt to look upon architecture as a business than as an art—partly because it is ruled more or less by common-sense principles, and partly because the accepted method of payment is more businesslike than artistic.

A time may come when this will be changed for a scale of charges more in accordance with a man's standing and reputation in his profession but this is neither the time nor place to deal with such a subject, and meanwhile we must accept matters as they are. We associate directness and the power of quickly grasping a difficult situation with dealing with it with the qualities that go to make a good man of business, and nowhere are these qualities so necessary as in the work of an architect, which, above all things, must be practical.

I would urge all those who are in office to try and learn all they can about the routine and working of every business, not to be content with good draughtsmanship and the preparation of a set of specifications and materials, and



such as appertains to the practical side of their work. Do not regard these as dull matters of routine that may be relegated to others afterwards—the success of your work in after life will depend very largely upon your business knowledge, as well as upon your artistic capabilities and instincts.

The office, after all, is the workshop, and, however much you may learn at classes and lectures, it is in the office that the actual work is carried out and where you will acquire that knowledge which is absolutely essential. It has been said, and I think rightly, that an architect learns more during the progress of his first commission than at any other time in his life, for here he is brought face to face with difficulties and problems that he must solve for himself.

From the commencement of the building almost countless practical problems have to be decided by him, and the most trifling defects can produce mischief. Every day he has demands made upon his judgment, and he must act impartially to the man who has engaged him and the man who is carrying out his instructions. To him also will be entrusted the expenditure and control of large sums of money, so that without practical knowledge and some business training unfortunate results in the way of extras and litigation are bound to follow.

In the management of accounts, in keeping a constant check and supervision of expenses, it is obvious that in his client's interest an architect must be a careful man of business. Not only so, but in the artistic side of his work, in the arrangement and disposal of the plans and elevations of his buildings, the business quality will again make itself felt. It would be an admirable thing if for some months you could get on a building under some capable clerk of works and see the work carried on from day to day. In this way you would have an opportunity of seeing the drawings you have previously been engaged upon being translated into actual brick and stone. This would give you self-reliance and confidence in your judgment, and accustom you to the decision at every-day problems.

#### *Houses for the Working Classes.*

Many of us this year have viewed with considerable interest the attempt made at Letchworth to solve the question of the better and cheaper housing of the working classes in rural districts. It does not seem to have been entirely successful, and it is open to question if much real progress has been made towards a solution of the problem.

The main idea and principle governing all good design, both in plan and elevation, is suitability for its purpose, and here too frequently no inquiry seems to have been made by the designers as to the mode of life and the requirements of the people for whom these cottages were primarily intended. Only an intimate experience of the working classes, their needs and habits and casts of mind, can enable any architect to cater for them rationally and well; indeed, without a thorough acquaintance with the requirements of one's clients it is difficult for an architect to produce a satisfactory building. But in our ways the exhibition is instructive and interesting, as showing that, after all, the cheapest and best buildings can be erected in brick and tile and of the natural materials of the country, and also as evidence of an endeavour on the part of architects to deal with the multiplicity of newer and cheaper materials in an artistic and yet sensible manner; and, though many of these do not lend themselves at present to a very sympathetic treatment, yet much has been attained in that direction. In using new materials an architect has to be more circumspect than his predecessors, and he has to discriminate in their use, as in adopting any of them he assumes responsibility for their good qualities.

I feel that all our members would do well to visit Letchworth and study the buildings there, from a practical point of view.

The exhibition, the outcome probably of the strong feeling aroused by the building by-laws in country districts, is most interesting and instructive, and, moreover, is evidence of an awakening interest on the part of the public, however tentative, in the restrictions and conditions under which architects are sometimes obliged to carry out their work.

#### *Buildings in Towns and Cities.*

Last year, in this room, I drew attention to the manner in which some of the new buildings in our towns and cities were treated, often entirely from the commercial point of view, and without any regard to their position and the dignity of their surroundings. The subject, though not in any way new, aroused much interest, and has been frequently referred to since, and now that such a large portion of London is being almost rebuilt, the public, through force of circumstances, are obliged to notice what is going on on every side.

People, in general, are inclined to shift the responsibility for this condition of things upon other shoulders, and blame the architects. They say that the fault rests entirely with them. Unfortunately, until the public are induced to appreciate the difference between good and bad architecture, and are urged as citizens to take a pride in the beautifying of their cities, so long will this indiscriminate disfigurement of our streets and thoroughfares continue. Familiarity, as you know, breeds contempt, and it also breeds indifference, and the public have become so accustomed to accepting certain things they see around them as being necessarily ugly that it does not occur to them to consider why they should be so or whether they could not be otherwise.

The long monotonous rows of jerry-built villas at seaside resorts or on the outskirts of our large towns, the pretentious and vulgar houses jarring with and spoiling the old-world charm of our country towns and villages, our railway-stations, workhouses, and factories—all these things they accept as a necessary evil and as part of the so-called progress of the age, just as they do the increase of rates and taxes. And when we consider the matter seriously, what encouragement is ever held out by our press, or art critics, to induce the public at large to take the least interest in this—the noblest and oldest of the arts?

#### *Architecture, the Press, and the Public.*

If we turn to our newspapers or magazines, we constantly find criticisms of pictures and paintings, often with interesting details of the work of the artists; but if we read of the opening of any building or the consecration of any church, the architecture, or even the name of the architect, is barely or seldom referred to. In the annual notices of the work at the Royal Academy the reviews in the papers stop short with a perfunctory notice of the sculpture, and never refer to the architectural designs or drawings at all. It has been truly said that the English as a nation "See with their ears," and the view the general public take of art at the present moment is entirely due to what has been written and published about it, and if no reference to or intelligent criticism of the enormous number of new buildings is ever made, how is it possible for the public to know what is good and what is bad?

There is no doubt that exhibitions, both public and private, have done much to popularise the arts of painting and sculpture—indeed, in the minds of many people art is only associated with the contents of our picture galleries and museums—that, in the form of architecture, it should help to elevate and ennoble the lives of the dwellers in our towns and cities never seriously occurs to them.

In our galleries, as you know, the actual finished works are shown—the pictures painted and completed by the hands of the artist. The representations of architectural buildings, however, convey to the public but little idea of the actual buildings themselves, and, as no attention is ever drawn to them, it is not surprising they receive no regard. When it is realised that the street is the architect's picture gallery, and that when he erects a building on a public thoroughfare, country road, or wherever his commission may lie, that his work is on exhibition, not for some few months, but for years to come, then I think the architect will recognise the responsibility of his task, and the public, if their attention is drawn to its good or bad qualities, will soon begin to take an interest in and criticise the work. Not that they do not criticise, and freely too. This, perhaps, to thoughtful men is the most disheartening

and unsatisfactory part about it, for people who would be dumb before a picture or piece of sculpture let loose with the assurance of absolute ignorance the invective of their opinion on architecture, quite regardless of whether they are right or wrong.

Indeed, the standard of taste in this country with regard to architecture is such that often a really fine and dignified work passes unnoticed or merely excites ridicule, because it is unusual and not in accordance with the popular taste.

It cannot be urged that the architecture of to-day is beneath sound criticism, or suggested that the large body of men who are engaged in the art are all incompetent and build what is unworthy of admiration—such would be unjust and absurd—for we know that at the present time work is being done in this country, not only in architecture, but in painting and sculpture and the subsidiary arts, that not only holds its own with, but surpasses, that of other nations.

Again, it cannot be that the public are altogether indifferent to architecture, for the veneration and regard in which our cathedrals, churches, old castles, and houses are held is evidence to the contrary—a veneration and admiration created and fostered by the halo of historical sentiment that has been drawn around them by our poets and writers of all ages.

I think we must, therefore, acknowledge that the lack of appreciation of architecture in this country is due not to apathy or indifference, but simply to want of knowledge.

#### *Should Buildings be "Signed"?*

On the continent it is the custom for an architect to sign the buildings which he has designed and erected, and I cannot help thinking that if this were done in England it would tend to make architects more careful of what they produced, as they would then have to stand or fall by their works. This would naturally be unnecessary in every instance, but, if an architect felt he had produced a building worthy of his art, I cannot see why it should be considered in any way derogatory to his calling for him to sign his work, any more than in the case of the painter or sculptor.

If this were done generally it would possibly tend to raise the quality of our work, and would in time arouse the interest of the public. But if we wish to produce architecture that is worthy of admiration, it is essential that we should educate and train ourselves, and spare neither time nor energy in the study of our art.

The outlook of architecture in this country at the present time was never brighter, for a large section of the public are becoming more appreciative and discriminating, and the number of brilliant and thoughtful men who are devoting all their time and enthusiasm to their work is day by day growing rapidly larger, and the Architectural Association is one of the foremost bodies in contributing to these ranks.

If we expect the public not to be indifferent to architecture we must produce work that is noble and beautiful, and though at the time it may not be appreciated at its full worth, yet our efforts directed in this spirit will most surely help forward the realisation of that standard which it must be our ambition to reach.

Our chief concern, gentlemen, must be to keep steadily in view the nobility of our craft. It is one which should be incompatible with low ambitions and ideals. There is always the temptation, which we share with other callings, to subordinate our work to inferior ends and commercial considerations. Let us lay it to heart that in a high conception of our art lies the best protection against this danger. There is a wide field open to originality and wise adaptation in architecture to-day, for the possibilities of progress are never closed in any department of life, and, however glorious the architectural heritage bequeathed to us may be, there is always an opening for further advance. The truest reverence for the past rests in the conviction that it may be improved upon.

As I have already pointed out, our work is on continual exhibition before the public eye. How far this open picture gallery is to win for architecture increasing respect and



recognition, how far it is to become more and more an effective means of educating and quickening the public taste, will depend largely on the high view we take of the obligations of our art, and it is to create and sustain this high view that the Architectural Association, over which I have the honour to preside, exists and works.

Mr. Leonard Stokes said he desired to propose a very hearty vote of thanks to the President for his most excellent address. He remembered about thirty of these presidential addresses, and the address they had just listened to was certainly one of the best. Mr. Dawber deserved their hearty appreciation for what he had done for the Association, and they must thank him for again accepting office as President. Of Mr. Dawber's works, they saw them in the picture gallery he had spoken of, i.e., the street—or rather, the country lane, which, in this connexion, was the same thing—and Mr. Dawber not only preached excellently, as on this occasion, but he carried out what he preached. The Association's debt, which was vanishing in a most extraordinary way, was largely due to the efforts of the President—aided by Mr. Driver, their secretary, who had been most indefatigable in the matter—and of many kind donors, particularly Mrs. Arthur Cates. If he might be allowed to say so, the new premises of the Association, in spite of the numerous defects, was not half a bad building, and it was one which, having discounted the defects, they might feel proud to own. It was something for a body like the Association to own such premises, and if some people regretted the past, to some extent, the present surely afforded more opportunity for that good-fellowship which they all wished for! Had the Association ever before had premises of the kind they now possess in which to meet? Had they ever before opportunities for studying fine examples like the casts they had in the museum? And had they ever before so many opportunities for intercourse—the A.A. Journal, the Purple Patch, and in various other ways? He thought there was as much good-fellowship in the Association as ever there was. The old system had altered a little, but the new one, if properly taken advantage of, was every bit as good. He was glad to hear the President commend the work of the schools, and especially that Mr. Maule's name had been mentioned in the way it was. The work which had been done in the Association schools was simply wonderful, and the way that Mr. Maule got his pupils to progress was remarkable, and it was to the benefit of the profession generally, and particularly the young men themselves, to have such a start as they were now getting under Mr. Maule and his staff. He might say a few words to those students who were present: Drawing was nothing compared with the work an architect had to do. It was all very well for a young man to make pretty drawings and make two lines meet after a little fudging, and so on; but that he must not do in his building, for fudging found him out in a terrible way. Things could not be dodged about on buildings as they were on paper, and one must think of one's design as a real thing, and not as a piece of cleverness on paper. As to the Board of Education, he had the honour to be a member, and the work they had had to get through was rather ponderous, but they had come to some sort of a conclusion, and he thought it could not but be to the benefit of the profession generally if some common course of training was recognised as the right one for all young men to go through. There had been so many mistakes made in the past, and young men found it all out too late; they should have done one thing when they did quite another, so that if we could get a recognised scheme, and let all young men work to it, it could not but be a good thing, and that was what the Board of Education are trying to do. They had got as far as to realise that the work of the Association was as good as its past records, and took an occasional hint from the Board of Education, it would continue to benefit, and the whole profession as well. The President had pointed out that two qualities were required in an architect—perhaps Mr. Dawber was not over-generous in saying that there were only two;

it seemed to him that an architect had to possess an extraordinary number of qualities if he was to succeed—which qualities were the artistic and the business. He (the speaker) would like to point out to those who thought that the business part of an architect's career was to be shirked that it was rather an extraordinary thing that most of the good and successful men—all the good architects, in fact—were extraordinary good business men as well as good artists; they grasped the fact that to put up a good building and be a good architect it was necessary that business matters and practical projects which affected the architect should not be shirked.

Mr. John Murray said he had very great pleasure in seconding the vote of thanks. The President's work and energy in the cause of the Association were vast and untiring, and it probably was not realised by most of the members how great was the work which the President did for them. The happy position in which the Association now found itself was largely due to Mr. Dawber's efforts. The address was so true that it was really beyond criticism, and it was full of hope and encouragement. It was to be hoped that the young men of the Association would embrace the educational opportunities which were now afforded, and which, he was sorry to say, had only recently been available. The facilities for study now offered by the Association would, he was quite sure, produce in the future better architects and architecture. He might say to the students who had not received prizes that evening that they should not be discouraged, for it was not always the prize-winners who had been the most successful architects in the past. Students should cultivate the two essential qualities mentioned by the President, i.e., the qualities which produced the artist and the man of common-sense business capacity, and they should remember that there was always room at the top. The aim of the architect should be to produce work which, as the President said, was noble and beautiful; such work could not satisfactorily be done without considerable study, and facilities for this were presented by the educational scheme of the Association.

Mr. Louis Ambler said he had great pleasure in supporting the vote of thanks to the President for his excellent and eloquent address. It was seldom that one heard an address which contained so much of interest and helpfulness in the way of hints and suggestions. Mr. Dawber spoke energetically and whole-heartedly for the Association, and it might not be generally known, but it was a fact, that Mr. Dawber himself wrote or signed many hundreds of letters appealing for contributions to the building fund of the Association, and the present position was largely due to his personal appeals. It was a pleasure, too, to work with a president who was so genial and tactful, and this was especially so in committee. The Association had good reasons for congratulating itself on having so nearly removed the debt incurred in procuring their excellent premises, but they should remember that that was not the end they should have in view. There were a great many other wants besides those they had realised. There was a great deal to do in the way of fully equipping the premises, and in rehanging and repainting or cleaning the casts, and in the provision of things they might hope to have in the future, such as workshops and life classes, modelling-rooms, etc., so that the clearing off of the debt was not the only thing they had to think of.

Mr. Edwin T. Hall, who spoke in support of the vote of thanks, referred to the indefatigable way in which the President worked for any cause he took up. As to the President's recommendation to students that they should exercise individuality in their work, he knew that the President did not mean that they should be eccentric and go against all the canons of construction and design, but that they should not set themselves in the rut and blindly follow the traditions of a school, but that they should apply the knowledge gained in such a way as to give expression to their own mind, and let it be seen in the work they produced. He ventured to suggest that young men should not shirk taking upon themselves responsibilities. He believed that one of the best means of training

a young man was by giving him individuality, and although it is true, like every one else, was liable to make mistakes, he should not shirk responsibility for fear of making them. It was the responsibility that made a young architect an efficient architect in the end, and to come. He was glad to see the President's remarks about the Association being men of business as well as artists. He (the speaker) could remember the time when if an architect professed to be a man of business he was rather sneered at—he was "not on the art side," he was told; but he was all in the past. An architect might be the best artist in the world, but if he did not possess business instincts he would not succeed, for no man of sense would entrust him with work, or with large sums of money unless he had business capacity. As to drawing, men should not look upon it as the be-all and end-all of an architect's work. It was a mistake also to make a pretty elevation, and then to make the plan fit the elevation. That was the wrong way. Every plan should provide what was necessary, and while an architect designed his building and made the plan and the arrangements convenient, the external design would grow *pari passu*, and they would get the building perfect in all parts. By expressing construction and the uses of their buildings they would get a satisfactory result. He should like to congratulate the Association on having so fine a set of buildings in which to carry on its work. The chief thing about the Association was the spirit in the work which was carried on, and the system of education which had been inaugurated within those walls. No words would be too extravagant to express what was being done by the excellent staff of teachers, and he had been delighted to see the progress made. Mr. Maule had the quality of enthusing his students, and of bringing them on while making them grow up in the spirit of freedom and individuality. Mr. Stokes then put the vote of thanks to the meeting, and it was heartily agreed to and Mr. Dawber briefly replied.

The Chairman announced that the next meeting would be held on the 20th inst., when Mr. Andrew Oliver will read a paper on "The Ecclesiastical Architecture of the City of London," illustrated by lantern views.

The meeting then terminated.

#### THE ARCHITECTURAL ASSOCIATION SCHOOL OF DESIGN.

THE Preliminary Meeting of the Architectural Association School of Design was held on Tuesday at 15, Tuford-street, Westminster, S.W., Mr. E. Guy Dawber, President of the Association, in the chair, when addresses were delivered by Messrs. Arthur Keen and A. T. Bolton.

Mr. Keen said that advice to students had been given so often by such well-qualified professors that he had little hope of throwing new light on the subject. The ground had been cleared and paths had been indicated, but progress was still slow, and he took it that a student's main difficulty was to grasp his subject as if it were a real thing instead of one that begins and ends with a sheet of paper. The architect in practice had the stimulus that was given to him by considerations of cost and construction, the limitations of approach and aspect, adjacent buildings and the like, and by his responsibility for producing a building that should answer its purpose well and completely and satisfy his client as well as himself. These things, although they might hinder him to some extent, helped him at the same time by making the problem real and tangible, and confining his action within certain boundaries. Probably his chief drawback was that he was working mainly by means of paper and a drawing-board in an office instead of, as in old days, mainly by means of building materials and workmen in the open air. Those who designed the old buildings were closely in touch with them, and the value of this personal contact was seen in all their work. The actual ground and materials before them were full of suggestion and guidance, and we should derive the same help now if we were to use the actual stone and timbers instead of



making drawings of them. A well-known architect told him once that the best thing he ever designed was a garden terrace made up of materials that his client had got together and wanted him to use without much addition. There were quantities of old balusters, bought at a sale, a truck-load of rubble which had gone astray on the railway, some steps, some bricks, and other things. They had to be dealt with at the site, and the very difficulties they imposed gave interest to the problem, and suggested the happiest solution of it.

He had often noticed the happy effect on the building of an important piece of heraldic work having to be incorporated in the design, as, for instance, in the Cambridge colleges that they saw recently. It was not only a spot of beautiful ornament in itself, but it affected the general design by the setting it required, or perhaps by suggesting other points on which decoration could be concentrated. Something definite to start from was as useful to a designer as a good text was to a preacher; it imposed a line of thought or treatment, gave scale, suggested composition, and otherwise removed uncertainty. Let them try it for themselves by designing a pavement in which two main lines of approach govern the scheme, or a ceiling in which the main divisions of the pattern were marked off by certain recesses or windows; they would be surprised to find how their invention was stimulated by the necessity to comply with certain unequal dimensions or some apparently unpromising angles. Certain forms and sequences were soon found to be inevitable, and where they arose in this way they generally proved interesting and effective.

Accordingly, he suggested in connexion with the subjects actually set in the School of Design that it would help a student if he could find an actual place to receive his design. For instance, in Mr. Hare's subject of an entrance to a park, it might be well to take the Albert-gate entrance to Hyde Park and make the design as if for a rearrangement of this entrance. For the book-seller's shop front a definite house in Bond-street might be settled on, and a new front assigned to suit it—perhaps with a side entrance to a print gallery upstairs and a bit of forecourt in front marked off with a railing at both ends. The actual location and existing conditions could not fail to be suggestive and helpful. As an instance of this he would mention a very successful piece of treatment that he saw lately in an addition to an old house in Kent. It was a simple Georgian house, with a big bay on the side and a doorway on the other, but nothing about it of much interest. The architect had taken the doorway as a centre and had doubled the front, thereby making a long, low symmetrical elevation of good proportion and considerable merit by the mere repetition of what had not in itself much beauty. Had the house been a new one the possibilities would have been more numerous, but the design would probably not have been so good. The limitations of the case had themselves suggested the best solution of the matter. Very much might be said in extension of this point, but a little experience would convince them that in this, as in most things, qualified liberty was better than unlimited freedom. Another thing he would like to impress on them was the necessity for working up their subject and getting technical information about it before going too far with drawings. For instance, to take a familiar example, the treatment of a stable must depend entirely on the class of horses it was for. For cart-horses it would be a huge open room, perpendicular on an upper floor, and with a great bay under it for carts and vans. For race-horses it would consist of ranges of separate large loose boxes round three sides of an open yard. A stable for carriage horses would have all kinds of accessories that would be useless in one for hunters. A shop that was convenient for a West-end boot-maker was useless to an East-end one, and so forth. It was essential to know all about the particular uses a thing was to be put to before they began to design it. A clock-maker showed him recently a large clock—designed and made by a certain guild of craftsmen; it was adorned with green paint and gilded hearts, and was striking enough in appearance, but it was not deep

enough to contain a clock, and there was no way of winding the clock without taking the case to pieces. Five minutes' conversation with the village clock-maker would have given the designer the information he so badly needed. And even in things that were designed mainly for appearance rather than utility—such as memorial tablets, for instance—it was wonderful to see how much one's eyes were opened by the close study of a few good examples and a chat with a man who had worked on such things before. If they had, for instance, a library to plan, they should not be satisfied with looking at drawings or reading books on the subject, but go themselves to two or three libraries in the evening and see them in full work—talk to the librarian and hear what he had to say about the loss of time or the expense of management consequent on defects in the planning, ascertain his views about windows and tables, the storage of books, and such things. They nearly always found that an expert approached a matter from a very unexpected standpoint, and, as the points he raised were probably vital ones, it did not do to neglect them. They asked a marble mason whether some columns they were designing would be strong enough for the weight they were to carry, and he would very likely say "Yes; but there is no marble of that size to be had without special quarrying, and you may have to wait a year before you get it!" Those who live in London had the advantage of being able to see and study every kind of building without going far. They could visit a country mansion at Kensington, or a bell foundry in Whitechapel. If they wanted a Gothic church, the most beautiful one in Europe was open to them; if they were designing a steeple, they might see half a dozen fine ones in half an hour's walk. They had examples of bridges of every kind—granite, stone, timber, suspended, hinged, steel, or iron. They might study park lodges at Regent's Park or Kew, entrance-gates at Gray's Inn or Hampstead, country churches in the old suburbs, terraces of Georgian houses at Edmonton or Clapham. They had a Tudor palace at Hampton Court and an ancient hospital at the Charterhouse, and, in addition to this, the museums and libraries were full of books, drawings, and examples of the best kinds in existence, so that there was no excuse for a man who did not acquire some information on the subject he undertook to deal with.

Might he say something on the question of style in connexion with their designs? He was old-fashioned enough to think that students ought to adhere more closely than they generally do now to the recognised styles. From one point of view, the styles might be taken broadly to typify the various attributes of good architecture. Norman work might stand for solemnity and mystery, Early English for vital force, decorated work for intrinsic beauty, and so forth, and he thought the best way of studying the styles was to work in them. A man with ability would emancipate himself in due time and express himself in his own way, and, on the other hand, the work of a bad designer would be less painful to us if he used recognised forms than if he invented new and terrible ones for himself. The newly-invented vulgarities of to-day offend one far more than the dull, common-place work of forty years ago. Some authorities tell us to go back to the simplicity of mere good workmanlike building, as opposed to so-called architectural design, and perhaps to work in some actual trade ourselves in the hope that we might thereby develop style, if not a style for ourselves; but, looking at the complex conditions of modern life, it seemed to him an impossible course. An individual here and there might do it for himself, but it did not seem to be a method by which the architectural system of the age would be regenerated, nor did it seem to him to promise to meet the needs of the case. The particular characteristics of Bow steeple or the west front of St. Paul's were not those which came from working at a carpenter's bench or a blacksmith's anvil, and Sir John Soane's wonderful interiors were not produced by the study of carving wood or modelling plaster. By all means practise some handicraft for themselves if they wished to; it would give them pleasure, it would teach them a great

deal about the qualities on which beauty of detail depended, it would show them how to use material and workmanship economically, and not to waste their resources—but they must not expect too much from it. The methods and qualities of ancient building were gone with the social life of the past, and could no more be recovered by putting architectural students to forging iron-work or making pipe-heads than the rural life of a century ago could be restored by people of education and refinement going to live in labourers' cottages and cooking their own porridge in earthenware pipkins over a wood fire! The student had still got to study the architecture of the past concurrently with the building methods of the present, and to learn to carry his ideas into effect by means of good working drawings and well-written specifications. He must learn by analysis and comparison what gave works of art their peculiar charm, and how it was produced. He must find out how the materials of a building and the uses it was to be put to had influenced its design. He must learn the proper uses and limitations of ornament and get into sympathy with the spirit of those who applied it in the building he studied, and then he would know how to use modern materials in buildings for present-day purposes, and how to adorn them with such enrichment as their nature allowed.

In this connexion he would point out the great desirability of taking measurements of the details of old buildings and getting into the habit of remembering them and contrasting them with current examples. They would find noticeable points of difference between old and modern designs in the heights of doorways and arcades, sizes of window openings and mullions, projections of bays and chimneys, and all such things. They might not be able to adhere to the old types in their own buildings, but the knowledge of them was useful to possess. The great thickness of old walls and piers was generally due to the very poor material they were built of, but it had an important bearing on the treatment and spacing of windows. Old flues were larger than modern ones, because they had to be swept by boys climbing up them; they could not make them so large to-day, but it was useful to see what a look of size and stability the chimneys had in consequence of these big flues. Actual size was a very important consideration in architectural design. Those fine brick and stone gateway piers on the west side of Lincoln's Inn-fields were 3 ft. 6 in. square and 23 ft. high. They might have been half the size without much difference in design, but they would not then have had the particular air of distinction which they possess, and which confers such dignity on the house they belong to. Facts like these, if properly understood in their relation to design, were an important part of their architectural outfit, and often more valuable than facility in design or power of invention.

As to the treatment of the various features of their designs, they must study to give them due importance, and not to introduce too many of them. Many a good design had been spoiled by too much being attempted and by emphasis and concentration being thereby lost—as, for instance, in much of the modern work at Cambridge. It was seen, of course, in close comparison with old work of a similar class, and, beautiful as much of it was, it was felt to lack the peculiar effectiveness and value which were the outcome of restraint on the one hand and concentration on the other, shown so well in the old examples. He had a photograph of the Maison Espagnol at Antwerp, as fine a street front as they need wish to see—the seven stories were very nearly alike in design, but what value the main lines of the front gain by the simplicity of its treatment, and how effective the design of the gable was by contrast with the regular divisions of the main wall below! And they could note further that this could be achieved without any loss of richness in the lower part.

It was most important, too, to let each feature appear as an essential and integral part of the building, so as to avoid the detached and uncomfortable look that was so common. There were few modern architects who could give an exterior chimney the peculiar effect that an old one had of



seeming to have grown up with the building as part and parcel of it rather than as an accessory that had been separately considered. An old Tudor bay gave the impression of having been carried up course by course with the rest of the structure; a modern one too often looked to have been put on afterwards—which was indeed often the case. The things which we might consider the distinctive features of a building were in great danger of being over-designed, and thereby detaching themselves and losing the particular value that should belong to them.

Finally, all manner of rules and principles might be laid down and carefully followed; but, unless that indescribable something which might be called artistic feeling or taste was present, the result might be a thing which could not fairly be criticised, but it would not be a work of art. In former times, when people did not live among vulgar surroundings, good tastes was natural and spontaneous, but nowadays, except in rare cases, it had to be developed, and the best training they could have, in his judgment, was the constant study of old examples. He suggested to them not to study them in a desultory fashion, but to take up from time to time the pursuit of particular lines, because by that means they got easily into a close and accurate habit of observation and comparison. Say, for instance, that they took up the subject of gate-piers or chimneys for a time; they found examples of them wherever they went, and, as they were interested in them, they took particular notice, instead of satisfying themselves with a casual glance. They got into the habit of arranging them in classes and noticing the features in them that were most capable of artistic treatment, and perhaps incidentally they might make a collection of drawings that would form the material later on for a useful publication. "Or take up the work of one of the old engravers, for instance; buy a few of his prints at a sale at Sotheby's, go to the museum and ascertain what state of the plate they represent, compare them with the same artist's earlier and later work. You will soon become interested, and learn to appreciate the beauty and artistic value of them. You will begin to compare them with other work of their period, and before long you will have acquired an amount of knowledge about a particular branch of art that will be very valuable to you, if not to others also, and incidentally you will help to make yourself an artist by entering into and valuing the qualities of artistic work. By every means in your power learn to appreciate and love the beautiful things you find about you in nature and art, and then if you have the capacity for arrangement and construction you will design beautiful and noble things, and if you have not that capacity your work will, at all events, be qualified by good taste and moderation."

Mr. Bolton said he did not like to refuse the invitation to be present and address them, because he was an old member of the Class of Design, and he felt that while he would not give a special address, yet he could support what was said by Mr. Keen. He would, however, take that opportunity of referring to the gratitude which pupils owed the heads of offices, for he knew personally how many times Mr. Keen had given him good advice in regard to his work in class designs. Pupils, if they were treated as he was by Mr. Keen, owed a very great deal to the heads of the offices. Personally, when particularly busy he wished he had not got an office at all or pupils who wanted instruction. He remembered Mr. Mountford, in the course of some very wise remarks to students, saying: "When the head of the office is in the midst of a competition do not go and ask him whether a 14-in. wall is to be put in with a thin line or a thick." The Brown Book told one the date at which one joined that Association, and he found he joined in 1885, exactly twenty years ago. In those days he had a very bad habit of keeping a diary—a habit which he had long since abandoned—and he had the curiosity to turn up that diary, and he found this entry under the date of October 9, 1885:—"Association Soirée, Prince's Hall; thought of going, but did not." He thought that was a characteristic entry, and would apply to three-quarters, or certainly two-thirds,

of those present. What happened was this. A young fellow coming back from his holiday felt very energetic, and made up his mind to go in for these classes, and for the first two or three months there were more members of the classes than the visitors could attend to. But when February and March came round they found that what was a promising class had dwindled down to a very small number. He would impress upon them that the value of these classes depended very much on the regularity with which a student attended them. He had seen a young man who had never made a design before come to a class and make a design which was absolutely bad. After a very few meetings, however, they would find that such a man would improve immensely. Therefore he urged on those present to come to the classes, however feeble they might feel themselves to be. It might be that they had never made a design before, but that did not matter. If they came regularly and put a sufficient amount of trouble into the work, he would undertake to say that at the end of the session they would be in a totally different position to what they were before. Another entry in his diary was October 29:—"Saw the Association Brown Book. The subject to be dealt with was 'Doorways.'" Mr. Keen had told them that the study of old examples was the right thing for young men, and that coincided with what was done twenty years ago from the entry in the Brown Book. Turning to his diary again, he noted the entry:—"November 12. Tufton-street; museum full of smoke and cold draughts." That state of things did not exist now, for when students came there there were not only good examples to be seen, but there was a considerable amount of comfort, which did not exist in the old days. There were other extracts, which he would not trouble them with, but he did wish to impress on them the benefits they could gain by coming to work at that place and the advantages they would get by continuing to work when they had once started. He remembered meeting a student in the old days and advising him to join the Association classes, and he replied: "I do the subjects and work them out at home, and I do not think it worth while going to the meetings." He did not think that any man who went into his work with such a spirit would do much, because it was a great mistake to feel that what they elaborated for themselves would be all the better for not being seen. The fact was that a young man beginning to make designs thought they were a great deal better than they really were, and the advantage of coming to such classes was that a man learned that there were others in the world who could do something besides himself, which was one of the most valuable lessons a man could learn. By attending the classes they would benefit by exposing their designs to the free and friendly criticism of their colleagues, and they would have the advantage of seeing what others had done and noticing how they treated the same problem in different ways, and they would probably come to the opinion that, after all, their own design was not the best. He remembered going over a building of an old fellow student and noticing some moulding he had done, and he had asked him what on earth he did a thing like that for, and he replied: "At the time I did it I thought it was the only possible mode in which it could be done." There were, however, many ways of doing it, and doing it better. The advantages of these classes were that these things were brought home to them, and they got the advantages of companionship in study. He remembered asking a fellow student in an office why he did not come to the classes, as there was a deal of work, but also a good deal of fun, and the man replied: "I can see where the work is, but I cannot see where the fun comes in." He could only advise them to come, and if they could not find a certain amount of fun in it they had better not be architects.

Mr. H. H. Statham said that in the light of Mr. Bolton's confession of his early entry in a diary he felt rather virtuous that night, because his own entry in the diary for to-day would have been:—"Thought I would not come, but did." He was very glad he did come and have the pleasure of hearing the very well-reasoned and practical paper of

Mr. Keen, with all of which he was particularly in accord. Keen on what he said of irregularity or little accounts in a site, as affording suggestions. He remembered complaining to him that he was going in for a competition, and he said: "It is such an abominable site; it has no regular shape." He replied: "That is the very thing that suggests treatment to you." In regard to making designs for some special sites, Mr. Keen suggested that it would be a very good thing if designs made there were calculated for some special site as if they were going to treat it anew. He thought it was a very good suggestion, and they would realize it if they compared it with the plans which were made by the students at the Ecole des Beaux-Arts. There they were given the problem to design a bank, or something of that sort, and were given no limitations of site, or position, or anything. It induced the most magnificent designs—the largest possible scale, which never would be built except in Utopia or some city where money would be of no consequence at all. There was, of course, the advantage and pleasure of giving full scope to the imagination of the sublime, but it did not fit people so well to deal with the practical problems which came before them in architecture. Then Mr. Keen spoke about the advantage of old examples. He quite agreed with him there, with this limitation—that they should be studied keeping in mind all the time that the object was not to imitate them, but to learn from them. He thought that the reason why they began studying the orders and studying ancient examples in classic and Gothic work was really to form a taste and to form a perception of what was refined and what was in good proportion in architecture. Now the want of that was very obvious in some of the efforts which engineers made in design. He was particularly struck with it two or three years ago, when a really able paper was read by a young engineer at the Institution of Civil Engineers upon the aesthetic treatment of bridges and engineering works—he forgot which. The paper was an admirable one; the principles were first rate, and there was nothing from beginning to end which an architect would not have agreed with. He got into correspondence with that gentleman, who sent him the design of a bridge which he had made. It was one of the most awful things he had ever seen in his life. The reason was that, although the engineer had thought about the principles of the subject, he had obviously never been through the training that architects went through in studying ancient works, and copying and drawing them, by which they got their perception and architectural tastes developed. That was perhaps the most important reason for studying old work—that it formed their taste and led them to see how they got refinement and proportion, and how the designs which had not got these qualities differed from the designs which had them. He was sorry he had not any paper on which to take notes for there were one or two other points in Mr. Keen's paper which had struck him, and which he would have referred to. Taking altogether, he felt that the student could not do better than take to heart what Mr. Keen had said, and endeavour to follow it as much as possible. He had very much pleasure in proposing a vote of thanks to the reader of the paper.

Mr. A. Maryon Watson seconded the vote of thanks. He said that Mr. Bolton had suggested some reasons why students should come to those meetings, but one great thing was that not only did they meet with one another, but they had the immense privilege of meeting men who were successful architects, and they heard their ideas about practical matters. In an ordinary office they might meet with one successful man and get to know him very well, but if they came down to those classes and worked intelligently they would probably make acquaintance with men who would be friends for the rest of their lives.

The Chairman, in putting the vote of thanks to the meeting, said that the addresses had been exceptionally interesting, and that by Mr. Keen was quite one of the best he had ever heard. It was so practical, so full of real good suggestions and clear and sound advice, that it was almost impossible



to know what special point to take up. He could only advise students to read it again and thoroughly digest it. There was one point which Mr. Keen emphasised which was that Mr. Leonard Stokes referred to in that room the previous Friday night, and it was that students when they were designing should accustom themselves to thinking of the building as a whole—seeing it in perspective, in the round, thinking of it complete in itself. They ought not, as used to be the case in his young days, design the façade and let the rest take care of itself. They would never make a good design unless their mind's eye they could see all parts of the building from the top to the bottom, the inside, and everything about it. Another point touched on was the question of features connected with the measurement of old buildings and old work. Anyone who had measured old buildings would find that a feature which looked a most important thing on the building was, if it was set up geometrically on the drawing, reticent and quiet, and would be surprised to find how it sank into the whole façade of the building when drawn on paper. If they took some of the XVIIIth century houses they would find how quiet and simple the old ones were compared with some of those they did now, even although they thought they were quiet in themselves. He thoroughly agreed with Mr. Bolton when he advised all students to get the advice and criticism of some of the best and ablest of the rising architects, and often that of those of eminence in the profession. He (the speaker) was brought up in a small county town, and would be joined that Association he never even saw a sketch-book. With all the advantages they now had, he could not understand how any student who was at all enthusiastic about his profession did not avail himself of the opportunities provided. He was sorry last session to see some of the classes dwindle down to five or six. It was a precious pity, and he did hope that this session they would have full classes. The vote of thanks was then heartily agreed to, and the meeting terminated.

#### MAGAZINES AND REVIEWS.

In the *Art Journal* Mr. Crol Thomson reviews this chapter of his series of articles on the National Gallery of Scotland to Ræmum, of whose portraits some fine illustrations are given. In the critical estimate of the work we quite agree. Mr. Waterhouse gives us the second chapter of his essay on "Painters' Architecture," taking his examples this time from Mantegna, and very fine the three examples are. We doubt, however, whether there is the symbolic motive which the author assumes in the broken-off arcade which forms the background to the "St. Sebastian." Our impression would be that Mantegna painted it because he liked it, and broke off one arch because he wished also to show the sky beyond. Partially broken off arches and entablatures are common in Early Renaissance backgrounds, and were nothing more than pictorial effect. The Middle Temple Cup, designed by Mr. Butter as a presentation from the Benchers of the Middle Temple to the King, of which illustrations are given, is what may be called a very "sumptuous" piece of work, but hardly represents more than the commonplace of design in work of this class. Mr. Edwin F. Reynolds gives us the first chapter of an essay on Byzantine craftsmanship. Aesthetically, he observes, the significance of Byzantine art lay in the regeneration of craftsmanship from the effete tradition of Roman decoræ. It was, in fact, the grafting of late Greek refinement on the constructive building power of the Romans. The present article deals mainly with the most prominent architectural monuments of Byzantine type. In the *Burlington Magazine* Miss Cecilia Horn commences a series of articles under the title "Some Notes on Mediæval Pottery," that strange meeting-ground of Byzantine and Norman elements in architecture and ornament. In the present chapter of the essay on "Life of a XVIIth Century Dutch Artist," Mr. Martin arrives at an important conclusion in regard to the

light under which Dutch painters of this period worked. The frequent representation in their pictures of the painter working by a high light at the left hand constitutes undoubtedly a presumption that such was the light they habitually worked in, and (following on that) leads to the important conclusion that in that case their pictures ought to be seen by a side light, and not by a front or top light; a conclusion which is being practically followed at present in more than one museum.

The *Berliner Architekturwelt* contains a whole series of illustrations of the new Rathaus of Charlottenburg, the same class of building as what we call in London District Council offices. The exterior shows a powerful though somewhat heavy and gloomy masonry design; there is some remarkable detail in the interior, especially in the staircase and the upper hall; odd and even grotesque in places, but undeniably vigorous. The architects are MM. Reinhardt & Sissenguth, of Charlottenburg.

The *Architektonische Rundschau* shows us an extraordinary specimen of architectural originality in a building in the Leipziger Platz at Berlin, called "Warenhaus A. Wertheim" (our German dictionary does not supply us with "Warenhaus")—we presume a commercial building. The lower two stories consist of a great open arcade forming a kind of cloister, with sculpture arranged over the arches in a different fashion in each bay; above this the whole front is a mass of vertical stone mullions with lofty narrow lights between, and a row of open tracery panels at the top. It is a curious affair, but is worth looking at. Professor A. Messel is the architect.

The *National Review* contains a picturesque and powerfully written article by the Earl of Ronaldshay, entitled "A Visit to Baku." Familiar as the name of this famous oil-producing district has long been in our ears, even before the disastrous events of the last few months, there are probably few Englishmen who have any distinct conception of the character of the region and of the work done there. Lord Ronaldshay has lifted the veil, and portrayed for us an extraordinary though lurid spectacle. The town of Baku, we are told, has the outward indications of prosperity, shown in imposing stone buildings, shops with plate-glass windows, large hotels and restaurants; but the country round is an arid waste of scorched earth without a blade of grass, and fresh water is only to be obtained by the distillation of the salt water of the Caspian Sea. Beneath the soil is a vast mine of oil. By merely sticking an iron tube in the earth and applying a light to the upper end you can light a flame that will burn for years, or till the tube is decomposed.

But curious as are the natural characteristics of the country, the strangeness of its appearance has been infinitely added to by the devising hand of man. Imagine a stretch of barren ground from which rise hundreds of pyramid-shaped towers, all packed as closely to one another as the trees of a forest; picture to yourself further a lurid atmosphere, heavy with the reek of oil, and throbbing with a wild medley of sounds almost defying classification—the grunting and groaning of pulley and windlass, the panting of engines, and a roar and hiss like the rushing of many waters which issues from furnaces where liquid fuel is in vogue—and you have some faint conception of the weird spectacle presented by the great oil-field of Balakhani. And Balakhani is but one of the oil-fields of the Caspian. The one of the pyramid-like erections known technically as derricks, represents an oil well which is producing, or has produced in its time, many tons of oil a day, and on the Ansheronk peninsula there are in round numbers some 2,000 of these erections.

There is something fascinating in watching the operations that go on under cover of a derrick. A hollow metal cylinder is let down to a depth of a few inches in diameter, 2,000 ft. perhaps into the bowels of the earth. The level of the oil having been reached, the engine is reversed, and the cylinder, now filled with the crude product, is drawn laboriously to the surface once more. Here the vessel is emptied automatically into a trough, whence the rich, silny-looking, dark green fluid, with its glittering pink froth, passes into reservoirs to await its final journey to the refineries. I watched a bluer on the Bibi Eibat field making its journey backwards and forwards into the depths of the earth, and became conscious of a sensation approaching respect for an implement that with clockwork precision and regularity was raising its 100 tons of oil a day.

The wells sunk are only a few inches in diameter; the initial cost of sinking one is somewhere about 5,000*l.*; and it has occasionally happened that the accidental fall of some implement or other obstacle has choked a well beyond recovery. One

company occupied several months in endeavouring to clear away something that had blocked their well, and eventually were forced to abandon it and sink a new well. But apart from such misfortunes, the result of carelessness, the return for the outlay seems, as far as the natural conditions go, to be immediate, certain, and enduring. As to the present position, and the estimated extent of the losses which have been suffered from the recent riots, we must refer the reader to the article. Out of this evil, the author suggests, good may come, in the fact that thereby "one more nail has been hammered into the coffin of a system of an administration which, neither at home or abroad, has shown itself worthy of the sacred trust of the guidance and government of a people which it has far too long assumed."

Mr. A. C. Benson's article in the same magazine, "A Stronghold of Art," is not exactly what its title would lead one to expect, for it is concerned with literary art, not with Art in the sense usually understood; though a good deal of his argument would apply to Art as well as to Literature. The main object of the article is a protest against individualism and sensationalism in style, and the suggestion that an Academy of Letters might exercise a restraining influence in favour of a severer and more balanced manner of writing. This is not a subject into which we can go in these columns, except to remark that while we quite agree in the general truth of Mr. Benson's indictment, the object-lesson afforded by the French Academy does not lead one to expect much from such an influence. None of the successful authors of modern France—either those who deserved or those who did not deserve their success—can be held to have been much influenced by the French Academy; indeed, one of the most successful, Daudet, snapped his fingers at it and insulted it in a novel written *ad hoc*. But in regard to criticism we can sympathise entirely with Mr. Benson when he says—"What one desires is that there should be something central and authoritative. There are certain newspapers which to some extent perform the desired function, but the best newspapers tend to reflect private mannerisms and prejudices." This is even more the case in art-criticism than in literary criticism. When we see journals which profess to be, and ought from their reputation to be, centres of light and leading, publishing criticisms in which everything that is sane and central in art is derided, and the works of cranks and faddists are held up to admiration as representing the only serious art of the time, one must recognise that art-criticism in this country is at present in a very unsatisfactory state. But whether an Academy of Art-Criticism would mend it, is another story.

In the *Monthly Review* an article on "Workmen's Trains," by Mr. Edwin A. Pratt, puts the case in regard to them from the railway companies' point of view, and shows pretty conclusively that the railway companies are really to a great extent victimised to make a workman's journey cheap, to an extent which is inequitable as regards the companies and pauperising as regards the workman, and totally contrary to all sound principles of political economy. The cry, he says, that "workmen cannot afford more than twopence a day for travelling expenses" is followed by the contention, not that employers should give a slightly higher rate of wages, but that railway companies should be invited to regard twopence a day as the recognised amount a workman should be required to pay, for any distance, with trains run to suit his convenience, irrespective of that of other travellers. The popular gibe that there is "one law for the rich and another for the poor" is inverted in this case, for the law is all for the poor, to an extent which seems utterly unnecessary and illogical. Our manner of nursing our artisans with cheap trains was one of the points in the indictment against the nation of our German critic in a recent number of the *National Review*, and Mr. Pratt's article sharpens the point of it. In the same number Miss Clerke gives an interesting and masterly review of our present stage of cosmical knowledge and theory, under the title "Evolution in the Heavens"—an article partly suggested by Professor Darwin's recent address at the meeting of the



British Association. The article tends, whether intentionally or not, towards inculcating humility in the human mind, as showing how little—how very little—we know or even conjecture, in regard to the making and the condition of the universe, with all our applications of scientific observation and calculation for some three centuries—for astronomy, properly so called, is scarcely older than that. Coming down to things terrestrial, we have an article on "Pisa" by Mr. Arthur Symons, who in this instance keeps within his province as an observer with a picturesque literary style, and does not make the mistake of attempting criticism. There is an article by Mrs. Ady on "A Tomb at Ravenna," that of an ancient and (but for the monument) nearly forgotten warrior, Guidarello Guidarelli, whose monument has recently been removed from the Franciscan church to the Accademia de Belle Arti. The monument, of which a photograph is given, shows a singularly beautiful recumbent figure in armour, the head slightly drooped to one side as if just dead. It was well worth while to bring before English readers an illustration of this fine work of the Early XVth century, which seems to be little known. It is attributed to Tullio Lombardi.

In the *Nineteenth Century* Mr. Oswald Crawford writes an article on what he calls "Nature Gardens," which on examination turns out to be practically a recommendation to return to the old trick of artificial landscape as practised by the English landscape gardeners of the XVIIIth century, Kent and Capability Brown, with all its childish devices for artificial scenery, rivulets, etc. We are really surprised that anything so foolish and involving such a complete step backward in taste and perception should have been allowed to appear in the *Nineteenth Century*. Captain Verney's important suggestion in regard to a Municipal Concert Hall, in the same issue, we have referred to in another column (see "Notes," page 383).

The *Century* contains an article on the new Naval Academy buildings at Annapolis, U.S.A., of which, through the courtesy of the architect, Mr. Flagg, we have already given a series of illustrations. The illustrations given with this article are, however, from different points of view, and give some new ideas as to the grouping and effect of this immense assemblage of buildings.

*Harper* contains three illustrations to Shakespeare's *King Henry VI.*, by Mr. Abbey, the accompaniment to the first part of a critical article by Mr. Ernest Rhys on the play which, as he says, "is called Shakespeare's, but is really Everyman's." The literary article is much the best part of the performance; Mr. Abbey's illustrations do not serve to alter the opinion we have before expressed, that this accomplished artist is much more successful in his large and carefully considered paintings of Shakspearean scenes than in his slighter illustrations in black and white. The scene between Talbot and the Countess of Auvergne, where the English general turns the tables on the haughty lady by bringing his soldiers in, is dramatic enough, but Talbot was never intended to be such a hang-dog looking ruffian as Mr. Abbey represents him; a reading quite out of keeping with his courtesy to the lady at the close of the scene. The picture of Joan of Arc standing in an embrasure of the battlements of Rouen, to welcome the Dauphin and his forces, is fine and vigorous in design, but the artist has not even taken the trouble to follow the text; he represents Joan leaning on her sword, whereas it is expressly said that she appears on the battlements "holding out a burning torch," which was the pre-arranged signal to the Dauphin. The picture would have been just as effective with the torch, and when one is illustrating Shakespeare (or what passes for Shakespeare) one may just as well illustrate him correctly.

*Scribner* contains, under "The Field of Art," a short account by Mr. Russell Sturgis of the decorations of the amphitheatre of the Sorbonne, the principal portion of which is Puvis de Chavannes' great symbolical picture of the arts and sciences, which was illustrated in our pages at the time of its execution. Mr. Sturgis does full justice, of course, to the great qualities of the painting, but expresses a regret that so great a painter "should be compelled to give his time to

thinking out these dreamy schemes of personification and metaphor"; and wishes that Puvis de Chavannes had been commissioned, instead, to paint four or five scenes illustrating the past history of the Sorbonne. We cannot agree with him. These "dreamy schemes" serve just as well for the exhibition of fine design and drawing (colour was not the artist's strong point), and furnish an opportunity for poetic and imaginative conception, which is a higher aim than the painting of historical incidents. The number contains a popular article by Mr. Elmdorf on "Shrines of the Desert," which is interesting from the number of photographs accompanying, illustrating the Kerouan mosque and other buildings, as well as bits of Arabian desert scenery of waste and oasis.

The *Revue Générale* contains an admirable article under the title "Pourquoi et comment défendre nos Paysages." We learn from it that the Belgian Government has established a "Commission des Sites et Monuments Naturels de Caractère Artistique," the object of which is to prevent the disfigurement of ancient buildings or of sites of natural beauty. It is apparently an effort to do something, but by official authority and not by private effort, on the same lines as our "National Trust," to which in fact reference is made at the close of the article. The author, M. Carton de Wiart, goes at considerable length, among other things, into the question of railways and engineering works in general in their relation to natural scenery, and the extent to which they should be controlled by State interference to prevent injury to the landscape.

Mr. Lewis Hind's kind of artistic pilgrimage, under the title "The Education of an Artist," which is continued in *The World's Work*, contains some good and enthusiastic writing on ancient art and ancient cities, accompanied by a fine set of illustrations, some of them of works little known, at all events not hackneyed by illustration.

*Knowledge* gives its readers a very fine coloured plate illustration of the corona during the recent eclipse, from a drawing made by Major Baden-Powell at Palma; and there is a short but valuable article by Mr. Crommelin on "The Two New Satellites of Jupiter," going into some interesting considerations as to the peculiarity of their orbits and of their relation to the planet and its other satellites.

#### COMPETITION DESIGNS FOR EPSOM PARISH CHURCH.

THE designs submitted in the limited competition for the new parish church at Epsom were exhibited at the vicarage, Epsom, last week. Mr. Fellowes Pryne was appointed assessor, and the competitors were Mr. Banister, Mr. Bidlake, Mr. Mileham, Mr. Temple Moore, Messrs. Nicholson & Corlette, Mr. Hatchard Smith, and Mr. Spooner. Mr. Fellowes Pryne has made his award in favour of the design by Messrs. Nicholson & Corlette. The authors of the successful design have won on their fine plan. This shows a nave and choir under one roof unbroken by a chancel arch, the wide side aisles roofed as if they have three transepts, connected by compartments square upon plan in the manner of St. Mark's, at Venice. The result is some interesting roofing above, and ample seating accommodation with unobstructed views of the pulpit and sanctuary from the major portion of the church below. There is sufficient vestry accommodation, and provision is made for procession and recession. A morning chapel is arranged for on the south side of the choir, and the organ balances it on the north. Externally the design is not so satisfactory. A rather squat tower and spire is shown on the north side. This will not be built at present, the sum which it is proposed to expend at the offset being 14,000*l.*, a sum insufficient to build more than a part of the church. The drawings showing the exterior are not very satisfactory or pleasing in colour, and the design will look better in reality. An alternative design on the same type of plan is shown in the Byzantine style, but it is not so satisfactory as the winning design, and would be more expensive to construct and decorate. As designs, apart from the necessities of congregational worship, we like those of Mr. Bidlake and Mr. Temple Moore better than

the successful one. Mr. Bidlake's design shows a very fine tower and spire at the end, the base of which forms a baptistry, narrow side aisles are provided which light the nave, there being no chancel; this always gives an impressive interior, simplicity and largeness of the design shown by the most perfect of the finished work. The same author shows the side aisle, with the nave at an angle of about 30 degrees, an expedient partly to suit the site, and partly for the sake of the congregation. We think the effect of this from the interior would have been a very doubtful success.

Mr. Temple Moore's design, in respects, superior to the others; the plan shows a nave and two lofty side aisles given an equally distributed internal height; the nave is roofed with a simple barrel vault, broken by a chancel arch; the choir and sanctuary occupy the last bays of the nave. The suggested treatment of details and tracery is remarkably fine; the only fault of the plan, and that a serious one, is the seating accommodation; too great a proportion of seats are out of view of the sanctuary and choir.

Mr. Spooner's design is carefully thought out, and illustrated with fine perspective drawings in colour. The character of work is somewhat barren and thin, the design particularly showing a lack of grasp. The other competitors show designs carefully thought out, Mr. Hatchard Smith sending two alternatives to his scheme. The site is a difficult one, the church having to be built adjoining the present parish church, which will be demolished when the new one is ready for occupation. The present church is of no architectural interest, being an inoffensive example of the church building of the seventeenth or eighteenth century.

#### LIVERPOOL ARCHITECTURAL SOCIETY.

At the opening meeting of this Society on Monday evening the President, Mr. P. J. Thicknesse, delivered his opening address, which we give in full with the exception of a few preliminary remarks relating only to the affairs of the Society.

"Since we all met in this room the most important thing that has occurred in the architectural world has been the much lamented death of Mr. Alfred Waterhouse, R.A."

Mr. Waterhouse was, perhaps, the best known and most respected architect in England; to the majority of people he stood in his day not only at the head of his profession, but almost, one might say, as its representative.

And this was likely to be the case, for he not only did he carry out more great buildings than any architect of that time, but when they were finished they were usually satisfactory, practically useful, well conceived, and planned.

The other side of his professional life, what one may call the public part, is what we architects miss most. His work at the Institute, which, for so exceptional a layman, was very great, was always most useful and helpful. His work in adjudicating competitions and the like was done with vigour and ability. His grasp of the subject was great, his mind so broad and fair, that he cannot remember ever hearing any man cast his judgment in question.

We can, most of us, I suppose, remember all this of him, but to those who had the honour to meet him it would seem very remarkable if I did not speak of his great personal strength of character, and, above all, his wonderful personal charm. He was entirely delightful that even when he found it necessary to say unpleasant things he found oneself forgetting the unpleasantness in the charming way he had said it.

Although all this personal greatness and charm was his, he did not, as he so easily have done, make his way in the world by it. It was entirely by his ability and hard work that he set his foot at one time up on the ladder of fame. While a young man he won his first important competition, the Assize Courts in Manchester, by his ability at that time the building remains to



he judged at your leisure. Of the work to obtain it I was told on good authority that, having almost completed the drawings for the competition, three weeks before the time for sending them in, he thought of a better arrangement of plan which necessitated the remodelling and redrawing of the whole design. This he did, working, I was told, almost continuously night and day to complete before the appointed time.

I said this competition placed him high up in his profession, and I suppose the other great Manchester civic building, the town hall, which is certainly, to my mind, the greatest thing he ever did, placed him at least on equality with the biggest men of his day. Still young, he was very much in advance of his times, but fashions change, and, in his older years, he was regarded by a large section of his profession as having been left behind.

I was talking to a well-known architect—a man considerably younger than Mr. Waterhouse—of him one day, and, in speaking of his versatility, he said:—“He is in the first rank of water-colour painters, and, if he had wished, he might have been a very first-rate accountant.” It was, I should say, speaking from my knowledge of his work, for I knew him very slightly personally, probably a very accurate judgment of the man, for, add to these qualities his powers as a constructor, they were no doubt reason enough for the success of any man as an architect. And I think it was these two opposite qualities—the artistic and the very practical and commonsensible—that undoubtedly made Waterhouse what he was, and also it was between these two rocks that he tried to steer a straight course, and if he did not ever strike on either, I think he was often very nearly doing so. His love of colour and of beauty of form was often tempered too much, to the disadvantage of his buildings, by his great practical commonsense, and he often failed to find a beautiful way out of his difficulties. But that the colour was there, and was well balanced, no one can deny who criticises his work with an open mind.

Here I think is one great lesson we may learn from the study of Mr. Waterhouse's work. Colour and form are, of course, the two greatest things an architect has to work with, and we do not at present give colour its proper value in our designs. I do not think in England externally it has ever been considered enough. It is curious that, with our comparatively dull skies and general colouring, this should be the case.

Here in Liverpool we are prevented to a certain extent because of the dirt which accumulates on a material which has not a hard metallic surface. But our work is not confined to Liverpool, and in the country we should, I am sure, take colour more into consideration.

But even in Liverpool, ought we not to try and face this problem of colour, as Mr. Waterhouse tried to? A monumental building must be stone we say, to go black in a year, and then we lay the blame on the soot and smoke and dust; in fact, we run away from our difficulty, and don't find out some way of overcoming it. Waterhouse did his best by using terra-cotta and hard red bricks; it was most sensible and practical, and it has, at least, left us some brightness in our streets. Cannot we find a way that would introduce a brightness without the metallic surface, and yet make our buildings look monumental? It can't be merely that colour is not monumental—it is a question of a design suitable, both in scale and colour, to its purpose and position.

Whether this is possible or not we may at least put as much colour as we like and as will harmonise with the green of the grass and trees and blue sky in our country or even suburban work. I speak of this because I think I see a tendency to another form of fashion in even our country architecture. Fashion in architecture is almost as variable as in ladies' hats, and some of us have veered only slightly at present, perhaps, from red bricks and red tiles to drab roughcast, white paint, and blue slates, and what is to be the end of it? Shall we go further round or back to more colour?

I feel no doubt that a good deal of Mr. Waterhouse's desire for colour in building came about by the dreariness of the streets of Liverpool, his birthplace, and Manchester,

where he began his work. Think of this place in those days—dreary enough even now. But fancy the dullness of a place with no buildings worth speaking of but the town hall and Custom-house, and even they, from a colour point of view, dull and dirty! And almost all the rest poor, mean, Early Victorian houses, without a single spark of pleasantness or colour on their outside, relieved here and there, I suppose, by the red, blue, and green bottles in the chemists' shops, and one or two bright red lamps of the doctors' houses. I fear we may be going back to this deadly dull building. I can't really call it architecture. We may vary it by a cast-iron church, painted and sanded, as the 1830 men did.

Gentlemen, it is in your hands, it is your responsibility if we sink so low.

We are inclined, I think, by our method of working, to give form more than its proper place in architecture. We draw our designs in pencil, and too often don't even attempt to colour them at all, and if we do we colour from a labelled paint-box—brick, stone, wood, lead—not labelled as it used to be in words, but in our thoughts, and our colouring gives no idea of what the material will really look like when the building is finished.

Why not try to work our designs in colour, and make the colour in some sort like the reality? I am not speaking of finished drawings coloured for the benefit of the contractor, but our own little first design. We should think of the colour more then, and give it its proper place with form, scale, and texture, instead of rather shunning it, and (if we can) having none—perhaps because we can only manage the reds and yellows of brick and stone.

Perhaps colour has got too much hold of me just now, for I wrote this address with the blue Atlantic breaking at my feet, the sunshine playing on the green grass and red fern, and the only shadows the black, frowning cliffs, lighted up here and there by the white spray that sprang suddenly a 100 ft. or so in the air, giving brilliant light where but a moment ago was only darkness.”

#### MUNICIPAL CONFERENCE ON HOUSING AT SHEFFIELD.

An important conference of local authorities and others interested in the housing question was held in the Council Chamber at the Town Hall, Sheffield, on Saturday, October 7. Sir John E. Gorst, M.P., presided, and there were present some 200 representatives of county and local authorities, including the West Riding County Council, the Corporations of Barnsley, Bradford, Birmingham, Brighouse, Chesterfield, Derby, Doncaster, Huddersfield, Keighley, Leeds, Liverpool, Manchester, Mansfield, Rotherham, Retford, and Sheffield; the Urban District Councils of Handsworth, Hoyland Nether, Mexboro', Penistone, Swinton, and Wath-upon-Deane. The following societies were represented:—The Royal Sanitary Institute, the National Housing Reform Council, the Association of Municipal Engineers, the Co-partnership Tenants' Housing Council, the Bournville Village Trust, and the Garden City Association, Ltd.

The Town Clerk read a letter from the Lord Mayor (Alderman Sir Joseph Jonas, J.P.), regretting his inability to be present.

The Chairman, in opening the proceedings, said they had met to discuss the difficulties which practical men and women had found in the carrying out of the attempt to furnish better houses for the working classes. The resolution to be moved dealt with three distinct points of the housing problem in suburban areas. First, the power which the local authorities should have for purchasing land; second, the restrictions which should be put upon the construction of houses to the disadvantage of the community; and third, the relaxation of the building by-laws which prevail in the centre of a great city.

Mr. W. H. Lever (Port Sunlight) opened a discussion on the development of suburban areas. He said that, being a conference of local authorities, he understood that they must confine themselves strictly to the range of possibilities and powers already obtained by local authorities, and avoid all schemes of development having for their object the making of the biggest possible commercial profit,

regardless of health and overcrowding. In short, not what would pay the best in cash possessions, but what would pay the community best in improved vitality, health, happiness and well-being of men, women, and children. In doing this they ought not to be unmindful of the fact that rates and taxes, local and imperial, were already strained to the point of hindering the progress and development of the country. Sound finance was at the root of all real welfare work, and therefore they must so arrange their scheme that, whilst avoiding the will-o'-the-wisp of cash profit advantages, they did not get caught in the barbed-wire entanglements of increased burdens on the already overburdened ratepayers. He need not take up much time in proving that life in suburbs was infinitely more healthy than in towns. The death rate for suburban areas was 12 to 14 per 1,000, as compared with 20 to 25 per 1,000 in the centres of towns and cities where no overcrowding existed, and the death rate mounted up to 30 to 50 per 1,000 in the most congested areas. If the figures of garden cities might be accepted as normal, they indicated a state of good health that would enable succeeding generations to live to 140 years of age at Bournville, and to 110 years at Port Sunlight. But not only were suburban areas able to show a low death rate, they also showed a higher birth rate, all pointing to life in suburban areas being suited to mankind. There was another important consideration. We were paying a great many millions annually on the education of our children, but the country would never get adequate results in return unless and until our children were living under healthy conditions. It was true we had spent millions of pounds in demolishing slum areas and rebuilding barrack-like blocks of dwellings; but all this enormous outlay could never produce conditions of health equal to those to be produced in suburban areas. The real remedy, and only one, was dispersion from the centre and development of suburban areas, and he congratulated Sheffield on leading the way by having already purchased two estates with this object. Private enterprise could not accomplish this dispersion because the very basis of a successful dispersion depended on the possession of three requisites which municipalities could provide more readily and efficiently than they could be provided by private enterprise. These three requisites were cheap money, cheap land, and cheap rapid transit. Thanks to the various Acts passed relating to the housing of the people, municipalities could borrow money for acquisition of suburban areas within or without their boundaries, and so were in a position to provide the money required at the very cheapest possible rate. Private enterprise could not compete with this. Calculating that the suburban area had cost, say, 200l. per acre, interest at, say, 3½ per cent., and sinking funds to repay in eighty years would amount to 7l. 1s. per acre per annum. The extra cost of width of avenues and roadways could be met by the higher price per acre building sites on these handsome, wide roads would command. The next question was—should the municipalities build the houses or lease the land for building purposes? Experience had not shown that municipal building had always proved successful, whilst the capital required was enormous, and the risk a speculative one. If trade at any time were bad, and houses became empty, the burden on other property owners and the ratepayers generally would become unbearable. Still, if no other course were possible, the risk must be taken for the many other advantages accruing to the whole community in health and social betterment. But, fortunately, there was another course open which was free from any speculative element, and that would be infinitely more profitable to the municipality, and requiring less than one-third the capital. He suggested that the municipalities should let the land at a ground rent based on cost price for a lease of ninety-nine years in large or small quantities, or even single house plots, and offer to advance up to not exceeding one-fourth of the cost of building houses, but with a limit of not exceeding 100l. to be advanced on any one house. This would provide just the little help that



was required to stimulate private enterprise in building. The financing of the remainder of the cost of house building would be easily arranged, partly by mortgage and partly by credit, and partly by the builder's own private capital. The effect would be immediate and powerful. Fresh population would be attracted to the town, overcrowding at the centre would be relieved, and slum property would fall in value and lie a drug on the market. The security would be absolute. At 200l. per acre, interest and sinking fund on the land came to 7l. 1s. per acre per annum; this, at ten houses to the acre, would be 14s. 1d. per house, and at twelve houses to the acre, costing 400l. each, 100l. per house could be advanced, and at twelve houses to the acre, each costing 200l., 50l. could be advanced. The interest at  $3\frac{1}{2}$  per cent., and sinking fund over eighty years, would amount to 3l. 10s. 6d. per annum on the larger houses, and 1l. 15s. 3d. on the smaller. Adding interest and sinking fund for the land, the annual cost of each would be 4l. 4s. 7d. for the larger, and 2l. 7s. for the smaller houses. The ground rents would be perfectly secure. As to the capital required, no investment that England could make imperially or nationally would make so large a return. If it were done on sound financial lines it would relieve the ratepayer and taxpayer rather than add to their burdens, would place garden homes within the reach of all, would make it easy for an artisan to become the builder and owner of his own home, and, greatest of all, would be the means of producing men and women, boys and girls, and young children that would be able to uphold the prestige of our race the world over.

Councillor T. Shaw (Sheffield) moved that this conference of local authorities and associations interested in housing problems is of opinion that greater attention should be devoted to the laying-out and development of suburban areas, and that more extensive powers in relation thereto should be conferred upon and exercised by local authorities, and particularly (1) that the erection of workmen's dwellings by local authorities in suburban areas under part 3 of the Housing of the Working Classes Act, 1890, which, where carried out, has proved generally successful, should be further encouraged and extended, and for this purpose powers should be conferred upon such authorities to buy land whenever a suitable opportunity occurs, and to hold the same pending the development of the neighbourhood; (2) that further powers should be conferred upon and exercised by local authorities to ensure the planning generally of suburban areas so as to secure healthful surroundings and the provision of an adequate garden space to each house, and thus to prevent the erection on such areas of closely crowded dwellings, which will soon become insanitary; and (3) that where such powers are exercised, provision should be made for some of the more stringent requirements of the building by-laws (except such as are necessary for purposes of sanitation and health, and for securing adequate stability of the buildings), to be modified in the case of workmen's dwellings erected in suburban areas.

Mr. H. R. Aldridge (secretary of the National Housing Reform Association) seconded the resolution. They should aim at housing the people, not warehousing them. They had heard a good deal of Germany, but he was inclined to think that Germany had been overpraised.

Miss S. Gurney (London, hon. secretary of the Co-partnership Housing Tenants' Council) moved, as an amendment, to add after the word "purpose" in clause 1 of the resolution, "and for that of leasing such land for the development of estates to societies corresponding to the German societies of public utility." She claimed these societies combined the advantages of public and personal control.

Councillor Nettlefold (Chairman of the Birmingham Housing Committee) seconded the amendment. He did not believe in municipal house building until they were absolutely driven to it. He felt that corporations could not possibly solve this problem themselves, they must have the assistance of others. His experience was that private enterprise had not always had fair play. It had often

been left alone to do this work in its own way, and then been found fault with because the work was badly done. It ought to be looked after, and directed, and kept straight.

Mr. J. H. Barlow (Bournville) said he was of opinion that our cities should be developed, not for the interest of the landowner or the builder, but for the interest of the community as a whole. Bournville was built by Mr. Cadbury with a clear conception of what he wanted to bring about. The one essential condition he laid down was that every house, however small, should have its own garden. There was an enormous demand for houses of the Bournville type. Applications were constantly flowing in, and they rarely saw a house to let. They did not attribute this to the fact that their rents were lower than the surrounding districts, for they were fair commercial rents. It was not because they were pauperising the tenants that the houses were sought after, but because they had rural surroundings and their own gardens. The most successful gardeners in Bournville were men who had spent thirty or forty years of their lives in Birmingham, never handling a spade before they went there. Those were the men who won the prizes at the flower shows, and whose gardens were the sight of Bournville.

Mr. F. Litchfield (London, secretary of the Co-partnership Tenants' Housing Council) considered corporations should, as far as possible, buy up all the suitable land for the purpose of housing the people. He believed many landowners would be prepared to let corporations have their land at a fair price if they knew the workers were going to have the benefit, and not building speculators. He admitted that they had not solved the problem when they provided a house at 6s. 6d. a week. The great need was to provide a house at a rent of 3s. 6d. per week.

Mr. Blanchard (Sheffield Federated Health Association) thought it an illogical position for a municipality to take up of buying the land and then of looking round for someone else to take it off their hands. He held it was the duty of the municipality to develop the land, and build on it for the benefit of the community.

Councillor Whiteley (Sheffield) complained that the municipalities were hampered in the solution of this problem by the restrictions of the Local Government Board.

Mr. Adams (secretary, first Garden City) asserted that in Manchester the whole of the suburbs were being developed in a higgledy-piggledy way, and slums were being created in the suburbs faster than they were being cleared in the centre of the city. The local opinion in Manchester was that the Corporation housing experiment on the Blackley housing estate was not a success, and they would be pleased to be relieved of it.

Councillor J. Fildes (Chairman of the Manchester Housing Committee) denied the accuracy of the statements made by Mr. Adams. The Blackley estate was four miles from the city, and they were ordered by the Local Government Board to put up at once 150 houses at rents of from 6s. 6d. to 7s. 4d. per week. They finished those houses a year ago, and he was delighted to say they had now 134 of those 150 houses let. As Chairman of the Housing Committee, he could say they were delighted with their purchase, which was ultimately going to be a benefit to Manchester. They went to the first Garden City when they began at Blackley, but they learnt nothing. There were no workmen's houses there, but they could show them to Mr. Adams at Blackley.

Mr. Morris (Liverpool) said he had been over this Garden City, which was so much boasted of, and it was so jerry-built that in thirty years it would be a howling wilderness.

Mr. W. H. Lever, in reply, referred to Mr. Blanchard's criticism that it was illogical for corporations not to build. He had sympathy with reform, but it was necessary to act with great restraint. Why stop where suggested? Why not be their own builders? Why not have their own quarries and get their own slates? Why not have their own brickyards and make their own bricks? His suggestion was that they should begin with the purchase of the land, and the leasing would give them what they required. They might learn with advantage in this respect from the great landowners who, instead of building, leased their lands to others.

The amendment was carried.

Sir Charles A. Skelton (Chairman of the W. H. Lever) said they did not mean to build houses for slum dwellers. They wanted to build good houses into which people who were to-day compelled to live in the slums could go, and so elevate the whole of the people. If, however, they brought into the slums those who would make any place a slum, that would be hindering the work.

The Mayor of Liverpool said:

Sir John Gorst, in acknowledgment, said it had been to him a great pleasure to preside and to have impressed upon him the fact that so many gentlemen were so concerned in the question of housing, and who possessed so much knowledge had taken part in that debate. It had shown how greatly this question of housing for the working classes was engaging the attention of the more educated people of the country. He did not pretend to be an authority on housing. He had been driven to this question from other branches of the general question of the social reform of the people. He had been convinced that all efforts at improving the health and education of the children and all their efforts to improve the condition of the working classes would come to nothing unless accompanied by a reform of their dwellings. That was what had brought him into the ranks of those who advocated housing reform, and it was a great consolation and pleasure to know that so many people had seen this matter in its own light, and were energetically endeavouring to carry out this reform by practical improvement in their various cities and counties. He sympathised very strongly with what was said by Councillor Whiteley upon the injudicious interference by the central government in this matter. What we wanted was a much greater discretion on the part of local authorities to purchase and use land as they saw fit in the interests of the community. In Germany there was less interference by the central authority with the local authorities, and such as there was came from a more enlightened class of reformers who had studied these things to better purpose. The meddling interference of persons who were ill-acquainted with the local necessities was a great evil, and was one of the obstructions to reform which everyone should contend against.

#### ARCHITECTURAL SOCIETIES

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual report of this Society shows a continued increase in the numbers of the Society. The Fellows now numbering fifty-seven and the Associates sixty-three, a total of 120, compared with 113 last year. There are two Honorary Fellows and eleven Honorary Associates. The number of students is forty-one, an increase of five. The report states that, in the death which occurred on March 4, of Mr. Thomas Denville Barry, the Society has lost its last foundation member. Mr. Barry was one of nineteen who met at the Lyceum, Bold-street, on March 1, 1848, and passed the following resolution:—"That in the opinion of this meeting the establishment of an architectural society would be productive of benefit generally to the profession, and is therefore highly desirable." Mr. Barry himself seconded the subsequent resolution appointing the first executive committee. In a further paragraph we read with interest that the Council have had under consideration the desirability of founding a travelling studentship in connexion with the Society. With this object in view, and in order more fully to carry out the objects of the Society, it is proposed to establish Standing Committees, an Educational Committee to take charge of all matters affecting education, and a Professional Practice Committee to take an active part in regard to local competitions and other matters affecting the profession.

LIBRARY, GAINSBOROUGH.—The new public library at Gainsborough, erected at a cost of 4,000l., was opened on the 4th inst. by Mr. James Marshall, J.P., Mayor. Several of the architects of Lincoln, were the architects of the building, being Mr. Sprakes, of Doncaster.

## Fifty Years Ago.

## A REVIEW OF THE POSITION.

Mr. Ruskin had not favoured them lately with anything architectural. The piazza of St. Mark had been abandoned for Trafalgar-square; and they had been rather startled to hear that Mr. MacIise not only paints badly, but that he does it on purpose. He believed that he was justified in saying that they would shortly see a building in the north of England erected from Mr. Ruskin's designs, with the constructive assistance of an architect. He (the chairman), for one, was delighted to hear it. They were rather tired of his singular recipes, and were anxious to see the pudding itself. Let them wish it every success, and may it be as rich and juicy as the mind that made it. But if it should turn out a failure, if it should prove flat, crude, and indigestible, then, by every architectural stomach in the kingdom, they would not spare him. The excuse about the Edinburgh windows, "that he did not care to perpetuate them," would not avail him now. They were much in want of new books, treatises, or other information on new modes of construction. They had recently adopted so many new applications of material, that the old and valuable treatises on the strength of materials were not enough. The results of a series of well-conducted experiments on bent timber and laminated ribs would be of incalculable value, and they were strangely deficient, even now, in proper information with regard to boiler plate girders. If it were not presumptuous, he would there make a humble suggestion to a senior society. It was no secret that the Royal Institute of British Architects intended shortly to remove to other premises. It would be a great boon to the profession generally if these premises should contain a yard or other open space fitted up with an hydraulic press and other apparatus, where architects would find facilities for making experiments on building materials. The only place where an architect could prosecute such researches was a builder's yard, and the builder was just the man to whom the architect did not wish to be under obligation. As the report had told them, they were about to memorialise their seniors to set on foot a public architectural examination and an honorary diploma. It might perhaps be thought somewhat presumptuous in a junior society to take the first step in such a matter; but that was surely a mistaken view of the case. The institution of a public architectural examina-

tion must be the work of the old and experienced, but it was no less the duty of the student strongly to insist on its necessity. He knew well that in these days of free trade it would be idle to insist upon that examination being a compulsory one, nor was that necessary. To say that no man could give an opinion as to the safety of a parapet, or the construction of a chimney-pot, without having passed an examination, would be manifestly absurd, and he had often heard this kind of argument used against examinations altogether. Let the examination only be a good one, and a stiff one—let the "pluckings" be tolerably numerous, and he was sure that there would be no necessity for a penal law to create candidates.—Report of Architectural Association meeting, *The Builder*, October 13, 1855.

## Illustrations.

## DESIGN FOR A COVERED BRIDGE.

HIS design is modelled on a famous bridge at Cambridge, and was meant to occupy a position under somewhat similar conditions.

The materials intended were stone, with stone vault ribs and brick filling, and a

timber roof, lead covered. One end of the bridge abuts against the college buildings, and the other is flanked by large octagonal turrets, finished with ornamental roofs.

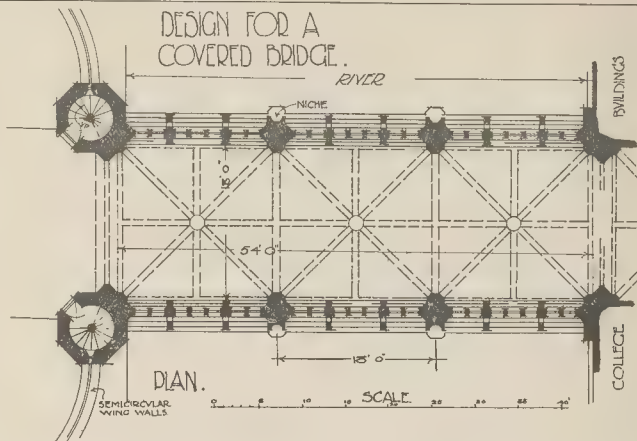
The large traceried windows were intended to be left open, and the small buttresses subdividing them run up through the pierced parapet and carry small figures.

The main buttresses are ornamented with niches and figures, and finish above the parapet with traceried heads.

ROBERT ATKINSON.

## DESIGN FOR ARTISANS' DWELLINGS, PARIS.

WE have referred briefly, in former issues, to the two successive exhibitions of competition drawings for the best plans for artisans' dwellings which have been held in Paris, and which were promoted by the "Fondation Rothschild," a company, as we understand, founded for the purpose of initiating a new movement in the provision of well-planned model dwellings to be erected in Paris. We are now enabled to give, through the courtesy of the architect, M. Adolphe A. Rey, some illustrations of his design which obtained the first premium in the competition. We give a plate showing one of the main pavilions to a pretty large scale, and a reproduction of the



First Premiated Design for Artisans' Dwellings, Paris (Fondation Rothschild Competition). By M. Adolphe A. Rey.



ground plan and one of the upper plans, which latter are mainly repetitions of one scheme on successive floors. We give also a small illustration on the page, showing the effect of the main portion of the long face towards the Rue de Prague.

The Fondation Rothschild was started not more than a year ago, and one of its first efforts was to arrive at the creation of types to be followed in this class of buildings; for which purpose its two competitions were organised. The first competition was a sketch one only, and from this the authors of twenty-five of the sets were selected to enter into a second competition with more detailed drawings. Among these M. Rey's design was awarded the first premium.

As will be seen, the buildings are arranged so as to leave three open courts planted with trees, one in the centre and one at each side. The buildings were laid out on the plan after a careful consideration of the direction of the prevailing winds, and of the best angles at which to place the buildings so as to secure a natural ventilation by the movement of the air, and to have no close or stagnant corners.

The stairs were regarded by the architect as very important agents in assisting ventila-

tion, and are planned partly with that object; being regarded, in fact, as a prolongation of the street.

All the stories are 3 mètres (nearly 10 ft.) in clear height, and are all lighted and ventilated by windows reaching nearly to the ceiling. The water-closets are all grouped with an entrance open to the outer air—a commonplace in England, but apparently a novelty in French planning, as attention is specially called to it.

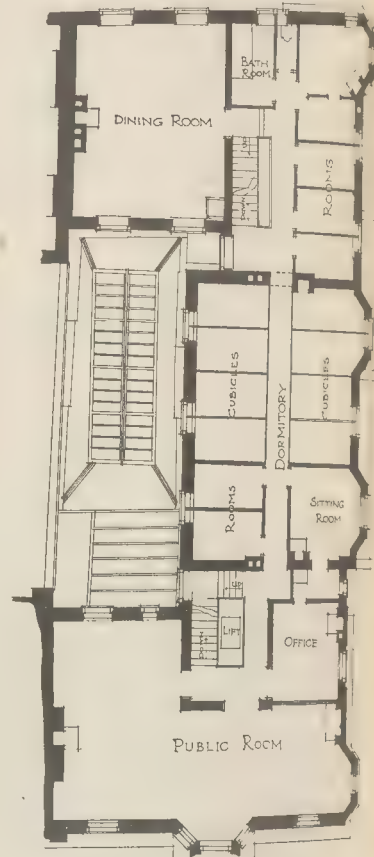
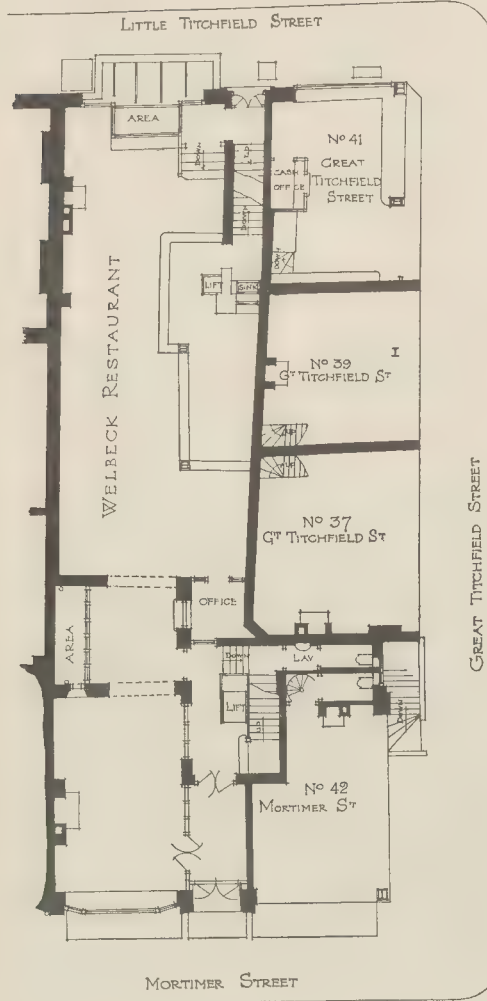
In regard to laundry work M. Rey objects strongly to the practice of forming general washing and drying-rooms at the top of the building, which are generally, he says, places where confusion reigns. He gives, instead, a little drying closet in connexion with each habitation, open to the air, but covered against rain. Each habitation is warmed by a "canalisation centrale" of warmed air, supplied from radiators situated in the basement. The architect is of opinion that this method is a considerable economy in saving the building of chimneys and chimney-stacks, which is no doubt true, though we should have thought most of this economy was nearly balanced by the cost of the calorifères and the heating channels. M. Rey adds—"Quant à la salubrité du logement et le bien-être des

locataires, la système du présent des ouvertures à l'air, nous ne doutons pas, avec le trouble of coal and coaling, and with one source of dirt tenants to prefer a clean and different.

M. Rey has no doubt in the subject in the proper spirit, as may be seen in the following sentence from the Report on his drawings:—

"En avant d'un court et de l'air, nous ne doutons pas, avec le trouble of coal and coaling, and with one source of dirt tenants to prefer a clean and different."

"S'identifier avec les ouvriers est nécessaire pour comprendre le foyer que réclame l'habitant. Sait-on ce que l'habitant de ces sujets les plus humbles de l'habitation infligera plus tard de misères à l'habitant, misères irréductibles, presque toujours car corriger les erreurs d'une construction terminée entraîne des dépenses la plupart du temps considérables si elles ne sont impossibles à faire."



Ames House and Welbeck Restaurant. Plans.

We regret that we were unable to give M. Rey's plans to a larger scale and in a clearer kind of impression. They are drawn in the manner usual in France, with a certain amount of shading and "effect," which looks very well on the original plan, but is not at all favourable to a clear reproduction, especially in a necessarily reduced scale. A plan in plain lines and with the sectional portions in black would, of course, have come out much more clearly. The views of the building reproduce well enough, and we think the architect has contrived to produce a kind of architectural treatment which is pleasing and picturesque, without being costly.

#### AMES HOUSE, MORTIMER-STREET, W.

These illustrations are from a drawing which was hung in the Royal Academy Exhibition of this year, and are the detailed elevations of a residential block erected by Mr. Alfred Ames for the Young Women's Christian Association. The building has accommodation for over 100 residents, and a large restaurant on the ground floor. The remainder of the ground floor in Mortimer-street and Great Titchfield-street is appropriated for shops, the rents of which endow the institution.

The builder was Mr. A. A. Webber, of Mortimer-street. The constructional steel work and fireproof floors are by Messrs. Lindsay, Neale, & Co. The cost of the building has been about 11,000*l*. The architect is Professor Beresford Pite.

#### THE LONDON COUNTY COUNCIL.

The first meeting of the London County Council after the summer recess was held on Tuesday in the County Hall, Spring-gardens, Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 8,500*l*. for museum, gymnasium, and baths; Bermondsey Borough Council 2,000*l*. for providing a public library; Camberwell Borough Council 3,000*l*. for contribution to cost of street improvement, 2,903*l*. for paving works, and 10,000*l*. for contribution to purchase of public park; Greenwich Borough Council 7,289*l*. for paving works; Hackney Borough Council 3,245*l*. for paving works; Hackney Guardians 6,000*l*. for poor law purposes; Islington Borough Council (sanction to borrowing) 13,000*l*. for electric lighting; Lewisham Borough Council 3,096*l*. for pipe sewer works; Poplar Borough Council 15,312*l*. for paving works; Poplar Guardians 4,440*l*. for poor law purposes; Wandsworth Borough Council 11,400*l*. for street widenings; and Woolwich Borough Council 10,233*l*. for electric lighting purposes.

**School, Wandsworth.**—The following recommendations of the Education Committee were agreed to:—

"a." That the estimate of 22,333*l*. submitted by the Finance Committee in respect of the erection of a school to provide accommodation for 840 children on the Selincourt-road site (Wandsworth) be approved.

(b) That expenditure on capital account not exceeding 23,204*l*. be sanctioned in respect of the erection of a school on the Selincourt-road site (Wandsworth); that the erection of the building be carried out without the intervention of a contractor; and that the drawings, specification, quantities, and estimate of 21,200*l*. be referred to the Works Committee for the purpose."

**Elevations of Buildings.**—The Improvements Committee reported as follows:—

"In accordance with the authority granted by the Council on August 1, 1905, we have approved drawings of the undermentioned buildings proposed to be erected on the Council's surplus land:—

Building proposed to be erected by Mr. F. Priddis on land in York-road and Lombard-road, Battersea. Three shops proposed to be erected by Mr. C. S. Nereid on land in Tooting High-street.

Building to be erected by Mr. W. Fitches on lot 11, Goldsmith's-row, Shore-ditch.

**Municipal Concert Halls.**—Mr. Verney moved "that in view of the decision of the Council of February 14, 1905, against the scheme for utilising the island site in Aldwych for a place of amusement, and of the resolution of the Council of May 16, 1899, in favour of granting a site for a municipal opera house, it be referred to the Theatres and Music Halls Committee to consider and report upon the whole subject of the Council providing for the benefit of the public a hall for music, dramatic representation, and recreation, including particulars as to the probable success, financial and otherwise, of such an undertaking, and the general

conditions under which it should be managed, and empowering the Committee to seek such assistance for their inquiry as may be placed at their disposal by eminent members in the professions." Since St. James's Hall had been demolished there was scarcely any hall in London for holding concerts, such as most provincial towns and almost every Continental town possessed. He recognised the fact that to ask the London County Council to support an opera house would be too much at the present time, but he believed that a concert hall, properly built, with good acoustic qualities, and in a convenient place—not necessarily the site suggested by him—would be almost certain to pay its way, and would do much to make the lives of the people happier and to increase the forces of civilisation.

Mr. Albert Smith, in seconding the motion, pointed out that the proposal was merely one for an inquiry, and was not of a mandatory character.

Mr. Howell Williams and Lieut.-Colonel Rotton opposed the proposal, on the ground of the existing enormous commitments of the Council.

On a show of hands, seven councillors voted for the motion, which was defeated by a large majority.

**Unemployed Problem.**—Mr. Warren moved that with a view of providing work during the winter for the large number of unemployed workmen in London, the several committees of the Council be instructed to commence and carry on as much work as possible, and to employ on such work only such persons as shall have been resident in the County of London for not less than twelve months immediately preceding their application for employment.

Mr. McKinnon Wood pointed out that the General Purposes Committee had already issued a memorandum to the spending committees to the effect that they should proceed with necessary work as soon as possible, and therefore the motion was unnecessary, and also introduced some undesirable controversial matter.

Mr. Thomas thought the committees might put in hand some building works already authorised, and thus provide work for about 2,000 men during the winter.

Mr. W. W. Bruce moved an amendment to delete all words after the word "possible" in the motion.

On a vote the amendment was defeated. Mr. Sidney Webb then moved that the Council proceed with the next business.

This was carried, and the motion therefore also fell through.

The Council then adjourned.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

##### *Lines of Frontage.*

**Lewisham.**—That the application of Mr. W. J. Stephens for an extension of the periods within which the erection of a building on a site abutting upon the east side of High-street and north side of Limes-grove, Lewisham, was required to be commenced and completed, be granted.—Consent.

**Lewisham.**—Twelve houses on the north side of Longhurst-road, Hither-green, Lewisham (Messrs. W. Goddard & Co. for Mr. C. E. Beaumont).—Consent.

**St. Pancras, South.**—That the application of Mr. W. Flockhart for an extension of the period within which the construction of underground cellars in the forecourts of Nos. 15, 17, 19, and 21, Euston-road, St. Pancras, was required to be commenced, be granted.—Consent.

**Hampstead.**—An oreil window and architectural projections at Nos. 166, 168, and 160, High-road, Kilburn (Mr. G. A. Sexton for Mr. B. B. Evans).—Consent.

**Hackney, South.**—A porch to a house in course of erection on the western side of Wattisfield-road, Hackney, to abut upon Cotesbach-road (Messrs. Deakin & Cameron for Mr. S. Franklin).—Consent.

**Kensington, South.**—The retention of a projecting sign at No. 11, Young-street, Kensington (Messrs. Harrods, Limited, for Mr. H. B. Fitzherbert).—Consent.

**Marylebone, East.**—That the application of Mr. F. M. Elgodd for Mr. J. A. Michell, for an

extension of the period within which the erection of buildings on the western side of Albert-road, Regent's-park, at the corner of High-street, on the site of Portland-terrace, St. Marylebone, was required to be completed, be granted.—Consent.

**Marylebone, West.**—A projecting clock at the first floor level of No. 61, George-street, St. Marylebone (Mr. H. Cousins).—Consent.

**Paddington, North.**—A porch and bay windows in front of "Maids-vale Mansions," Ashworth-road, Paddington (Mr. E. E. Davies for the Maids-vale Mansions, Limited).—Consent.

**St. George, Hanover-square.**—The retention of a projecting balcony and entrance porch at Symonds Hotel, No. 34, Brook-street, St. George, Hanover-square (Mr. J. E. Trollope for the Symonds Hotel Company).—Consent.

**Hampstead.**—An addition on the eastern side of St. Saviour's Church, Eton-road, Hampstead (Messrs. Carle & Passmore).—Consent.

**Wandsworth.**—Two houses on the north side of Hazlewell-road, Putney, to abut upon Larpent-street and Champion-street (Mr. J. C. Radford for Mr. J. Coleman).—Consent.

**Hackney, North.**—The retention of an addition to a portico at No. 118, Stamford-hill, Hackney (Mr. C. Cheston).—Consent.

**Islington, North.**—One-story shops upon part of the forecourts of Nos. 549, 551, 553, and 555, Holloway-road, Islington (Mr. H. N. Smith for Mr. B. Blauvelt).—Consent.

**Kensington, South.**—Bay windows and an open porch at No. 57, Campden House-road, Kensington (Mr. J. W. Simpson for Col. H. H. Roberts).—Consent.

**Lewisham.**—Two projecting porches at Nos. 7 and 8, Radford-road, Hither-green, Lewisham (Messrs. Thomas & Edge for Mr. H. W. Budd).—Consent.

**Marylebone, East.**—A projecting balcony at "Harley-house" (Blocks Nos. 5 and 6), Marylebone-road, St. Marylebone (Messrs. Boehmer & Gibbs for Mr. C. J. Hinsley).—Consent.

**Marylebone, East.**—An iron and glass hood over the entrance to No. 40a, Devonshire-street, St. Marylebone (Messrs. Maple & Co., Limited, for Mr. Friarwell).—Consent.

**Marylebone, East.**—A bay window at "Carlyle Lodge," Avenue-road, St. Marylebone (Mr. A. F. Faulkner for Mr. W. Willett).—Consent.

**Marylebone, West.**—A porch at "Loudon Mansions," Marlborough-road, St. Marylebone (Mr. P. Hoffmann for Mr. W. H. Dunn).—Consent.

**Peckham.**—A stable building at the rear of No. 64, Shard's-road, Peckham, to abut upon Meeting House-lane (Mr. F. W. Smith).—Consent.

**Southwark, West.**—The reconstruction and extension of an iron and stone balcony at the first floor of No. 81, Blackfriars-road, Southwark (The Fireproof Co., Limited, for Mrs. Sandys).—Consent.

**Strand.**—A shop front at No. 119, Pall Mall (Mr. J. A. Minty for Messrs. Hugh Rees, Limited).—Consent.

**Woolwich.**—Buildings on the eastern side of Wood-street and western side of Lower Wood-street (Mr. F. C. Henesy).—Consent.

**Brixton.**—A one-story shop upon part of the forecourt of No. 87, Bedford-road, Clapham (Messrs. Price, Arrow, & Taylor for the County of London Estates Co.).—Refused.

**Kensington, South.**—Erection of a bay window at No. 27, Camden-hill-square, Kensington (Mr. F. Warman for Mr. E. H. Hodgkinson).—Refused.

**Peckham.**—Buildings with one-story shops in front upon the site of Nos. 176 and 178, Rye-lane, Peckham (Mr. A. E. Mullins for the trustees of the late G. T. Congreve).—Refused.

**Woolwich.**—An iron and glass shelter at the Grand Theatre, Wellington-street and Lower Market-street, Woolwich (Mr. B. Crews for Mr. C. Soumes).—Refused.

**Marylebone, East.**—A building on a site situated between Nos. 11 and 13, Portland-place, St. Marylebone (Messrs. Buckland & Garrard for the Right Hon. Earl Temple).—Refused.

**Hackney, Central.**—A building on the east side of Ardleigh-road, Hackney, southward of No. 14 (Mr. J. H. Storror for Mr. J. Sleep).—Refused.

**Hammersmith.**—A building on the west side of Eynham-road, to abut upon Shiffeld-street, Wood-lane, Hammersmith (Mr. G. O. Rassen).—Refused.

**Hammersmith.**—A one-story shop on the forecourt of No. 60, Rylett-road, Hammersmith (Mr. A. Dawkins for Mr. S. Fortesque).—Refused.

**Hammersmith.**—A building upon a site abutting upon the southern side of Delgarno-gardens and the western side of Bracewell-road, Hammersmith (Mr. A. Dawkins for Mr. F. Tincham).—Refused.

**Hampstead.**—A bay window at No. 3, Wedderburn-road, Hampstead (Mr. V. H. King for Mr. F. E. F. Barham).—Refused.

**Kennington.**—Buildings on the eastern side of Montford-place, Upper Kennington-lane, Kennington (Mr. A. W. Tribe for Messrs. Hayward Brothers, Limited).—Refused.



**Kensington, South.**—A covered way to a building between Nos. 7 and 11, Addison-road, Kensington (Messrs. G. Trollope & Sons, and Colls & Sons, Limited, for Mr. E. R. Debenham).—Refused.

**Kensington, South.**—The retention of a boundary wall in front of No. 35, Holland-street, Kensington, next No. 33 (Messrs. Chesterton & Sons for Messrs. C. A. Daw & Son).—Refused.

**Marylebone, East.**—The erection of a projecting balcony at No. 80, Portland-place, St. Marylebone (Messrs. Boehmer & Gibbs for Messrs. Matthews, Rogers, & Co.).—Refused.

**Wandsworth.**—A one-story addition adjoining No. 54, High-street, Tooting (Mr. S. S. Dottridge for Mr. E. Dottridge).—Refused.

**Westminster.**—One-story shops in front of Nos. 79 to 95 (odd numbers only) inclusive, Victoria-street, Westminster (Messrs. Griffin & Woollard for Mr. H. Webley).—Refused.

#### Lines of Frontage and Construction.

**Hackney, North.**—The retention of a wood and iron structure upon part of the forecourt of No. 19, Fife-avenue, Upper Clapton (Messrs. H. Purney & Son for Mr. G. Kemp).—Consent.

**Hampstead.**—The retention of a wood and iron building at No. 1, Bolton-road, Hampstead, abutting upon Greville-place (Mr. A. H. D. Nonweiler).—Consent.

**Islington, West.**—An iron ash hopper on the west side of Burnard-place, Islington (Mr. A. Gay for the Council of the Metropolitan Borough of Islington).—Consent.

**Fulham.**—Permission to retain a motor house at the rear of No. 219, New King's-road, Fulham, abutting upon Coniger-road (Messrs. R. Hes for Dr. Ayre).—Refused.

#### Lines of Frontage and Space at Rear.

**Kensington, North.**—Dwellings on the south side of Kenley-street, Notting-hill, to the line, and with open spaces about such buildings (Mr. W. C. Lee for the Council of the Royal Borough of Kensington).—Consent.

**Battersea.**—Buildings on a site abutting upon the north side of York-road and east side of Lombard-road, Battersea (Mr. Cannell for Mr. F. Priddis).—Consent.

#### Width of Way.

**Rotherhithe.**—A one-story building at Dinorwic Wharf, Rotherhithe-street, Rotherhithe, with a forecourt boundary at less than the prescribed distance from the centre of the roadway of the street (Mr. A. H. Lanson for Mr. J. J. Greenwood).—Consent.

**Poplar.**—Two rows of water-closet buildings on the east side of Hale-street, Poplar, with external walls and forecourt boundaries at less than the prescribed distance from the centre of the roadway of the street (Mr. H. Heckford for the Council of the Metropolitan Borough of Poplar).—Consent.

**Paddington, South.**—A one-story building at the rear of No. 28, St. Petersburg-place, Paddington, with external walls at less than the prescribed distance from the centre of the roadway of St. Petersburg-mews (Mr. T. H. Smith for Mr. F. Lenders).—Refused.

**Wandsworth.**—Three houses on a site abutting upon the northern side of Warple-way and western side of Warple-road, Wandsworth, with external walls and forecourt boundaries at less than the prescribed distance from the centres of the roadways of those streets (Mr. F. Dolley).—Refused.

**Brixton.**—Three houses on the eastern side of Dolland-street, Lambeth, with external walls and forecourt boundaries at less than the prescribed distance from the centre of the roadway of the street (Mr. E. A. Swinger for Messrs. C. Blyton & Sons).—Refused.

**Greenwich.**—Forecourt boundaries in front of Nos. 6, 7, 8, and 9, and Nos. 16 and 17, Queen-street, East Greenwich, at less than the prescribed distance from the centre of the roadway of the street (Messrs. Meakin & Archer for the Very Rev. F. Henry, the Rev. C. Aherne and the Rev. J. Sala, of St. Joseph College, Mill-hill).—Refused.

#### Lines of Frontage and Width of Way.

**Lambeth, North.**—A building on the southern side of York-street, York-road, Lambeth (Mr. E. B. Lamb for Messrs. McGaw & Co.).—Consent.

**Marylebone, East.**—The rebuilding of the porch, with conservatory over, at No. 22, Sussex-place, Regent's-park, St. Marylebone, with external walls at less than the prescribed distance from the centre of the roadway of Sussex-place (Mr. J. Embelin-Walker for Mr. H. D. Ripley).—Consent.

**St. Pancras, South.**—A one-story shop at No. 138, Cleveland-street, St. Pancras, with external walls at less than the prescribed distance from the centre of the roadway of the street (Mr. C. Harris).—Refused.

#### Space at Rear.

**Dulwich.**—A modification of the provisions of section 41 of the Act with regard to open spaces about buildings, so far as relates to the erection of a building on the north-western side of Caltoun-road, Dulwich, between No. 17 and "Holmwood,"

with an irregular open space at the rear (Mr. A. E. Mullins for Mr. J. H. Cooper).—Consent.

#### Formation of Street and Line of Frontage.

**Wandsworth.**—That an order issued to Mr. A. Wellings, sanctioning the formation or laying out of new streets for carriage traffic on a site abutting upon the east side of Trinity-road and the south side of Upper Tooting-park, Wandsworth, and in connexion therewith the erection of buildings upon such site.—Consent.

#### Formation of Streets.

**Wandsworth.**—That an order be issued to Mr. A. Wellings sanctioning the formation or laying out of new streets for carriage traffic to lead from Tooting Bec-road to Upper Tooting.—Consent.

**Dulwich.**—That an order be issued to Mr. A. E. Mullins, sanctioning the formation or laying out of a new street for carriage traffic to lead from Reli-road to Troy Town, Peckham (Mr. J. Frampton).—Consent.

**Greenwich.**—That the Council do make no order upon the application of Messrs. Cronk, on behalf of Mr. H. G. Williams, for consent to the erection of a cottage on the west side of a road leading out of the south side of Shooter's-hill-road, Greenwich.—Agreed.

**Lewisham.**—That an order be issued to Mr. T. H. Burroughes, sanctioning the formation or laying out of new streets for carriage traffic to lead southward from Kanleybridge-road, Lewisham (Mr. A. Cator).—Consent.

**Wandsworth.**—That an order be issued to Messrs. Lee & Pain-Clark, sanctioning the formation or laying out of new streets for carriage traffic out of the east side of Erpingham-road and north side of Clarendon-road, Putney (for Mr. R. J. Pettward).—Consent.

#### Means of Escape at Top of High Buildings.

**Strand.**—Means of escape in case of fire, proposed to be provided on the eighth (top), seventh, and sixth stories of a building on the western side of Kingsway (Messrs. Cubitt, Nichols, Sons, & Chuter for Messrs. W. H. Smith & Son).—Consent.

**Westminster.**—A deviation from the plans approved in respect of the means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the seventh (top), sixth, and fifth stories of a block of office buildings on the north side of Tothill-street, Westminster, eastward of the Imperial Theatre (Mr. J. S. Gibson for Messrs. Holloway Brothers, (London), Limited).—Consent.

**City of London.**—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the sixth (top) story of No. 16, Cornhill, for the persons dwelling or employed therein (Mr. H. L. Anderson for the Mutual Life Assurance Company of New York).—Consent.

**Marylebone, East.**—Means of escape in case of fire proposed to be provided on the fifth (top) story of blocks 5 and 6, Harley-house, Marylebone-road, St. Marylebone (Messrs. Boehmer & Gibbs for Mr. C. J. Hinsley).—Consent.

#### Cubical Extent.

**Woolwich.**—The erection at Kenley-road, North Woolwich, of two buildings to exceed in extent 250,000, but not 450,000 cubic ft., and to be used only for the purposes of the manufacture of electric cables, switch-boards, and telephone instruments (Messrs. Ardron & Dawson for the Western Electric Company).—Consent.

**Fulham.**—That the consent be not given to the erection at Farm-lane, Walham-green, Fulham, of a building to exceed in extent 250,000 cubic ft., and to be used as a shed for motor omnibuses (Messrs. Gilbert & Constanduros for the London and District Motor Bus Company, Limited).—Refused.

#### Buildings for the Supply of Electricity.

**Westminster.**—That the Council do consent to the application of Mr. C. S. Peach for permission to retain for a further period the temporary iron chimney shaft at the electricity generating station, Millbank-street, Westminster.—Consent.

#### Space at Rear and Height of Buildings.

**Kensington, North.**—A building on a site abutting upon the eastern and southern sides of Blechynden-mews, Blechynden-street, Kensington (Mr. W. J. Wadman for the Committee of the Fawcett Liberal Club).—Consent.

#### Working-class Dwellings.

**Lewisham.**—Dwelling-houses to be inhabited by persons of the working-class, and proposed to be erected on a site at the rear of houses in Lea Hurst-road and Longhurst-road, Lewisham (Mr. E. H. Harrison for Mr. J. Johnson).—Refused.

#### Alterations to Building.

**Southwark, West.**—A deviation from the plans approved in respect of the reconversion into a dwelling-house of No. 21, St. George's-road, Southwark (Mr. R. F. Bacon for Messrs. Gillman & Spencer).—Consent.

**St. George, Hanover-square.**—Residential flats

on the site of Gloucester House, Piccadilly, and the site of the Duke of Devonshire's house, Grosvenor Place, London, W. 1. The Committee of the Council of the City of London.

### COMPETITIONS

**CENTRAL LIBRARY FOR ST. PANCRAS.**—The Public Libraries Committee of St. Pancras reported on Tuesday that they would have vacant possession on Lady Day of the site in Prince of Wales-road, by Angel, on which the Central Public Library is to be erected. They had considered whether it would be advisable to invite by public advertisement competitive designs offering premiums for those which may be placed first, second, or third in order of merit by a professional assessor, or whether it would be better to ask the President of the Royal Institute of British Architects to nominate six gentlemen who, in his opinion, would be best qualified to compete. They had decided in favour of the latter course, and had resolved (subject to the usual sanction) to ask the President of the Royal Institute of British Architects to nominate six gentlemen who, in his opinion, would be best qualified to prepare designs, also to ask him if he would act as assessor, and place the designs submitted in order of merit, and, if so, on what terms. The Committee had further resolved that an honorarium of 40 guineas be given to each of the five unsuccessful competitors. The same Committee reported that steps were being taken for the acquisition of sites in Chester-road, Euston-road, Camden Town, and Gospel Oak for the erection of branch libraries.

**FREE LIBRARY BUILDINGS AT WEST BROMWICH.**—The West Bromwich Free Library Committee met on the 9th inst. to consider the competitive plans for the new free library buildings which are to be erected at a cost of 7,500l. There were altogether twenty-seven sets of plans sent in, and the following awards were made:—First, 500l. (which is to be merged into the commission), Mr. S. J. Holliday (West Bromwich); second, 300l., Mr. A. G. Latham (Birmingham); third, 200l., Messrs. Crouch, Butler, & Savage (Birmingham).

### BOOKS RECEIVED.

**SOUTHWARK: THE CATHEDRAL AND SEE.** By George Worley. (Geo. Bell & Sons.)

**CASSELL'S BUILDING CONSTRUCTION.** By Professor Henry Adams, M.Inst.C.E. Part I (Cassell & Co. 3d. per Part.)

**PRACTICAL TRIGONOMETRY,** for the use of Engineers, Architects and Surveyors. By Henry Adams, M.Inst.C.E. Second Edition (Whitaker & Co. 2s. 6d.)

**SUBSTRAN HOLLER: A SERIES OF PRACTICAL PLANS.** By J. Herbert Pearson, architect. (E. & F. N. Spon. 7s. 6d.)

### Correspondence.

#### SCALE IN BOILERS.

**SIR,**—May I ask through your columns whether any of your readers can throw any fresh light upon the household boiler trouble? In towns where the water is hard it would be a great boon to have some means for the prevention of the scale in the boiler.

"CAMBRIDGE."

\* \* In the case of existing boilers, we do not believe there is any remedy but periodical cleaning of the boiler. It is important to see that the flow pipe, where it leaves the boiler, is kept well away from the fire, or it may get stopped up while the boiler itself is still efficient. The more heat, the more rapid is the deposit; and of course a pipe is much sooner choked than a boiler. In fitting in new boiler and range apparatus, the best method of preventing deposits in domestic boilers is to heat the water which is drawn off at the taps indirectly, by means of a coil in the cylinder. The usual course is to heat the water directly in the boiler, with the result that nearly every drop of water which is drawn off at the taps is first circulated through the boiler where it deposits a small amount of scale. It is the accumulation of these small amounts which causes the trouble complained of. In the indirect method of heating, the water is heated in the boiler circulated through a coil in the cylinder and has no connexion whatever with the hot-water service-pipes. As the water in the boiler is not drawn off, the amount of the deposit is inappreciable. The service-pipes free.



a secondary circulation from the body of the cylinder (not from the coil), and, as the temperature of the water is not as high as in the boiler, the amount of the deposit is less. Deposits will, of course, occur in the cylinder, but are not as objectionable there as in the boiler. We may have more to say on the subject.—ED.

#### AYLESBURY ELEMENTARY SCHOOLS COMPETITION.

Sir,—As one of the competitors in the above competition promoted by the Bucks County Council in February last, I was considerably interested in the list of tenders published in your recent issue for the erection of the buildings from the accepted design.

Those of your readers who were unfortunate enough to be participants in this competition will remember that the accommodation to be provided was for 750 scholars at a maximum expenditure of 10l. per head, together with an allowance of 400l. for a cookery school—or a total allowance of 7,900l.; a clause in the conditions provided that if the lowest tender exceeded the estimate by more than 5 per cent. the promoters reserved the right of rejecting the plans. Now, if we turn to the tenders actually received we find the lowest to be 9,200l., or an excess over the estimate of about 16½ per cent., and that tender is marked "provisionally accepted."

It was, of course, obvious to every competitor of experience in this class of work that it was impossible to carry out the buildings according to the conditions of the sum allowed, and there were two courses open—one, to comply with the building requirements and fake the estimate; the other, to keep within the estimate and point out that departure from the conditions would be necessary, not as regards accommodation but as regards construction. I do not complain that the allowance of 10l. per head was insufficient, for I know from a considerable experience that a perfectly satisfactory school can be built for that sum, but I also know that it is necessary to observe very strict rules of economy, and that orthodox methods as practised in London are out of the question.

Now, who is to blame for the obviously unfair result of the competition? Certainly no one but the assessor. The promoters of the competition did all that was necessary; they went to the R.I.B.A., asked for an assessor, and accepted his decision; and it is most disappointing to find the appointment of an assessor by the R.I.B.A. followed by an obviously unjust decision.

The moral seems to be that assessors should be appointed for their special knowledge of the subject in question, and not because it happens to be their "turn."

#### A.R.I.B.A. AND A COMPETITOR.

#### HOVE PUBLIC LIBRARY COMPETITION.

Sir,—The award of the assessor in this competition has been most disappointing. Surely amongst all the designs sent in there must have been some good ones. It is possible, of course, that every one of them may in some small particular have failed to conform with the conditions, but that is just as likely to have been a fault of the conditions or site as of the designs.

The withholding of the premiums is a great slight upon the architects who competed, and is very vexatious, especially when we remember that assessors, even one so gifted and respected as Mr. Belcher, are after all but human, and that there is undoubtedly room for difference of opinion in regard to vital questions of library planning.

Surely the course which has been adopted is one which should not be taken up without some more adequate explanation than has been offered; and I think the competitors, as well as architects generally, would welcome a public statement by Mr. Belcher giving the reasons which compelled him to take this very extreme view of the case.

A COMPETITOR.

Sir,—I herewith enclose for publication copy of letter received from the Town Clerk of Hove stating the award of the assessor, and which I feel sure the competitors will regret as much as the committee. Such an award condemning the whole of the designs of eighty architects has never before been recorded, and I trust that the committee will take a charitable view of the circumstances which must have been the cause of such an award, and that they will not take it seriously.

A COMPETITOR.

#### LONDON BUILDING ACTS AMENDMENT BILL.

Sir,—On page 346 of your issue of the 30th ultimo I notice a number of suggested amendments, and I should like to suggest that the Borough Surveyor should have carefully studied the 1894, 1898, and 1905 Acts before writing so much about nothing. The larger portion of the matters described are dealt with in these Acts. Others would not meet with the approval of the public.

It is quite possible that the proposed Bill may not be introduced at all, as the legislation this year has not been successful.

OBSERVER.

#### DISTRICT SURVEYORS' FEES.

Sir,—I suggest to your correspondent "C.J.S." that 7l. was the proper fee under the Act, but in all cases the district surveyors accept a nominal fee when a very small work is executed in a large building (see amount of abatements in the Returns of District Surveyors published by the London County Council). It is possible that other work was done to the building, otherwise a nominal fee or none at all should have been charged.

Can any of your readers give me any information about London district surveyors' prior to 1845? I have complete notes since that date. Also I am very anxious to have proof that the late C. J. Matthews, the eminent comedian and husband of Mrs. Vestris, was a district surveyor of either South Islington or Stoke Newington.

HENRY LOVEGROVE,  
Hon. Sec. District Surveyors' Association.

#### TENDERS FOR RUSSIAN RESTAURANT, STRAND.

Sir,—In your issue of the 7th inst., under the list of tenders, you state in the third column, on page 377, that the electric lighting order has been placed with A. Collins, A.M.I.C.E., at 180l. for Romano's, Ltd. This statement is quite incorrect, and is liable to cause me some considerable inconvenience, as I am not a contractor but a consulting engineer, and the amount mentioned, namely 180l., is the sum that I mentioned in the report would be necessary to be expended on the work.

ADRIAN COLLINS.

\* \* The mistake is not ours; we printed the list of tenders as sent to us.—ED.

#### PICTURES AND DECORATION.

Sir,—In thanking you for your kindly reference (page 340 ante) to my paper read before the Master House Painters and Decorators at Plymouth, I can in no way take exception to your concluding remarks, with which I, of course, agree, but I would like to point out that the entire address has not yet been printed, therefore you have not had an opportunity of seeing the following paragraph:—

"I have spoken so severely of a most exalted calling—the noble, educational, and soul-inspiring art of painting—because that art has lost something of its greatness and purpose by its exponents ignoring decoration and decorative claims, and therefore neglecting the decorative instruction which should also be a part of every painter's training."

It is because the mere picture painter arrogates to himself the position due to those vested with genius, and ignores the claims of men of genius in other directions, that my complaint is just—viz., the placing of pictorial art upon a ridiculous pedestal."

I give way to no man in love and veneration for the fine arts of painting and sculpture, but in my love and admiration to justify me in being insensible to the claims for recognition of the applied arts of architecture and decoration, which are after all more essential to the comfort of humanity if appealing less to the imagination? If any excuse is necessary, only extravagant comparisons can at the present day draw attention to abuses. This comes hard upon one who holds the view that such comparisons should be needless.

GEO. C. HAITE.

\* \* Our point was that the highest achievements of pictorial art represent a higher order of genius, and have a higher intellectual interest, than anything that can be done in decorative art. Decorative design is relative, it has reference to its surroundings, and it cannot express the highest order of ideas. Pictorial art at its highest has the quality of original poetry; it stands alone and on its own basis, and represents intellectual effort in a sense in which decorative art cannot.—ED.

CENTRAL HALL, NEWPORT.—The foundation-stones have been laid of a central hall for the Newport Forward Movement. It will be situated in Commercial-street and will accommodate over 2,000 people. The design is Gothic, and the architects are Messrs. Habershon & Faulkner, of Cardiff and Newport.

PUBLIC LIBRARY, SOUTHEAST.—Two improvements at Southend-on-Sea were inaugurated on Monday last week, the first being the laying of the foundation-stones of a public library, and the other the official opening of the Chalkwell Esplanade. The public library was the outcome of a gift of 8,000l. from Mr. A. Carnegie, and the Corporation provided a site on the east side of Victoria-avenue, which will ultimately be close to the municipal buildings. The structure, of which the builders are Messrs. F. and E. Davey, was designed by Mr. H. T. Hare, the architect. The reference library will afford space for fifty readers, and the stock room for 20,000 reference books. The building will be fireproof throughout.

## The Student's Column.

### STEAM BOILERS AND PIPES.—XV. CHIMNEYS (continued).

FROM the preceding articles it is evident that, other things being equal, the theoretical velocity of draught in a chimney depends entirely upon the height of the chimney. The practical velocity also depends upon the height of a chimney, although in point of fact the actual rate of speed is affected by the internal area and the general proportions of the chimney and its connected flues. Therefore, while the interior area of a chimney is in no way connected with the origin of draught power, it has an important bearing upon the actual velocity of draught and upon the capacity of a chimney to carry away the required volume of gases.

*Output, or Capacity.*—Velocity of draught and internal area must be considered together, for the carrying capacity of a chimney is governed by both factors, and for a given discharge of gases the required area of a chimney is inversely proportional to the actual velocity of the draught, and, conversely, the required velocity is inversely proportional to the area of a chimney.

It follows, then, that if the height of the chimney be comparatively great the area may be comparatively small, and if the area be comparatively great the height may be comparatively small.

Therefore by increasing the height it is possible to minimise the transverse dimensions of a chimney, and so to secure the required discharge by increased velocity. Apart from the expense involved by lofty building construction, and the proportionately heavy increase of friction with increased velocity, the attempt to augment the output in this way is impracticable beyond reasonable limits, for the reason that the velocity of the air and gases is not proportionate to the height, but to the square root of the height.

Tables XXI., XXII., and XXIII. show that by doubling the height of a chimney the velocity is only increased in the ratio of  $\sqrt{1} : \sqrt{2}$ , and by quadrupling the height of the chimney, the velocity is only increased in the ratio  $\sqrt{1} : \sqrt{4}$ .

As an illustration, let us suppose that 64 cubic ft. of gases have to be discharged per second. If the chimney were 50 ft. high the actual velocity by Table XXIII., column 8, would be 16 ft. per second, so the required area would be 4 sq. ft. By making the height 100 ft. the velocity would be 22.6 ft. per second, and the area of the chimney need only be 2.83 sq. ft.; and by making the height 200 ft., with a velocity of 32 ft. per second, the area need not be more than 2 sq. ft.

It does not require much consideration to see that the small reduction of area could not possibly compensate for the cost of the greatly increased height. In actual practice the reduction of area would be still less, owing to the necessity of providing for the rapid increase of friction with the increased velocity of the gases, or, expressed in other words, for the purpose of minimising the reduction of velocity by the increase of friction. Another practical consideration is that a given thickness of soot has a far greater effect in reducing the available area of a small chimney than that of a larger chimney.

The aspect of the case presented above is made very clear by calculating the loss of head corresponding with the heights and areas stated, the square root of each area being taken to represent the side of a square chimney.

Formula (3), p. 301, may be inverted for the purpose of obtaining comparative results. Thus using  $v_a$  to denote actual velocity, and  $H$  in place of  $h$ , we have

$$h = \frac{v_a^2 H}{(48)^2}$$

Then the losses of head are:—

For the 50-ft. chimney

$$h = \frac{(16)^2 \times 50}{2304 \times \sqrt{4}} = 2.7 \text{ ft.}$$

For the 100-ft. chimney

$$h = \frac{(22.6)^2 \times 100}{2304 \times \sqrt{2.83}} = 13.1 \text{ ft.}$$



For the 200-ft. chimney

$$h = \frac{(32)^2 \times 200}{2304 \times \sqrt{2}} = 62.8 \text{ ft.}$$

These figures are sufficient to show how rapidly friction and consequent loss of head increase with the velocity of the draught, and to suggest how necessary it is to consider the area of a chimney from the standpoint of friction, as well as from that of cubical capacity.

In calculating the proportions of the chimney for any given boiler installation the estimated coal consumption is the starting-point. Next it is necessary to consider the supply of air per pound of fuel, and the consequent volume of the hot gases.

The consumption of coal, of course, varies with the duty of the boiler, and ranges from 5 lb. to about 30 lb. per square foot of grate area per hour in boilers with natural draught. The air supply usually ranges from 14 lb. to 30 lb. per pound of coal, and the volume of the products of combustion in a chimney can be calculated by formula (1), p. 280, or taken from Table XIV., p. 281.

Having settled these data, the area of any chimney can be calculated if the height of the shaft or the velocity of the hot gases be known, or the height if the area be known.

The required area is obviously the quotient of the volume of the gases divided by their practical velocity of flow.

Whence

$$A = \frac{c q}{v_a} \dots \dots \dots (29)$$

As by formula (28) the practical velocity of the hot gases =  $2.26 \sqrt{H}$ , we have also

$$A = \frac{c q}{2.26 \sqrt{H}} \dots \dots \dots (30)$$

Again, for the height we have from (28)

$$H = \left( \frac{v_a}{2.26} \right)^2 \dots \dots \dots (31)$$

and from (30)

$$H = \left( \frac{c q}{2.26 A} \right)^2 \dots \dots \dots (32)$$

If the area of the chimney be already settled, we can ascertain the actual velocity required for a given output by the equation

$$v_a = \frac{c q}{A} \dots \dots \dots (33)$$

Knowing the area and practical velocity, we can calculate the weight of coal that can be consumed in the boiler furnace by the equation

$$c = \frac{v_a A}{q} \dots \dots \dots (34)$$

In the foregoing formulae  $q$  and  $Q$  are in cubic feet;  $A$  is in square feet;  $H$  is in feet, measured from the fire-grate to the top of the chimney;  $v_a$  is in feet per second; and  $c$  is in pounds per second.

If the designer wishes to calculate the area with a fair approach to accuracy, the value of  $v_a$  in formula (29) should be calculated by taking into account the number of bends and other structural features in the boiler flues tending to reduce the velocity of the gases, and by taking account also of the length of the flues, the height of the chimney, and the diameter corresponding to the area of the flues and the chimney, as in example (10), p. 371.

On the other hand, if a rough approximation should be thought sufficient—and in many cases nothing more than this is necessary—formulae (30) and (32) will give the required area and height with a minimum expenditure of time.

Formula (34) may be used in connexion with the design of projected chimneys, where all the data are hypothetical, or in computing the possible fuel consumption for existing chimneys where the velocity can be ascertained by measuring instruments, and where the air supply per pound of fuel can be determined in a similar manner.

In the following examples we have assumed the total coal consumption to be 720 lb. per hour, the air supply to be at the rate of 24 lb. per pound of coal, and the temperatures of the cold air and of the hot gases to be 62 deg. and 585 deg. F. respectively.

Hence we have  $c = (720 \div 3,600) = 0.2$  lb. per second. The value of  $q$  is given by formula (1), p. 280. Inserting the weight of air per cubic foot at 62 deg. from Table XVIII., p. 326, we get

$$q = (24 \div 0.0761) \frac{461 + 585}{461 + 62} = 630 \text{ cubic ft.}$$

Example (11).—Find the area for the top of a chimney 100 ft. high, this height being assumed as necessary for the purpose of avoiding annoyance to the owners of adjacent property.

(a) Assume the values of  $n$  and  $\frac{H+L}{d}$  to be as stated at the top of Column 4, Table XXIII.

Then by formula (29) we have

$$A = \frac{c q}{v_a} = \frac{0.2 \times 630}{2.26} = 6.126 \text{ sq. ft.}$$

(b) Taking an average velocity as given by formula (28) and using formula (30), we have

$$A = \frac{c q}{2.26 \sqrt{H}} = \frac{0.2 \times 630}{2.26 \times 10} = 5.574 \text{ sq. ft.}$$

Example (12).—Find the height of a chimney, supposing that it is not necessary to adopt any minimum height, the internal diameter at the top being assumed at 3 ft., with a corresponding area of 7.0686 sq. ft.—say, 7 sq. ft.

By formula (32) we get

$$H = \left( \frac{c q}{2.26 A} \right)^2 = \left( \frac{0.2 \times 630}{2.26 \times 7} \right)^2 = 63.3 \text{ ft.}$$

Then the chimney is 63.3 ft. high by 3 ft. internal diameter at the top, and the correctness of these proportions may be tested by formulae (28) and (29).

Formula (28) gives for the velocity of the hot gases

$$v_a = 2.26 \sqrt{H} = 2.26 \times 7.96 = 18 \text{ ft. per sec.}$$

Substituting this value in formula (29), we get

$$A = \frac{c q}{v_a} = \frac{0.2 \times 630}{18} = 7 \text{ sq. ft.}$$

In the next two examples we will alter the assumed coal consumption, the air supply per pound of fuel, and the temperature of the gases.

Example (13).—Ascertain the required velocity of the gases and the height of a chimney, with an internal area of 9 sq. ft., to provide for the consumption of 1,800 lb. of coal per hour; the air supply being 20 lb. per pound of coal, and the temperature of the gases 600 deg. F. The coal burned per second is  $(1,800 \div 3,600) = 0.5$  lb., and by Table XIV the volume of the gases at 600 deg. is 533 cubic ft.

Then by formula (33)

$$v_a = \frac{c q}{A} = \frac{0.5 \times 533}{9} = 29.61 \text{ ft. per sec.}$$

and by formula (31)

$$H = \left( \frac{v_a}{2.26} \right)^2 = \left( \frac{29.61}{2.26} \right)^2 = 171.6 \text{ ft.}$$

The same result is given by formula (32).

Thus

$$H = \left( \frac{c q}{2.26 A} \right)^2 = \left( \frac{0.5 \times 533}{2.26 \times 9} \right)^2 = 171.6 \text{ ft.}$$

Example (14).—Find the quantity of coal that can be consumed in the boilers connected with a chimney 200 ft. high having an internal area of 12 sq. ft., the velocity of the hot gases, at the temperature of 600 deg., being 32 ft. per second, and the air supply 22 lb. per pound of fuel. By Table XIV the volume of the gases at 600 deg. F. = 586 cubic ft.

Substituting these values in formula (34), we have

$$c = \frac{v_a A}{q} = \frac{32 \times 12}{586} = 0.655 \text{ lb. per sec.}$$

Hence the possible consumption is  $(0.655 \times 3,600) = 2,358$  lb. per hour.

For application to cases in which the temperature of the hot gases is about double that of the external air, or when the air supply is such that the volume of the hot gases is 650 cubic ft. per pound of coal, we can further simplify formulae (29) to (34) as shown below.

Formula (29) :—

$$\text{The expression } \frac{c q}{v_a} \text{ becomes } \frac{c \times 650}{3,600 v_a}$$

whence

$$A = \frac{C \times 0.18}{v_a} \dots \dots \dots (35),$$

where  $C$  is the weight of coal per hour.

Formula (30) :—

$$\text{The expression } \frac{c q}{2.26 \sqrt{H}} \text{ becomes } \frac{c \times 650}{2.26 \sqrt{H}} = \frac{c \times 287.6}{\sqrt{H}}$$

Here  $c$ , as before, is the weight of coal consumed per second.

It is more convenient, however, to use the symbol to  $C$  and dividing by the number of seconds in an hour, we get

$$A = \frac{C \times 0.08}{\sqrt{H}} \dots \dots \dots (36)$$

Formula (32) :—

The expression

$$\left( \frac{c q}{2.26 A} \right)^2 \text{ becomes } \left( \frac{c \times 650}{3,600 A} \right)^2$$

and by reduction as above we have

$$H = \left( \frac{C \times 0.08}{A} \right)^2 \dots \dots \dots$$

Formula (33) :—

$$\text{The expression } \frac{c q}{A} \text{ becomes } \frac{c \times 650}{3,600 A}$$

and by reduction

$$v_a = \frac{C \times 0.18}{A} \dots \dots \dots (38)$$

Formula (34) :—

$$\text{The expression } \frac{c q}{v_a} \text{ becomes } \frac{c \times 650}{v_a}$$

whence

$$C = \frac{v_a A \times 3,600}{650}$$

Substituting for  $v_a$   $(2.26 \sqrt{H})$  as given by formula (28) we have

$$C = (2.26 \sqrt{H}) A \times 3,600$$

which reduces to

$$C = \frac{A \times H}{0.08} \dots \dots \dots (39)$$

In all the above equations  $C$  represents the weight of coal per hour.

Formulae (35) to (39) give results that are similar to most of the chimney rules published, but it is very important to remember that these and all other equations of the kind are based upon a certain set of assumed conditions which may or may not be realized in practice.

Chimney formulae as given in ordinary books of reference are not usually accompanied by any explanation of the manner in which the equations have been derived. Consequently the equations may be quite suitable in some cases and equally unsuitable in others, and if the user is not enlightened as to their derivation he cannot judge of their applicability.

For these reasons we have been careful to state the exact basis upon which every formula is founded, and to trace, step by step, the manner in which the rules have been deduced.

#### COURT OF COMMON COUNCIL.

THE Lord Mayor presided over the fortnightly sitting of the Court of Common Council at the Guildhall on Thursday last week.

**Motor Traffic.**—Mr. Deputy Morrison called attention to the nuisance caused in the City by the heavy motor traffic, and asked if the Streets Committee would try and mitigate the nuisance. Mr. Norton admitted that the nuisance ought to be mitigated, but doubted whether the Committee had any power to deal with it. He promised to give the matter consideration.

**Corporation Property.**—It was agreed to grant a building lease for eighty years at a rental per annum of 900l., twelve months peppercorn, to Geo. Trollope & Sons and Colls & Sons, Ltd., of the remainder of the City's land on the south side of Store-street, Tottenham Court-road, comprising 24 and 25, Store-street, and Nos. 1 to 8, and part of No. 9, South-crescent.

**New General Post-Office.**—A letter was received from the Postmaster-General inviting the Lord Mayor, Sheriffs, and fifty members of the Corporation to the ceremony of laying the foundation stone of the new General Post-Office building on the site of Christ's Hospital, on October 18, to be performed by the King.—It was agreed that a vote of fifty guineas be made for decoration in connexion with the event.

**The Old Bailey Buildings.**—Mr. Cooper asked who was responsible for the inscription over the portals of the new Old Bailey buildings. Mr. Deputy Ellis said there was a little history attached to the inscription. The architect sent to the office a large drawing of the inscription, the words being, "Defend the children of the poor and punish wrongdoers." It appeared that the architect met Mr. Justice Grantham, who said, "For God's sake, select a suitable inscription." or Grock on that day. The inscription was submitted to the Dean of Westminster, who chose the inscription which now appeared on the building.—Mr. Stapley moved that steps be taken to remove the inscription, and that



was seconded by Mr. Rowe, who objected to the Dean of Westminster being asked to select an inscription.—After considerable discussion an amendment was carried to the effect that the whole question of the inscription be referred to the Lands Committee.

**Blackfriars Bridge.**—Replying to a question as to whether the Bridge House Estates Committee would consider the question of rebuilding Blackfriars Bridge in connexion with the tramway schemes of the London County Council, Mr. W. T. Alger said the Committee were endeavouring to arrange a conference with the London County Council, and they would listen to any suggestions made.

#### WESTMINSTER CITY COUNCIL.

The usual fortnightly meeting of this Council was held on Thursday last week at the City Hall, Charing Cross-road, W.C.

**Paving Works.**—On the recommendation of the Works Committee the Council authorised the repaving of the carriageway of Upper Brook-street, between Park-street and Park-lane. The estimate of the City Engineer of the cost of repaving with creosoted yellow deal blocks is £251. The work will be executed under the annual contract for wood-paving carriage-way works.

**Hyde Park Corner—Diversion of Sewer.**—The Works Committee reported that, in accordance with a resolution passed by the Council in April last, they had invited tenders for the diversion of the sewer at Hyde Park Corner in connexion with the construction of the underground station of the Great Northern, Piccadilly, and Victoria Railway. Three tenders had been received; that of Mr. D. R. Patterson for £871, 10s. 6d. had been accepted, and the work was now in progress. The action of the Committee was endorsed.

**Gladstone Memorial in the Strand.**—The same Committee reported as follows:—

"The Council having, on July 27 last, left in the hands of the Chairman and the City Engineer the matter of the site and arrangements for the erection of the Gladstone memorial in the Strand at the western end of St. Clement's Church, we have to report that the statue itself is 6 ft. 6 in. high, mounted upon a pedestal 10 ft. 6 in. in height. Surrounding the pedestal, about 12 ft. from the ground will be four subsidiary bronze groups about life size. The pedestal will be of Portland stone. Application has been made for the necessary road licence for formation of the foundation, &c., and granted, in accordance with the plan submitted, and the site of the memorial has been set out in conjunction with the Engineer of the London County Council."

**Temporary Awnings Over Footways.**—After considerable discussion on the Council agreed to the following recommendation of the Works Committee:—"That the Council do not permit the erection of temporary awnings over the public way without a written licence being first obtained from the Council, and that a fee of 6s. be charged on the issue of each licence." The matter was carried up by the Committee in July last and referred back.

**Locomotives on Highways.**—The same Committee reported:—

"We have received and submit a letter from the Secretary of the Local Government Board, dated August 8, relating copies of an order authorising, subject to certain conditions, the use on highways of locomotives, used for drying wheel of which, instead of being smooth, are covered with diagonal crossbars, shall be constructed in such contact with the surface of the ground shall be by means of a single set of wheels, not protruding from the circumference of the wheel at equal distances."

#### BOARD OF EDUCATION, SOUTH KENSINGTON.

The following is the list of candidates who were successful in the competitions for Royal Exhibitions (Art), Local Scholarships (Art), and for National Scholarships (Art) and Free Studentships (Art), in 1905.

**Local Exhibitions (Art).**—P. A. Wise (Birmingham Municipal School); Emily G. A. Abraham (Bristol); J. W. Baxter (Carlisle); H. R. Fraser (Leeds); Royal Institution; Jessie M. Lawson (Leeds); Royal Institution; H. H. Stensfield (Manchester Municipal School); F. N. Smith (Bridgewater); V. O. Cunnell (Bournemouth, Poole Hill); T. Lewis (London, St. Marylebone); R. W. Stewart (Edinburgh, &c. Institution).

**Local Scholarships (Art).**—F. Tustin (Northampton); W. Bondal (Salford); F. P. Brown (Rochester); J. W. Watts (Rink); Mary E. Waring (Barnby); J. M. W. Reid (Aldershot, Gray's, S. of A.A.); J. Dover (London, Deptford); W. Rathbone (Sunderland); S. Rushingham (Burslem); A. Ward (York, St. Leonard's); Margaret S. Dolan (Edinburgh, Royal School); J. B. Bain (Edinburgh, Royal Institution); F. Lawson (Leeds); J. Smeyers (Antwerp); J. L. F. Fritchard (London, St. Marylebone); Helen M. Nicholson (Rochester); Mabel T. Eckenley (Carlisle); Kensington; A. E. Rendle (Bristol, Queen's-road); Maude A. Lovines (Kensington); H. B. Wright (Buckingham); J. L. Johnson (Ashton-under-Lyne); G. Harrison (Leeds).

**National Scholarships (Art).**—F. W. Burrows, designer (Manchester Municipal School); F. Müller, furniture draughtsman (Edinburgh, Royal Institution); Jessie M. Lawson, sculptor (Edinburgh, Royal Institution); C. Carz, stone carver (Edinburgh, Royal Institution);

H. N. Stansfield, modeller and metal worker (Manchester Municipal School); C. Vyse, pottery modeller (Hanley); H. Whiteside, designer for stained glass and decoration (Manchester Municipal School); L. Preston, lithographic artist and designer (Leeds).

**Free Studentships (Art).**—R. H. Parker (Leeds); J. E. Rawson (Ashton-under-Lyne); S. B. Hewitt (Ashton-under-Lyne); J. R. Hurnford (Belfast); H. B. Williamson (Ashford); Beatrice M. Pritchard (London, St. Marylebone); E. W. McGowan (Belfast); Amy B. C. Dinn (Manchester Municipal School); W. H. Megaw (Leeds); T. Lewis (London, St. Marylebone); S. Tushingham (Burslem); Margaret M. Rudge (London, Battersea); R. Gill (Bournemouth, Poole Hill); W. Washington (Ashton-under-Lyne); Jeanne B. Bailer (Birmingham, Royal Institution); Inez Topham (Bristol, Queen's-road); S. C. Bowles (London, Battersea); T. Whitehead (Hull); Agnes I. Tarn (Hull); H. L. Oakley (Leeds); Kate Ellingworth (London, Clapham).

#### OBITUARY.

**MR. MELVIN.**—The death, on September 30, is announced of Mr. John Melvin, at Clarendon, Alloa, N.B., in his fifty-first year. Mr. Melvin was the senior partner of the firm of Messrs. John Melvin & Son, of Alloa, in which he succeeded to his father's practice. The chief architectural works carried out by him comprise the Clackmannan Hospital, for which he made the plans and designs ten years ago; the Infectious Diseases Hospital, Linlithgow, for which his designs were chosen in competition; the Fever Hospital at Bathgate, N.B.; and the Joint Fever Hospital on the south side of the Burgh of Linlithgow, which consists of four wards in two pavilions, and an administrative block, offices, laundry, dairy, &c., and was opened on May 12 of this year, having been erected at a total cost of about 9,000.

**MR. R. S. HENSHAW.**—It may not be generally known that the death of Mr. R. S. Henshaw, secretary of the Builders' Accident Insurance, occurred in July last, at Margate. The deceased, who was forty-six years of age, had been connected with the builders' associations for the past twenty-three years. He was appointed secretary of the Institute of Builders in 1884, and, on the death of his father in 1893, he became secretary of the Builders' Accident Insurance, Limited, and the London Master Builders' Association. When the Workmen's Compensation Act came into force in 1898, there was a division of the staffs, and Mr. Henshaw devoted himself entirely to the duties of secretary of the Builders' Accident Insurance, Limited. Deceased, who was buried at St. Mary's, Plaistow, Kent, left a widow and three children. Mr. Henshaw was well known to a large number of our readers, and his unflinching courtesy to those with whom he had business transactions had won for him a large measure of respect and esteem, and his premature death will be regretted by many.

#### GENERAL BUILDING NEWS.

**CHURCH RESTORATION, ARLESDON.**—St. Michael's Church, Arlestone, was recently reopened by the Bishop of Carlisle after restoration and the addition of a new tower. The work was carried out under the supervision of Mr. J. H. Martindale, architect, Carlisle, at a cost of about 4,000.

**CALVINISTIC METHODIST CHURCH, GILFAC.**—The foundation-stones of a new Calvinistic Methodist Church at Gilfach-Begod were laid on the 6th inst. The contract price is 1,891. 6s. 5d., the work being undertaken by Messrs. Williams & Sons, Bargoed, from plans prepared by Mr. William Harris, Gilfach.

**JEWISH SYNAGOGUE, BRADFORD.**—The foundation-stone of a new synagogue and schools for the Bradford Hebrew congregation has just been laid. The building is to occupy a site of about 600 sq. yds., with a frontage of 66 ft. to Spring Gardens, Manningham-lane. There is a fall in the street frontage of about 7 ft., and advantage is taken of this in arranging the entrances to the synagogue and the schoolroom. The synagogue is to be approached by a short flight of steps from the higher end of the site, and it will have a vestibule, with two staircases to the galleries, an emergency exit being provided at the rear. The synagogue, which is 52 ft. by 37 ft., is to provide seating accommodation on the ground floor for 250, and seats for 200 ladies in the galleries. The minister's vestry is to be at the east end of the building, with a vestry on the first floor. Under the synagogue are to be schools for boys and girls' Hebrew classes, consisting of three rooms, two 29 ft. by 18 ft., and one 37 ft. by 19 ft., divided by movable partitions, so that when necessary they may be thrown into one room for meetings. The schools are entered direct from the street from the lower end of the site. The estimated cost of the building, including the site, is about 3,600. The design is Byzantine in character, executed in local stone walling, with wrought-iron dressings. The work is being carried out by J. Moulson & Sons, Ltd., from designs prepared by and under the supervision of Mr. B. S. Jacobs, of Hull, who has undertaken the duties of honorary architect.

**SCHOOL OF ART, HULL.**—Hull's new Municipal School of Art, situated on the Anlaby-road, the

foundation-stone of which was laid in April, 1903, was opened on the 6th inst. Messrs. Lancaster & Stewart are the architects, their design having been selected in competition. Messrs. Hockney & Liggins were the contractors.

**POLICE STATION, NEWPORT.**—The new police station at Mill, Newport, was opened recently by the Mayor (Mr. R. Wilkinson). The new station has been built by Messrs. D. W. Richards, Ltd., from designs by Mr. R. H. Haynes, Borough Engineer. Exclusive of furniture, the contract price was 4,342.

**WORKHOUSE INFIRMARY, LEICESTER.**—The new Workhouse Infirmary, North Evington, was opened recently. The site, consisting of over 62 acres of land, cost 6,820, and the whole work will involve an outlay of over 100,000. The buildings consist of the official and administrative block in the centre, and standing parallel with this are four large two-story double partition blocks, two on each side, to accommodate 128 patients each. The two blocks on the left are for male patients, and the two on the right for female patients. The whole of these are connected by corridors running in transverse direction to the line of the pavilion blocks. At the back of the administrative buildings are the laundry block, power-house, &c., with the water tower adjoining. The administrative structure faces south-east, with three stories in front and two behind. The front portion contains an entrance hall, committee-rooms, clerks' offices, dispensary, offices, and consulting-room and accommodation for the medical staff; and in a separate wing are the matron's apartments, sitting-rooms, and dining-rooms for the nurses, with bedrooms in the upper story for about forty nurses. In the back portion are the great kitchens, sculleries, larders, &c., for the cooking and other requirements of patients and staff. The stores occupy a separate department near the central kitchens. There are also a servants' hall, linen and sewing rooms, and apartments for female officers and servants. The laundry block is connected by a covered way with the main building. The water tower stands 125 ft. high. It carries at a height of 424 ft. above ordnance datum a tank having a capacity of 24,000 gallons. There is a power-house erection, with two large boilers, engine and pump room, engineers' workshops, coal stores, disinfecting station, incinerator, &c., and from this there are connections with all the main buildings for the purpose of heating, and for supply of hot and cold water and electric services. The four ward pavilions already spoken of are each 330 ft. long, and contain bedrooms, dayrooms, nurses' duty-rooms, bathrooms, &c. The buildings will contain room for beds for 520 patients, and three additional double pavilions can be added as required, increasing the accommodation to 900 beds. There will be over 900 cubic ft. of air space to each bed. The buildings are of red brick, relieved by bands of white brick, with stone dressings to the window and door openings. The roofs are tiled and the external walls up to the plinth line are built in blue brick. The infirmary is lighted throughout by the Corporation electricity, which also drives the motors in the laundry, and gas is also installed as a stand-by for cooking. There is telephonic communication between all parts of the building. Messrs. A. Gough & Trollope were the architects, and Messrs. C. & R. Moss the contractors.

**HOSPITAL PAVILION, BRADFORD WORKHOUSE.**—The Bradford Board of Guardians have erected a new hospital pavilion for male patients. The pavilion has been erected from plans by Mr. Fred Holland at an estimated cost of 16,000. The contractors are Messrs. John Moulson & Sons, Ltd., Messrs. E. Fearnley & Sons are the joiners; Mr. E. Townsend, plumber; Messrs. A. & S. Wheeler, of Leeds, plasterers; Mr. George Wilkinson, slater; and Mr. W. Townsend, painter.

**LIBRARY, GRAVESEND.**—A new public library has been erected at Gravesend, the architect being Mr. Edmund J. Bennett. The building has a frontage of 52 ft. 8 in. to Windmill-street, and is built of Ancaster and Portland stone with red brick courses in the first floor. It is divided into two stories, with a pedimented bay at each end carrying through the two floors, and a ground floor ornamented with four Doric columns, dividing the centre of the tower front into three bays. The upper part is divided into an equal number of bays, with windows in stone dressings. The new room is 36 ft. by 24 ft., the magazine-room 22 ft. by 53 ft., and 16 ft. by 17 ft., the reference library 24 ft. 6 in. by 17 ft., and these rooms are on the ground floor, as well as the lecture hall, which is 31 ft. by 35 ft. On the first floor the future reference-room is found (the present reference library will later on be used as additional lending library, or for such other purpose as the Library Committee may deem advisable), 22 ft. by 24 ft. The committee-room, with a small hall, landing, and stairs, takes up the remainder of the first floor. The partition walls can be removed, and the committee-room and the small hall thrown into the reference-room. The fireproof floors and stores are by Stuart's



Granolithic Co., Ltd., Millwall. The floors in terrazzo are the work of Messrs. Tramontini, of Southend. The news stands and tables are manufactured by the North of England School Furnishing Co. The bookcases, chairs, etc., are by Messrs. Wenham & Hunter, of Gravesend. The hot-water work and the constructional iron work are by Messrs. Fowle Bros., Gravesend. The tiling to the walls is by Messrs. Van Straaten, of Little Britain, E.C. Mr. Nelson Dawson is responsible for the wrought iron work. Mr. Hibbert Binney is the sculptor, from whose models the whole of the carving has been executed. The lighting of the building has been carried out by Mr. Blandford, to the specification of Mr. C. F. McInnes, the Borough Electrical Engineer, who has supervised the work. The basement is given up to a book store for 5,000 volumes, a coal store and heating chamber, with sink and a geyser for cleaning purposes. The contract for the whole of the works was placed in the hands of Mr. Albert Edward Tong. Messrs. Swift Bros. were the masons.

**WORKMEN'S HALL, STRATFORD.**—The new Workmen's Hall and Club Rooms in the Romford-road, Stratford, were opened recently. The building was erected from plans prepared by Messrs. E. M. Thomas & Co., under the supervision of Mr. G. F. Taylor, in conjunction with Mr. W. H. Winder. It is of steel construction, with fireproof floors, roofs, etc., carried out by Messrs. G. Aston & Sons. The artificial stone used and the mosaic paving in the entrance-hall was supplied by Messrs. Phillips & Co., and the heating arrangements were entrusted to Messrs. C. P. Kinnell & Co. The builders were Messrs. Greger & Son, of Stratford, whose clerk of works was Mr. J. Grover.

#### SANITARY AND ENGINEERING NEWS.

**LEEDS WATERWORKS.**—The Leeds City Council have been engaged on a scheme for the construction of several new reservoirs, involving an aggregate expenditure of between two and three millions sterling, in the course of some ten or twelve years. The formation of the Colsterdale reservoir is now in hand, and a waterworks engineer to superintend the works was recently appointed at a salary of 1,000l. per annum. Some serious defects in regard to the scheme were, however, reported by Mr. J. H. Armitage, the Chairman of the Waterworks Committee, at a recent meeting of the City Council. He stated that in twenty-nine contract drawings he had discovered 300 mistakes, 255 of which were of a serious character, and would mean a loss of several thousands of pounds. One result of these mistakes was that it was found that no less than fifty additional acres of land would be required satisfactorily to carry out the work. That meant the corporation would either have to go to Parliament for a new Act or would have to sign a treaty with Lord Masham. The Corporation, as a result, had to pay Lord Masham 50l. per acre more for the fifty additional acres that were required than had been paid for the other land, the price of which had been fixed by arbitration. By the changes effected, the Committee had been able to save 40,000l. in the construction of a bywash. The tunnel which brought the water through the embankment had curves and tangents that were wrong, and the tunnel itself did not meet. The drains would not carry the water away. The bridge at the head of the reservoir terminated 4 ft. above the level of the ground, so that any cart coming over the bridge would have that distance to fall or climb; while another bridge that was to cost 800l. was left out of the plans altogether. The original estimate was 300,000l., and there would be an extra cost of 227,000l. on the trench alone. In consequence of these and other defects the works were for a time not being proceeded with. The statements of the Chairman were in a measure corroborated by the newly-appointed engineer having declared, according to Mr. Armitage, that he would accept no responsibility in any shape or form if the embankment and trench were to be constructed in the manner proposed. The result of expert evidence, Mr. Armitage said, had been one of the most shocking exposures revealed in connexion with the work of any city. The minutes of the committee on the subject were adopted. —*Times.*

**BRIDGE, MAR LODGE, N.B.**—The new Victoria Bridge across the Dee at Mar Lodge, erected by the Duke of Fife, was opened by His Majesty the King recently. The bridge is in three spans, with two piers, of granite, in the river. The structure has been built to the design, and under the superintendence, of Mr. P. M. Barnett, C.E. The foundations and mason work of the piers and the tar macadam of the roadway have been done by Mr. George Hall, builder, Aberdeen; and the steel work by Messrs. James Abernethy & Co., Aberdeen.

**WATERWORKS, EAST STIRLINGSHIRE.**—The formal opening of the East Stirlingshire Waterworks, which have been constructed by the Eastern District Committee of the Stirling County Council, took place at Buckie Burn Reservoir on the 5th inst. The works, which

were begun on August 3, 1901, have been carried out under seventeen separate contracts, and have cost about 112,000l., exclusive of land and servitudes, surface drainage, Parliamentary expenses, etc. Mr. James Watson, C.E., of Bradford, was the consulting engineer, and the whole of the works were designed and carried out under the supervision of Messrs. Warren & Stuart, C.E., Glasgow. The sources of supply which have been drawn upon are the Buckie Burn, a tributary of the river Carron, and three tributary streams on the lands of Muirhead and Craigiehall in St. Ninians parish. The storage reservoir, which is on the line of the Wee Buckie Burn, has a capacity of about 156,000,000 gallons. The total supply available from the new reservoir is estimated at 1,450,000 gallons per day, but of this compensation water, equal to 483,000 gallons per day, has to be given off to the stream, leaving a net supply for the district of 966,700 gallons per day. Powers have, however, been acquired for the construction of a second reservoir at some future time lower down on the line of the main stream, which will provide the whole of the compensation water, and leave for the service of the district the whole available supply from the Buckie Burn reservoir, namely, 1,450,000 gallons per day. An initial installation of four filters, with a filtering area of 756 sq. yds., has been constructed to begin with, and the clear-water tank, which has a capacity of 546,000 gallons, is so arranged that it can be duplicated. The pipe system of the district is a very extensive one, covering the greater part of five parishes, extending in all to about 80 miles, and with a range of elevation from 10 ft. to 700 ft. above ordnance datum. From the service tank the trunk main passes through the parishes of Denny, Falkirk, and Slamannan to two service reservoirs, one at Greigg, with a capacity of 825,000 gallons, and the other at Limerigg, south of Slamannan, with a capacity of 181,000 gallons. From the main pipes and these two service reservoirs distributing pipes are led throughout the limits of supply from Greenhill and Bonnybridge on the west, to Linlithgow Bridge, Polmont, and Muiravonside on the east, and from Grange-mouth on the north to Avonbridge, Slamannan, and Limerigg on the south. —*Glasgow Evening Times.*

#### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Mr. F. M. Simpson, architect, has removed from 137, Gower-street, to 88, Gower-street, W.C. — Mr. Joseph Francis, for many years engineer to the New River Company, since the transfer of the undertakings of the company to the Metropolitan Water Board, has removed to offices at 28, Victoria-street, S.W., where he will carry on his practice in future. — The Fireproof Partition and Spandrel Wall Co. have appointed Mr. J. James, of 160, Stapleton-road, Bristol, as their agent for Somersetshire and Gloucestershire.

**APPOINTMENT.**—The Board of the Builders' Accident Insurance, Limited, have unanimously appointed Mr. C. M. Brown, who has been assistant secretary since 1900, to the position of secretary occupied by the late Mr. Henshaw.

**APPOINTMENT OF SANITARY OFFICERS.**—The Local Government Board has sanctioned the appointment of the undermentioned persons as sanitary inspectors in the metropolitan boroughs as follows:—Hackney, Mr. W. C. Vobe, as from July 25, 1905; Islington, Miss J. J. Brown (in the place of Miss J. M. S. Gray, resigned), as from September 1, 1905; City of Westminster, Miss A. M. Dick (in the place of Miss C. W. Byrne, resigned), as from September 4, 1905.

**SALFORD HOUSING SCHEME.**—The housing scheme of the Salford Corporation on the Sleaford-road site has now been practically completed. To provide dwellings for people unhoused owing to the demolition of insanitary property the Corporation have erected 228 dwelling-houses and three shops, which have quickly become tenanted. The net cost of the work, including an estimate of 147l. for the paving of Gerald-road, when the site is finally widened, will be about 44,058l. 18s. 1d., as against 47,737l., the amount sanctioned by the Local Government Board.

**PROPOSED MUNICIPAL BUILDINGS FOR BOURNE-MOUTH.**—The Bournemouth Town Council had before it, on the 3rd inst., a proposal to adopt a scheme to erect a town hall and Municipal buildings, at an estimated cost of 126,000l. At the Municipal Buildings Committee, on September 15, the joint report of Messrs. F. W. Lacey and C. E. Mallovs, architects, was read, submitting for the Council's consideration alternative plans for Municipal buildings, as follows:—Scheme A.—Municipal offices, Council chamber, sessions and police courts, police department, Mayor's rooms (including reception-room), and small town hall capable of seating about 700 to 800. Estimated cost for Municipal buildings, 78,500l.; extra for town hall, 18,500l.; total, 97,000l. Scheme B.—Similar accommodation to above, without a town hall,

but with a free library and a museum. Estimated to cost for Municipal buildings, 78,500l.; extra for free library, 22,000l.; total, 100,500l. Scheme C.—Accommodation to above, without free library and art gallery, but with a large hall capable of seating about 2,500, pursuant to terms of cost for Municipal buildings, 78,500l.; for town hall and adjuncts, 69,000l.; total, 147,500l. Mr. Lacey pointed out to the Committee that it was impossible to adopt scheme C, without acquiring considerably more land than had been purchased, but that if the Council desired a larger hall than shown in plan A, this could be managed to the extent of seating provision for 1,500 persons by omitting the free library and art gallery from plan B, and substituting a town hall. The Committee resolved that Mr. Lacey be instructed to prepare a plan on the lines generally of scheme B, but substituting for the library and art gallery a town hall capable of seating 1,500 persons, and that such scheme be recommended to the Council for adoption. It was decided that detailed descriptive plans, schemes and lithographed plans should be sent to each member of the Council, while all plans and reports be placed in the large Council-room for inspection. Consideration of the details were left over till the Council had adopted the scheme. At a subsequent meeting of the Committee, Mr. Lacey submitted plans for scheme D, in accordance with directions given at a previous meeting, with detailed report and estimate of cost. The Committee approved and recommended:—That the scheme D, Municipal buildings and town hall not submitted, be adopted by the Council, the estimated cost being as follows: For the Municipal buildings, 78,500l.; for the town hall and adjuncts, 47,500l.; total, 126,000l. The necessary plans and particulars, and estimate of cost for submission to the Local Government Board, be prepared, and that the requisite borrowing powers be applied for pursuant to Section 11 of the Bournemouth Corporation Act, 1897. —*Bournemouth Daily Echo.*

**THE ROYAL COMMISSION ON MOTOR-CARS.**—Among those who have been invited to give evidence before the Royal Commission, which to begin its sittings on the 18th inst., is the Highways Protection League, who are now collecting evidence as to the interference with the rights of the public at large in the free use of the highways, and the danger and inconvenience to persons and injury to property caused by motor traffic as at present conducted. The League will be glad to hear from any person interested in the subject who can speak of these matters from personal experience—especially with regard to country roads; and those who are willing to be witnesses are invited to state shortly the gist of the evidence they would be prepared to give. Communications may be addressed to W. L. L. Bell, Esq., Secretary of the Highways Protection League, 4, Harcourt-buildings, Temple, E.C.

**RURAL BUILDING BY-LAWS.**—A recently issued return shows that in 246 rural districts in England and Wales—out of a total of 688—there are no by-laws for the regulation of new buildings, and that throughout 169 districts and in parts of 114 there are by-laws based on the urban model. It further shows that throughout 106 districts and in parts of thirty-two there are by-laws in force based on the rural model, and that throughout eleven districts and in part of six the by-laws in force are not based on the model series, but were mostly made before the first issue of the model in 1877. In various instances series of diverse character are in force in different parts of the same district. —*Money Post.*

**DISCOVERY AT DURHAM CATHEDRAL.**—The workmen engaged in excavation on the north-west front of Durham Cathedral, where a memorial is to be erected to the officers and men who fell in the South African War, have discovered at a depth of 10 ft. a number of interment cells. The cells are constructed of large slabs of stone, and several contained the skeletons of persons of good stature. The age of the remains is difficult to judge, but the interments were probably antecedent to the year 1200 A.D. The remains will be reinterred in another portion of the Cathedral graveyard.

**CARPENTERS.**—Mr. Henry Adams, late professor of engineering at the City of London College, read a paper before the British Institute of Certified Carpenters at Carpenters' Hall, on the 7th inst., entitled, "Timber and Builders' Practice." He suggested a suggestion of identity of material, he explained that it was the intelligent use of timber that he wished to bring before them. He described the timber that could be used in foundations, and gave examples of durability, followed by those that would best resist a damp situation, and then mentioned examples and exhibited specimens of durability in wood.



ground. The timbers best suited for marine work and for use in wet countries, to resist the attacks of worms and insects, were also mentioned. The nature of the grain of various woods, as affecting their use, was then referred to and many examples given. The characteristics of good timber were described, the chief defects named, and the modes of preservation briefly noticed. The mode of shrinkage and the alteration of shape produced during seasoning were explained, and how advantage might be taken of this knowledge. Finally, the principles of stress and strain, and the designing of beams, were described, and some useful rules given.

**ANCIENT WOODEN CONDUIT, HOLBORN.**—In the course of excavating a cross trench in connection with the work of the electrification of the tram-lines in Theobald's-road, the workmen ran across an ancient wooden water conduit, in excellent preservation. Immediately opposite No. 25, Theobald's-road, a length of about a dozen feet of the conduit has been removed.

**BRADFORD BUILDING REGULATIONS AND GARDEN CITY HOUSES.**—The desirability or otherwise of obtaining an alteration in the Bradford building regulations such as would allow of the erection of houses somewhat on garden city lines has recently been discussed by the Street Improvement and Buildings Committee of the Bradford Corporation. The idea was to erect houses which should have a long strip of garden in front, with a good portion of the main avenues devoted to grass and with substantial back streets for vehicular traffic. This scheme, the Town Clerk (Mr. F. Stevens) has advised, cannot be carried out under the existing building regulations. It was pointed out, however, at the meeting on the 4th inst. of the Committee that plans could be passed which provided for the erection of semi-detached houses with a roadway twelve yards wide and a building line of garden space of five yards. These semi-detached houses could be put up, it was explained, without a back street. One of the points of the scheme put forward was to effect a saving in street expenses, but the alternative proposals introduced do not offer anything in this direction, because what economies were effected in street expenses would be swallowed up in the extra space ends of the dwellings. However, the Buildings Committee decided that no steps should be taken to obtain an alteration in the building regulations.

**INTERNATIONAL EXHIBITION, MILAN, 1906.**—The first Italian International and Universal Exhibition will be opened in Milan on April 15 next. This exhibition will be on a large scale, and the contents will be divided into nine international and one national section, as follows:—

1. Land transportation, aeronautics, meteorology; 2. Sea and river transportation (including ship's models); 3. Social economy; 4. Manufactures and decorative arts; 5. Miscellaneous industries (machinery in motion); 6. Retro-spective transportation exhibit; 7. Fisheries and pisciculture; 8. Agriculture; 9. Hygiene; 10. Fine arts (national). A British Commission has been formed, and Government has made a grant of 10,000, for the creation of a British section. In spite of the shortness of time as to its disposal, the Commission has been fortunate enough to secure in the various buildings space which, both in regard to area and position, will place this country on an equality with the various other foreign nations who will participate. The importance of this country taking a prominent part in the exhibition will be evident to all those manufacturers who have wished with confidence the gradual decrease of their trade relations with Italy and the corresponding growth of German and French imports. Detailed information regarding the exhibition may be obtained by application at the offices of the British Commission, London Chamber of Commerce, 1 and 2, Oxford-court, Cannon-street, London, E.C.

**WIN MEMORIAL, EDINBURGH.**—A memorial erected in St. Giles' Cathedral, Edinburgh, to the heroes and men of the Queen's Own Cameron Highlanders who fell in the South African War was unveiled on the 7th inst. by Lieutenant-General Sir Ian Hamilton. The memorial, which takes the form of a mural monument placed upon the west wall of the Cathedral, is of dove-grey marble in the style of the Scottish Renaissance, and was designed by Mr. W. S. Black, Edinburgh.

**MEMORIAL TO DEAN HOLE.**—A stained glass window was recently unveiled at Canton Church, Newark, to the memory of the late Dean Hole of Rochester. The window contains three lights, and was designed and executed by Messrs. Percy Bacon & Brothers, of London and Edinburgh.

**NEW BUILDING FOR GLASGOW TECHNICAL COLLEGE.**—The annual report of the Glasgow and West of Scotland Technical College states that efforts have been made during the year to complete the first section of the new building in time for the coming session, and credit is due to the several contractors for their endeavours to meet the wishes of the Governors. The building is probably the largest and one of the most substantial in the city, as well as the largest devoted to education in Britain. The transfer

of the equipment is far advanced, but the difficulties involved in commencing the work of the session under the new conditions have necessitated the postponement of the formal opening to a later period of the session. The total expenditure to date on the site, building, and equipment has been 163,060*l.*; the building and equipment fund now stands at 209,763*l.*, of which 193,845*l.* has been received. The small balance available after payment of the liabilities already incurred is not sufficient to enable the Governors to proceed with the remaining section of the building, but it is hoped that they will soon be placed in a position to complete the scheme originally proposed.

## Legal.

### ALLEGED INFRINGEMENT OF ANCIENT LIGHTS.

THE case of Barff v. Mann, Crossman, & Paulin came before Mr. Justice Bray, sitting as Vacation Judge, on Wednesday last.

Mr. Neville, in opening the case, said it was a motion by the plaintiff for an *interim* injunction restraining the defendants until the trial or further order from building so as to obstruct the ancient lights in the plaintiff's buildings.

His lordship: I have seen the affidavits, but not any exhibits or plans, and I cannot give any opinion without the plans.

Mr. Bramwell Davis, K.C., representing the defendants, said he had a preliminary objection, and that that was that the plaintiff was premature in suing. He submitted that the plaintiff could not sue until after twenty years had expired when his light accrued. The plaintiff's own evidence showed that the action was premature.

Mr. Neville differed, and said that that question depended upon the construction of section 3 of the Prescription Act. The buildings in question were actually started in the beginning of 1885, and the windows in respect of which the plaintiff was claiming were chiefly on the ground, first, and second floors. The first floor windows were completed in June, 1885, the second floor windows in July, 1885, and the third floor windows by September 1, 1885, and the ceilings, roof, and joists were put over on September 21, 1885. He had an affidavit by the architect under whose direction the building was erected stating that twenty years had elapsed since the windows were put in.

Mr. Bramwell Davis: The authorities say you must have a building roofed in.

His lordship: The point is whether a house can be a dwelling-house until it be roofed in.

Mr. Neville replied it was clear that if they had put on the roof by September 8, 1885, the date of the issuing of the writ, no exception could have been taken. He submitted that the important thing to see was whether there had been uninterrupted access of light to certain definite apertures for the period of twenty years. The buildings in question were industrial dwellings—in other words, self-contained flats, and before July 1 the ground floor was completed.

His lordship: Do you call them separate buildings?

Mr. Neville: They are separate tenements. I submit you ought to consider them separate buildings for the purposes of the Act.

His lordship: If I decide against you, you can issue another writ.

Mr. Neville hoped his lordship would not put the plaintiff to that expense.

His lordship: I confess I am against you on the point.

Mr. Neville contended that section 3 of the Prescription Act did not lay down that the finishing of the roof was of vital importance.

His lordship, in giving judgment, said he must decide against the plaintiff on the simple ground that the action was premature. It was admitted that this was not a dwelling-house in September, 1885, and, in his opinion, the section of the Prescription Act cited was not intended to include a building which was not completed.

Mr. Neville: Then I must issue another writ.

His lordship: Yes, you can do that or you can go to the Court of Appeal if I am wrong.

Mr. Neville: Yes. Then the present action will be dismissed with costs?

His lordship: Yes.

Order accordingly.

## PATENTS OF THE WEEK.

### APPLICATIONS PUBLISHED.\*

17,409 of 1904.—E. BOMMER: *Spring Hinges*. A spring hinge, the body of which is composed of a web, provided with a recess in its lower edge and barrels at the ends of said web, and a sheet-metal covering for said hinge body composed of three parts, a web covering extending over the

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

upper edge of the web of the hinge and connected by a lock seam to the lower edge of the same, two coverings for the barrels connected by longitudinal lock seams at their sides with the sides of the web covering.

19,595 of 1904.—A. J. BOULT (E. MOLAS): *Water or other Heaters*.

A heating apparatus comprising a closed casing, an air supply jacket within said casing, an annular boiler or generator within said jacket, a heating device within said boiler, with the air inlet and combustion air inlet so arranged that they may be extended into the outer atmosphere with their ends terminating at approximately the same point.

19,666 of 1904.—J. J. STRAIN: *Gas Stoves*.

This relates to a gas cooking stove, consisting in the combination with the stove body of a boiler for containing water that is placed in the stove so as to form the roof of the oven, and pipes connected to the boiler for receiving cold water from, and for delivering warmed water to, a storage tank, a flue in the lower part of the boiler and an opening from the flue, at the rear side to the open air, a plate having its central portion removed in the oven supporting the boiler, said plate having openings that coincide with the said flue and pipes for circulating the water to and from the boiler.

20,481 of 1904.—W. WYSSLING: *Pressing and Moulding Machines for the Manufacture of Briquettes, Bricks, or the like*.

A pressing or moulding machine for the manufacture of bricks or the like, in which a pawl is carried by a lever which is adapted to turn freely on the boss of a table, the free end of which lever is connected by a chain to a crank mounted on the shaft, said pawl engaging with a ratchet wheel mounted on the boss of the table, and whereby an intermittent rotary movement is imparted to the latter, and temporary stopping of the table being insured by a stop pin which is indirectly actuated by a toothed wheel.

22,169 of 1904.—W. H. PERKIN and WHIPP BROS. & TON, LTD.: *Treatment of Wood for Rendering it Fireproof*.

According to the invention, the wood to be treated is placed in a vessel, which is then tightly closed, and a solution of stannate of soda of 32° Beaumé is forced into the vessel, and a pressure of 500 lb. per sq. in. is kept upon the contents for about six hours. The solution is then run out of the vessel. The wood is then dried by hot air, but is allowed to stand till the fixation of stannic acid within it is complete.

23,292 of 1904.—H. H. LAKE (CHEMISTS): *TECHNISCHE FABRIK, DR. A. R. W. BRAND & CO.): Colouring of Stone*.

A process for the production of marbling by colouring stone surfaces without the employment of skinning means, consisting in first impregnating the stone to be treated with an ammoniacal metallic salt solution and then with a neutral alkali salt solution.

23,464 of 1904.—J. E. A. SQUIRE and H. A. SQUIRE: *One-Lever Locks and Latches*.

According to the invention, the usual spring which is fixed to the lever is dispensed with, and instead a V-shaped or U-shaped spring is employed, which is made entirely independent of and separate from the lever, and is made from thin strip steel or other suitable metal, bent to the required shape, and of somewhat less width than the depth of the interior of the lock or latch case from front to back. This spring is situated between the side of the lock and the lever, and in order that the spring may always bear properly on the lever, said lever is made with a projection at that side, against which the spring bears.

23,963 of 1904.—H. NICHOLSON, C. HUNTER, and J. CAMPBELL: *Safety Suspending Apparatus for Mining Cages, Lifts, and the like*.

This relates to safety suspending apparatus for mining cages, lifts, and the like, comprising gripping jaws adapted to engage vertical ropes or the like disposed in the shaft, levers on which the jaws are mounted pivoted to the cage, a weighted or spring-pressed rocking lever suitably pivoted on the cage and adapted to engage the jaw levers, and means for supporting the rocking lever from the main shackle, so that when the cage is suspended the levers on which the gripping jaws are mounted are in such a position that the jaws are opened.

24,322 of 1904.—C. H. BAXTER: *Saws for Stone or like Cutting Machines*.

This relates to a saw, and consists in forming grooves or cuts of convenient width towards the cutting face of the saw blade, such grooves extending from the cutting face to the said saw blade about one-third of the depth of the same, and at an angle of 45°, the said grooves being formed in pairs. By so constructing a saw blade it is claimed that the waste of the sand used is obviated.



This consists in the combination with sinks, wash-tubs, or the like made of earthenware or

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By Ws. WESTON.

Paddington—96, Prad-st., n. e. 51  
x. 100.  
Marylebene—100 and 102, Church-st. s. e.  
16 yrs. g. r. 138.  
98 and 107, East-st. and 17, Little East-st.  
x. 7. 78. 79. 911. 18.  
October 4—By BUSTERS & BUSTERS.  
Dulwich—South Greenwich, l. g. 1895 18.  
x. 67 yrs. g. r. 34.  
Hackney—30, Aspid-st. x. 54 35 27  
4. 58. 97. 311. 48.  
M. L. L. & S. & Co.  
Bow—14, Norman-st. x. 73.  
Forest Gate—6, 8, and 10, Wellington-st. l.  
x. 73.  
Leyton—79, Riddi-st. n. e. 34.  
132 and 133, Fifth-st. x. 73. 91. 92. 93. 94.  
x. 464. 168.  
*Contractions used in these lists.*—E.g. for the ground-rent; l. g. for leasehold ground-rent; l. g. r. for leasehold ground-rent; g. r. for ground-rent; t. for freehold; c. for copy; p. for possession; a. r. for estimated rental; v. r. for rental; q. r. for quarterly rental; y. r. for yearly rental; p. a. for purchase annuity; p. a. y. for years; p. l. for place; t. for terrace; cr. for acre; v. for avenue; j. shops, for gardens; y. for yards; g. r. for ground-rent; p. b. for public-house offices; s. for shops; c. for court.

\_\_\_\_\_







## CONTRACTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
<b>ROAD MAKING AND PAVING WORKS</b>	Hendon U.D.C. ....	Council's Engineer, Council Offices, Hendon, N.W.
SUP. OF SINGLE & FIXING WOOD FENCING	do.	do.
Two Small Filters and Clear-water Well	Dundee Water Commissioners	F. S. Baxter, Engineer, 93, Commercial-street, Dundee
Lancashire Boiler at Olney Workhouse	Wharfedale Guardians	E. C. Newstead, Clerk, Union Offices, Olney
Storey Institute, Lancaster: Additions	Monmouthshire Education Com.	R. L. Roberts, Architect, Abercarn
Cloakroom, Retaining Walls, etc., at Garnfach School	Workop U.D.C.	J. F. Crowther, Electrical Engineer, Workop
One 36-horsepower Steam Balance	do.	do.
One Water Softener	East Indian Railway Co.	At the Offices of the Company, Nicholas-lane, London, E.C.
Cast-iron Chairs	do.	W. Dyack, Burgh Surveyor, 414, Union-street, Aberdeen
Grey Hematite Pig-Iron	Aberdeen Town Council	W. James, Clerk, Dorking
Widening of Union Bridge	Dorking Guardians	Inspector of Nuisances, Council Offices, Ashby-road, Hale
Road Repair, Dorking Union Workhouse	Hale U.D.C.	R. S. W. Perkins, County Surveyor, Comm'n-road, Ely
Seavering	Isle of Ely Education Committee	S. C. Hooley, Controller of Stores, 17 and 19, Bedford-st., W.C.
Block of Elementary Schools for 500	Postmaster-General	Surveyor to the Council, Town Hall, Aldershot
Crossing Red Fir Telegraph Poles	Atherton U.D.C.	W. Wrennall, Engineer, 9, Harrington-street, Liverpool
Goods and Materials	Leyland U.D.C.	W. Moss Settle & F. Brown, 127, Ramsden-sq., Barrow-in-Furness
Steam Engine and Two Pumps at Waterworks	Leeds Education Committee	G. Gordon & Co., Engineers, Liverpool
Field Drainage Works, Lower Cullerme etc., Farms	Horwich U.D.C.	W. & Brathwaite, Architect, Education Office, Leeds
Galvanised Iron Structure, Kirkstall-roads	Radcliffe U.D.C.	P. Taberner, Clerk, Council Offices, Horwich
1,700 yds. of 12-in. Cast-iron Pipes	Radcliffe U.D.C.	A. L. Rothwell, Engineer, Council Offices, Radcliffe
Sewage Works, Mount Sten-road, Radcliffe	Hendon R.D.C.	H. W. Walton, Clerk, Alnwick
Excavate and Clear Reservoir, Fairlie Wtrwks., Large 970 ft. of Iron Bar Fencing	Glamorgan C.C.	J. A. Wobb, Engineer, Stanmore
Widening Bridgend, etc., Main Road at Coychurch	Metropolitan Asylums Board	T. M. Franklin, Clerk, Westgate-street, Canlis
COVER, HEATHS & PIPING, AT BROOK HO.	Croydon R.D.C.	Office of the Board, Embankment, E.C.
1,200 ft. of 6-in. Pipe Sewer, Higher Drive, Purley	Messrs. Alexander & Sons	J. P. Price, City Engineer, Council House, Birmingham
Farm Buildings at East Ash Farm, Morchard Bishop	Postal Telegraph Industrial Society	Cook & Birmingham, Hampton-street, Evesham
Branch Stores, South Elmston, near Doncaster	Mile End Guardians	J. F. Curwen, F.R.I.B.A., 26, Highgate, Kent
NURSES HOME AT INFIRMARY, MILE END	Rhondda U.D.C.	Garsdale & Pennington, Architects and Surveyors, Pontefract
Waste-water and Recording Meter	Merthyr Tydfil Guardians	J. M. Knight, Architect, 36, Rancourt-road, Mile End-road, E.
Two Cottage Homes for Children, Bangor	Mr. J. R. Grainger	O. Thomas, Engineer, Gas and Water Offices, Pontefract
Detached Residence, Olney-road, Edwicks	Alnwick R.D.C.	T. Roderick, Architect, Clifton-street, Aberdare
Metal Pipes for Convey. Water, Acklington Station	Gadys Uchar Building Club	W. B. Nunn, Architect, 73, Market-street, Bingley
Police Station at Gorseon	Romford R.D.C.	T. M. Franklin, Clerk, Westgate-street, Canlis
61 Houses, Aberdare	Broadstairs U.D.C.	T. D. Williams, 10, Canon-street, Aberdare
Road Material	Liverpool Select Vestry	G. Lapwood, Highways' Surveyor, Victoria-chambers, Bedford
1,100 cubic yds. of Broken Pit Flints	Blything Guardians	J. Price, C.E., Town Surveyor, Broadstairs
Couvaes. Hosp. for Child, Olive Mount, Waverley	Wallasey U.D.C.	E. Kirby, Architect, 5, Cook-street, Liverpool
Despensing Well at Workhouse, Bulecamp, Halesworth	Survey Education Committee	H. A. Mullens, Clerk, Union Offices, Bulecamp, Halesworth
400 tons of 4-in. Granite Cube Setts	United W'minst. & Wrexham C.C.	W. H. Travers, Engineer, Public Offices, Egmont-chambers, S.W.
ALTERA. & ADDIT. TO SCH. WARLINGHAM	G. W. & G. C. Blys. Joint Committee	J. P. Price, City Engineer, Council House, Birmingham
Drivag. etc., a Tunnel (500 to 800 yds. long)	Ealing Town Council	Engineer, Great Central Railway, Marylebone Station
ERECT. OF STATION AT FADDENHAM, ROCKS	Glyncorrwg U.D.C.	Council's Engineer, Town Hall, Ealing, W.
MAKING-UP ROAD AND BACK ALLEYS	Mr. W. Walfenden	W. P. Jones, Surveyor, Council Offices, Cymmer
Culverting of Gwynn Brook, Blaencynon	do.	A. Cattanach & Son, Architects, Kingsmead, N.E.
Additions to Duke of Gordon Hotel, Kingsmead	Beeston U.D.C.	Surveyor, Public Offices, Beeston
Stables, Coach House, Motor Car Buildings	St. Helen's Borough Council	Shean and Dickson, 16, High-street, Belfast
NEW SCHOOLS, THATTO HEATH, ST. HELEN'S	Tourist Development (Ireland), Ltd.	E. H. Bruce-Vaughan, 21, Dumfries-place, Cardiff
Additions, etc., Laharna Hotel, Larni	Cardiff Corporation	Spiers & Beavan, 10, Queen-street, Cardiff
Branch Library, Canton	do.	Council's Surveyor, Town Hall, Wood Green
Branch Library, Cathay	Birmingham Public Works Comtee	G. J. Gunyon, Surveyor, Town Hall, Wood Green
3,000 tons Tram Rails, British Standard, Section No. 3	Wood Green U.D.C.	H. Edwards, Borough Engineer, 348, Kenning-road, S.E.
MAK-UP GRASSMERE & WINDHAMER ROADS	Lambeth Borough Council	G. J. Woodbridge, Surveyor, Bank-chambers, Watling
Private Street Improvements, Wood Green	Woking U.D.C.	Beddoe Rees, Architect, 3, Dumfries-place, Cardiff
Underground Convenience, Waterloo-road	The Managers	Mr. Gilmour, at the School
1,300 Tons of 2-in. Basalt	Wirral Guardians	J. H. Davies & Sons, Architects, Chester
Tabor C.M. Chapel, Schools, etc., Macclesfield	Arncliffe Town Council	A. H. Jones, Town Clerk, Arncliffe
Enlarg. of Clockrooms, etc., Plymouth St. Mary Sch.	Gloucestershire C.C.	C. Rule, Surveyor, Haswell, via Sunderland
TRAC. INFIRM. ETC., CLATTERIDGE, WHESE	Isle of Ely Education Committee	The County Surveyor, Shire Hall, Gloucester
Sewage Disposal, Merton College, Durham	Mr. E. H. Wilson	Mines & Sutherland, Ltd., 65, South John-street, Liverpool
PAIR OF SMALL SEMI-DETACHED VILLAS at Llandudno	Gloucester C.C.	Teather & Wilson, Architects, Andrew's-bldg., Queen-st., Cardiff
BLOCK OF ELEMENTARY SCHOOLS, ELY	War Department	E. Bergin, C.E., 26, Westmoreland-street, Dublin
Bungalow, Sully		County Surveyor, Shirehall, Gloucester
Shop and Dwelling House at Thurles		H. B. Measures, Architect, War Office, Secretary-street, S.W.
Police Station and Court, Henbury, near Bristol		
BOUN. WALL, ETC., KENS. PALACE BARBACKS		

Those marked with an asterisk (\*) are advertised in this number.

Competitions, —.

Contracts, iv. vi. viii. x.

Public Appointments, —.

METALS.				METALS (continued).				LEAD, &c. (continued).			
Per ton, in London.				Per ton, in London.				Per lb.			
s. d. p. d.				s. d. p. d.				s. d. p. d.			
IRON—				IRON—continued.				TIN—English Ingots			
Common Bars				Best Soft Steel Sheets, 6 ft. by 2 ft.				Golden—Plumbers			
Staffordshire Crown Bars, good				to 3 ft. by 20 g. and thicker				Timmen's			
merchant quality				Best Soft Steel Sheets, 22 g. & 24 g.				Blowpipe			
Staffordshire "Marked Bars"				Cut nails, 3 in. to 6 in.				ENGLISH SHEET GLASS IN CRATES			
Mild Steel Bars				(Under 3 in., usual trade extras.)				15 oz. thirds			
Hoop Iron, basis price				LEAD—Sheet, English, 3 lb. and up				fourths			
Galvanised				Pipe in coils				fourths			
("And upwards, according to size and gauge.")				Soil pipe				fourths			
Sheet Iron, Black				Compo pipe				fourths			
Ordinary sizes to 20 g.				ZINC—Sheet				fourths			
24 g.				Vielles Montagne				fourths			
26 g.				Silesian				fourths			
Sheet Iron, Galvanised, flat, ordinary quality				COPPER—				fourths			
Ordinary sizes to 20 g.				Strong Sheet				fourths			
24 g.				Thin				fourths			
26 g.				Copper nails				fourths			
Sheet Iron, Galvanised, flat, best quality				BRASS—				fourths			
Ordinary sizes to 20 g.				Strong Sheet				fourths			
24 g.				Thin				fourths			
26 g.				Galvanised Corrugated Sheet				fourths			
Ordinary sizes 6 ft. to 8 ft. 20 g.				22 g. and 24 g.				fourths			
22 g. and 24 g.				26 g.				fourths			
26 g.				28 g.				fourths			

LONDON.—For first section of block of buildings,  
 1, Cheapside, E.C. Mr. A. E. Kingwell, architect,  
 2, and 104, Cheapside, E.C.:—

Plot .....	£4,520	Sims & Co. ....	£3,950
Winsted & Sons ..	4,449	J. C. Richards & Co.	8,925
Overhead & Sons ..	4,236	Fatman & Fother-	
J. Renshaw .....	4,193	Patmer .....	3,783
Rowe & Co. ....	4,127	Lyle & Co. ....	3,765
Went & Sons .....	4,038	Minter .....	3,760
Wat & Sons .....	3,992	Waring White	
Water & Sons .....	3,964	Building Co. ....	3,749

[Architect's estimate, £4,000.]

LONDON.—For first section of block of buildings,  
E.C., Cheapside, E.C. Mr. A. E. Kingwell, architect,  
and 104, Cheapside, E.C.:—

at .....	£4,520	Sims & Co. ....	£3,950
nsfield & Sons, .....	3,449	J. C. Richards & Co. ....	8,925
thead & Sons .....	4,236	Patman & Pother-	
J. Renshaw.....	4,193	ingham* .....	3,783
Rowe & Co. ....	4,127	Lole & Co. ....	3,765
ver & Sons.....	4,032	Minter .....	3,760
ne & Sons .....	3,992	Waring White	
water & Sons, .....	3,964	Building Co. ....	3,749

[Architect's estimate, £4,000]



**LONDON.**—For the erection of new administrative block (superstructure), Homerton, N.E., for the Hackney Union Board of Guardians. Mr. W. A. Finch, architect, 76, Finsbury-pavement, E.C. Quantities by Mr. G. T. G. Wright, 3, Great Winchester-street, E.C. :—

Coulson & Loft ..	£30,510	Pethick Bros. ....	£34,444
Perry & Co. ....	38,500	Shurmer & Sons ..	34,443
McCormick & Sons	38,285	C. Wall .....	34,300
Lawrence & Sons	35,926	W. Lawrence & ..	33,894
J. F. Holliday ..	35,789	Sons .....	33,854
Wilkinson Bros. .	35,779	Kirk & Randall ..	33,699
Leslie & Co. ....	35,597	H. & R. Roberts .	33,396
Stapleton & Sons	35,526	A. Faulks .....	33,340
F. & T. Thorne ..	35,300	Johnson & Co. .	33,243
Thomas & Edge. .	35,280	Pattinson .....	32,587
Nightingale .....	34,980	Davey .....	32,331
J. & M. Patrick .	34,839	Kilby & Gavford	31,972
H. Wilecock & Co.	34,775	Kerridge & Shaw	31,948
Patman & Fother-		Walls & Co. ....	
ingham .....	34,700	A. Monk, Lower	
Shelbourne & Co.	34,540	Edmonton, N.	31,700
Lovatt, Ltd. ....	34,500		

[Architect's estimate, £34,000.]

**LUDDENDEN FOOT.**—For reconstruction of 1,515 super. yds. of paving upon a concrete foundation certain portions of main road, for the Urban District Council. Mr. J. Stockwell Bottomley, Council's Surveyor, Luddenden Foot. Quantities by Surveyor :—

J. Brunton £1,268 14 0	H. Burnham £180 16 0
T. Coates .. 580 4 0	Bellfield & ..
A. Walker ..	410 19 10
Sons .....	515 4 0
Riley Bros. ....	T. Wild, Lud-
	denden Foot* 495 0 0

[Surveyor's estimate, £428 6s. 8d.]

**MESSINGHAM.**—For erecting an elementary school at Messingham, near Kirton-in-Lindsey, for Lindsey County Council Education Committee. Messrs. Scooter & Gamble, architects, Bank Street-chambers, Lincoln :—

H. J. Thompson £2,705 0 0	W. Moss & Sons, Ltd. ....	£2,574 0
W. Pallister .. 2,675 0	J. R. Manders ..	2,460 0
Kettering Co-operative Builders, Ltd.	S. R. & T. Kelsey ..	2,377 0
C. Sprakes & Sons .....	C. M. Greenwood	2,340 0
J. Guttridge .. 2,593 0	W. B. Loughton	2,212 5
	F. Scarborough, Lincoln* ....	2,199 9

**PENZANCE.**—For alterations at Poldenham Quarry. Mr. F. Latham, Borough Engineer, Public-buildings, Penzance :—

Tomin & Triggs Bros. ....	£100 14
---------------------------	---------

**RAMSGATE.**—For 3,000 ft. of 12-in. by 6-in. granite channel, for the Corporation. Mr. T. G. Taylor, Borough Engineer, Albion House, Ramsgate :—

	per ft.
P. Falla .....	1 4
Macleod & Co. ....	1 3
J. Brunton .....	1 2
Carlinghouse Granite Co. ....	1 0 4
L. Sommerfeld ..	1 0
Burgess Burgess & Co. ....	0 11
J. Goodchild & Co. ....	0 10 1
Bilchfeldt & Co. ....	0 10 1
E. J. Van Praagh & Co. ....	0 10 4
J. R. White & Co. ....	0 10 1
A. & F. Manuelle, London* ..	0 10 1

**SEVENOAKS.**—For removal and building steel girder bridge over river Eden, for the Rural District Council. Mr. W. H. Bolt, Surveyor to the Council, Ryebridge :—

H. Y. Smith & Son ..	£160	F. Pluck, Tonbridge* £124
Stone, Farley, & Co. 137		

**SOUTHAMPTON.**—For Bitterne Park Congregational Church, Cobden-avenue, Bitterne-park, Southampton. Plans and quantities prepared by Mr. J. H. Blizard, F.S.I. (Lemon & Blizard), of Southampton, (architect to the trustees) :—

H. Stevens & Co. ....	£2,838 0 0	Exors. of the late W. Franklin £2,538 0 0
A. Bailey .....	2,698 9 7	J. Nichol .....
H. Cawte .....	2,687 0 0	Dyer & Sons .....
Jenkins & Sons, Ltd. ....	2,670 0 0	W. Jupp .....
		H. Lawrence .....

[Architect's protecting estimate, £2,300.]  
\* Withdrawn.

**ULVERSTON.**—For widening the highway between the villages of Near and Far Sawrey, on the ferry to Hawkehead-road, for the Rural District Council. Mr. W. F. Y. Molinoux, Surveyor, Town Hall, Ulverston :—

G. Wilson, Rydal-road, Ambleside ..	£232 14 1
-------------------------------------	-----------

**WANSTEAD.**—For the erection of three villa residences at Wanstead, N.E. Mr. H. Riches, architect, 3, Crooked-lane, King William-street, London, E.C. :—

Clemens Bros. ....	£1,940
--------------------	--------

**WATFORD.**—For Cassio-bridge sewerage and engine house extension, for Watford Urban District Council. Mr. D. Waterhouse, Surveyor, 14, High-street, Watford :—

A. E. Riley .....	£592 13 3	J. Jackson .....	£549 16 2
Stone, Farley, & Co. ....	619 11 0	Smith & Co. ....	448 7 1
H. Brown .....	585 14 0	G. Wiggs .....	439 0 0
Baleman .....	563 18 7	Gifford & Gough .....	439 0 0
A. E. Nunn .....	561 3 3		

**WATFORD.**—For sewerage, Rickmansworth-road, etc., for Watford Urban District Council. Mr. D. Waterhouse, Surveyor, 14, High-street, Watford :—

R. C. Brebner & Co. ....	£2,810 19 0	Free & Sons £4,421 7 2
Long & Cook .....	3,320 0 0	Raynor .....
J. Riley .....	6,930 13 0	Stone, Farley, & Co. ....
Bateman .....	6,297 10 0	Read & Sons .....
G. Wiggs .....	5,130 0 0	Hardy, Atkin-son, & Co. ....
W. G. Wilmoit ..	4,784 0 0	Davies, Ball, & Co. ....
J. Watson .....	4,650 0 0	Smith & Co. ....
A. T. Catley .....	4,650 0 0	
A. E. Nunn .....	4,488 10 0	
H. Brown .....	4,455 0 0	

**WALDSTONE.**—For making-up and providing proper means for lighting Hamilton, Warrington, and Radnor-roads, for the Union District Council. Mr. H. Walker, Council's Engineer, Waldstone. Quantities by Surveyor :—

C. W. Killingback & Co. ....	£2,770	J. & W. Drake ....	2,595
J. Shelbourne & Co. 2,754	A. & B. Champness, T. Adams .....	2,784	2,548
W. & G. French ..	2,706	F. E. Barry .....	2,634
S. Gibbons .....	2,644	T. E. Starkey ..	2,439

**WEYBRIDGE.**—For supply of road materials, for the Urban District Council. Mr. John S. Crawshaw, Council's Surveyor, Weybridge :—

C. M. Manuelle, 120-123, Fenchurch-street, London, E.C. ....	14s.
--	------

**WIMBLEDON.**—Completing Nos. 4 and 5, Parkside. Messrs. Homer & Lucas, architects, 35, Bucklebury, E.C. Quantities by Mr. G. Silvester, 46, Strand, W.C. :—

Larko Bros. ....	£1,606
A. Hudson, Westminster* ..	1,435
Hammond .....	1,429

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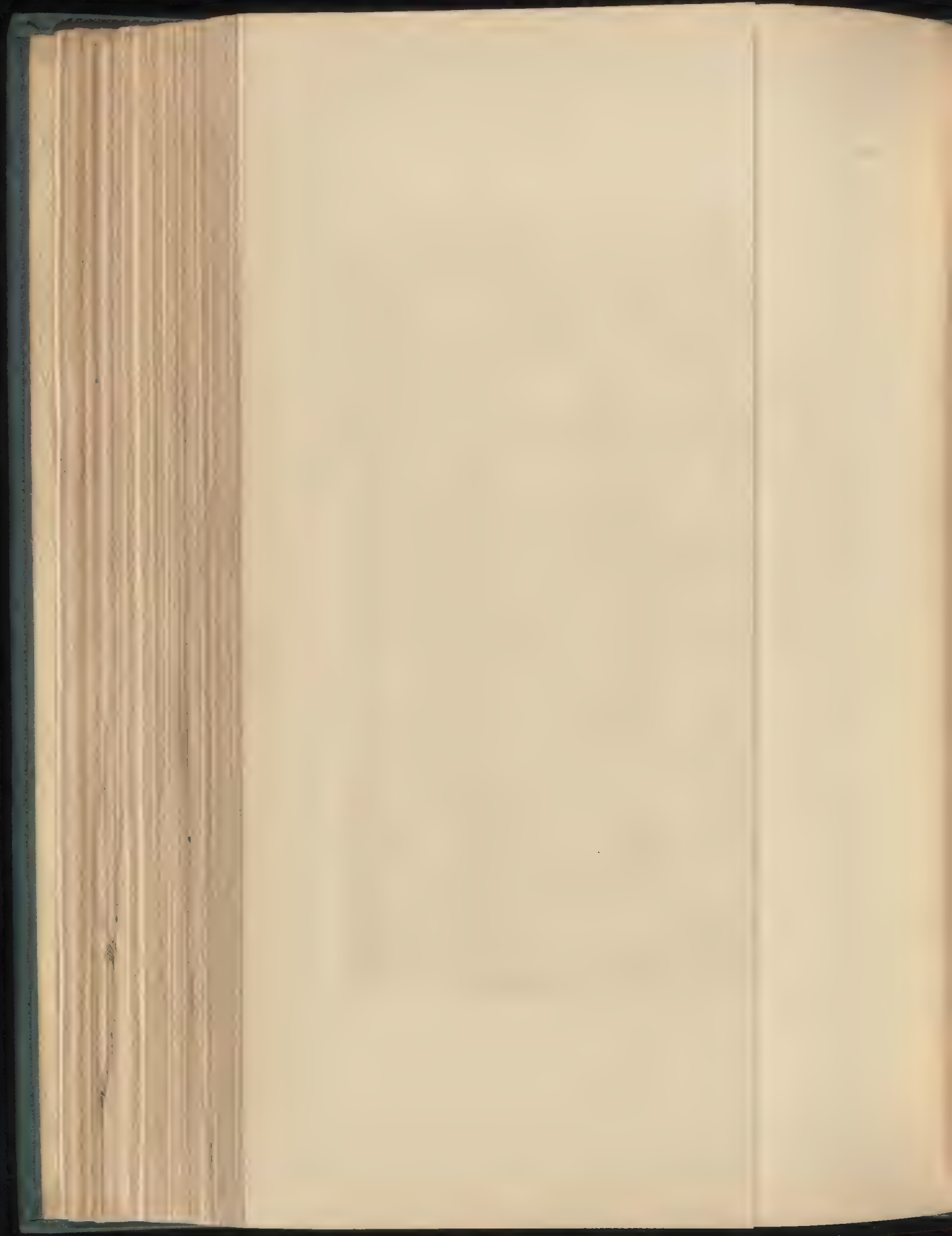
THE FIREPROOF COMPANY, LTD., 10, YORK BUILDINGS, ADELPHI.

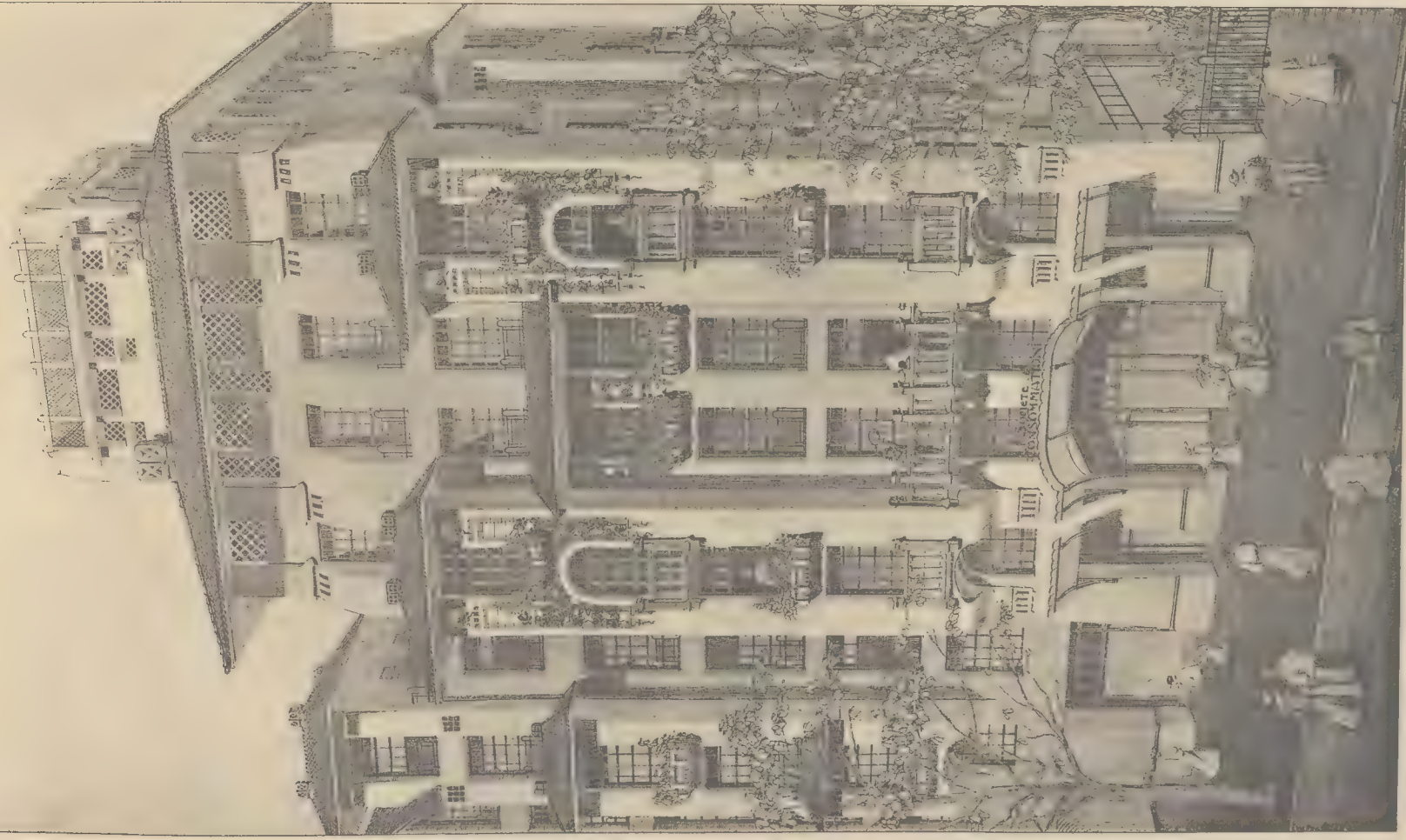


THE BUILDER, OCTOBER 14, 1906. 4 & 5 EAST END OF STREET, LONDON, W.C. 2.

DESIGN FOR A COVERED BRIDGE.—By MR. ROBERT ATKINSON





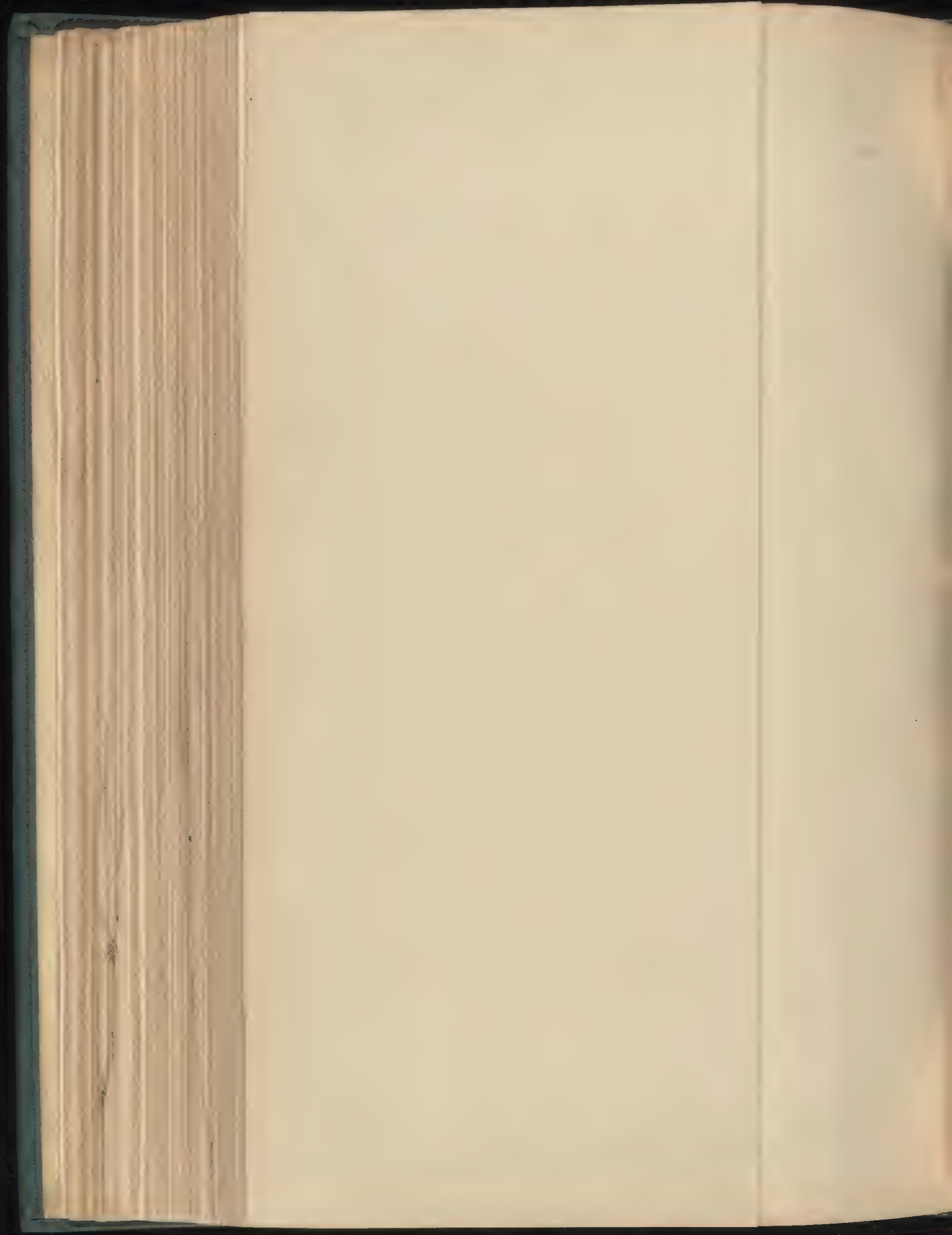


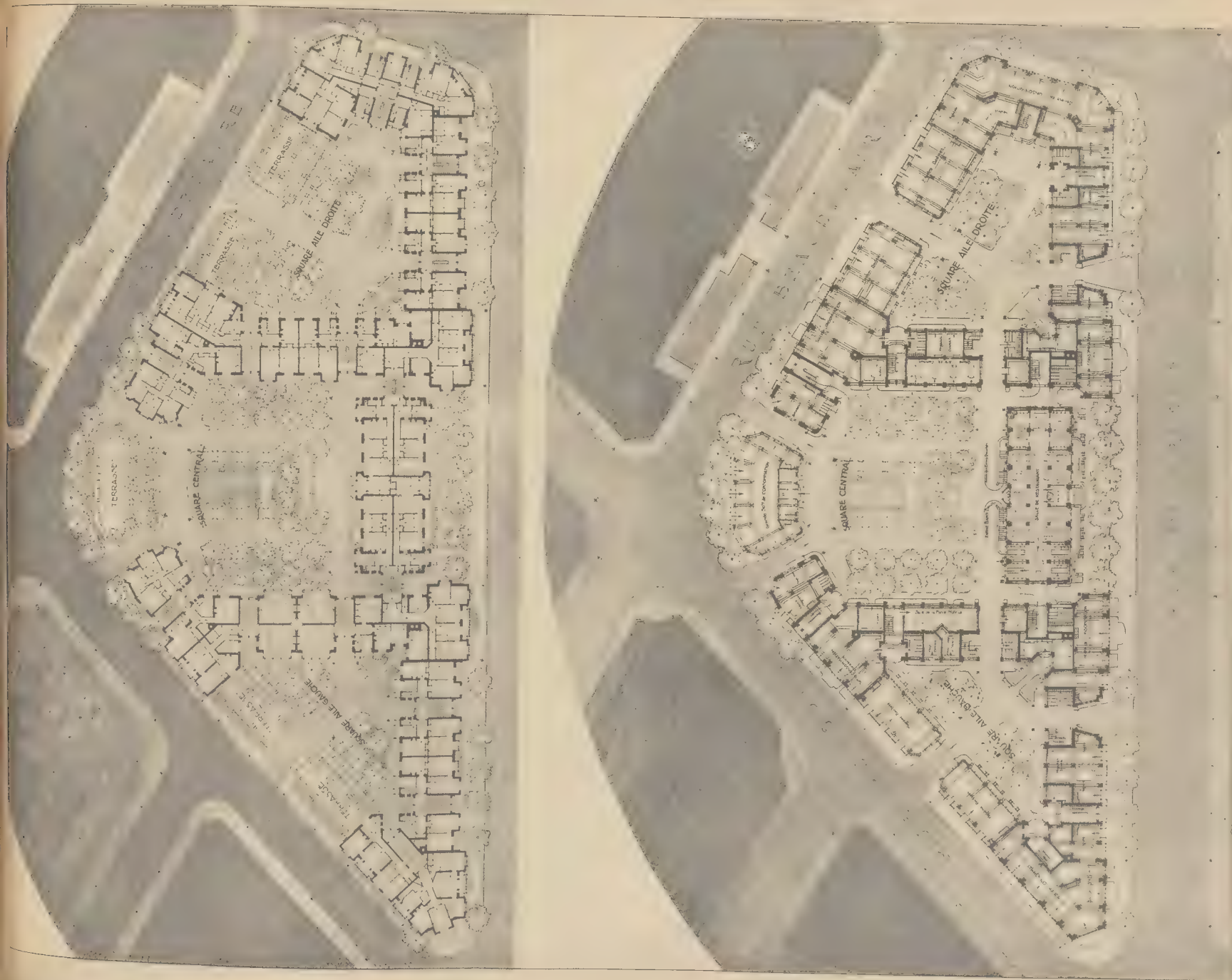
FIRST PREMATED DESIGN FOR ARTISANS' DWELLINGS, PARIS (FONDATION ROTHSCHILD COMPETITION)

By M. AUBREY, A. R. S.

A VIEW OF ONE OF THE PAVILIONS.



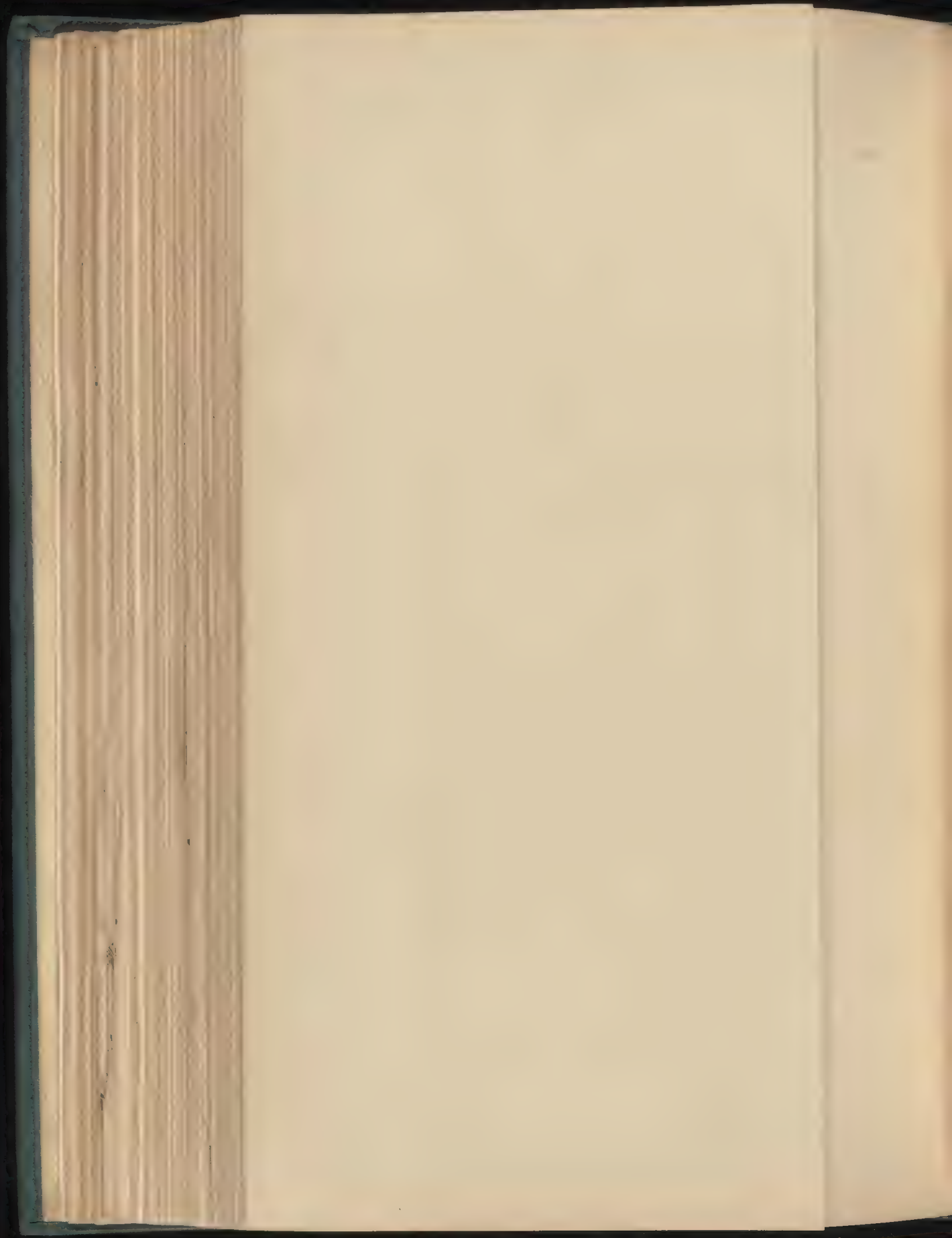




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PLANS OF GROUND FLOOR AND ONE OF THE UPPER FLOORS





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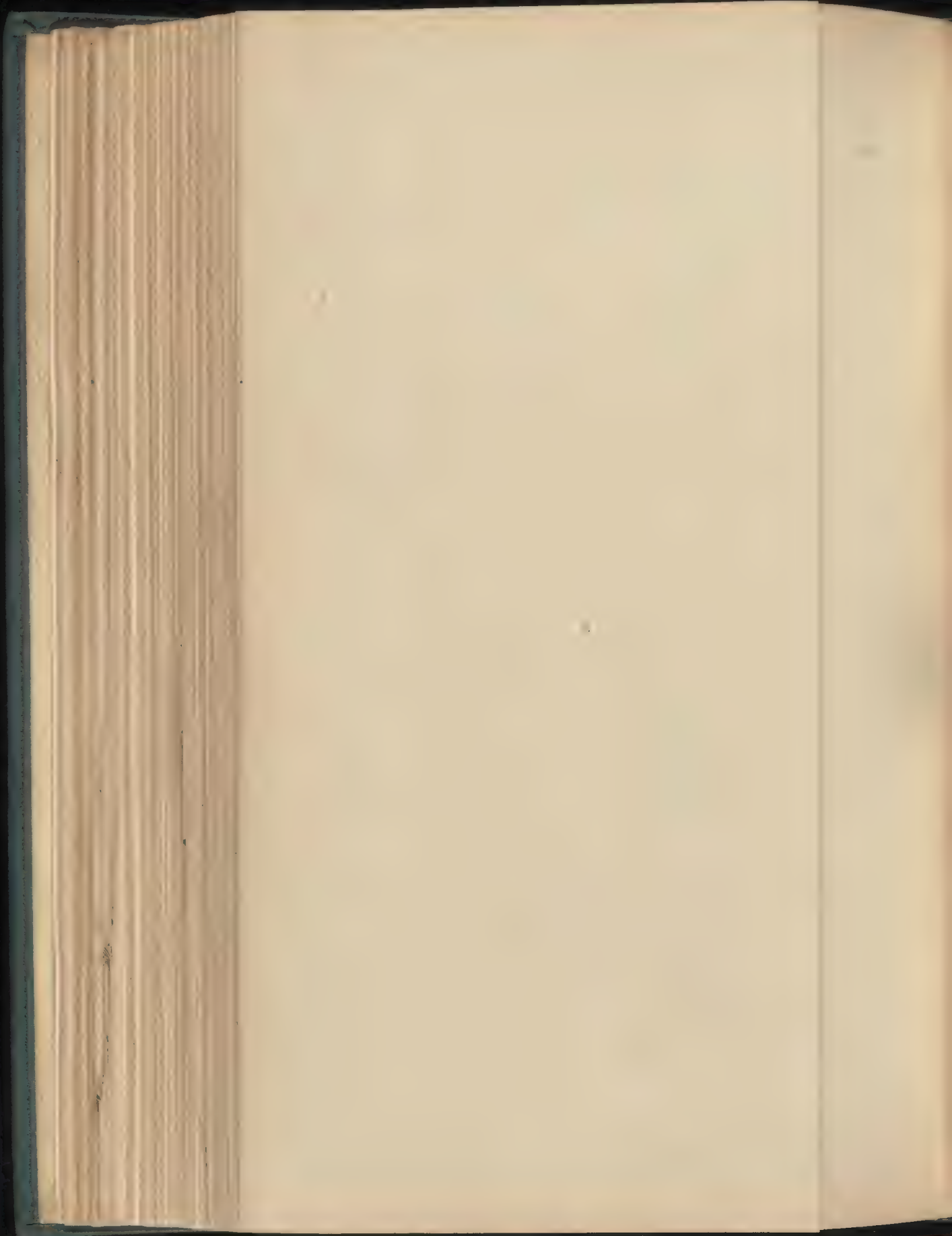


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GE TITCHFIELD STREET







# The Builder.

VOL. LXXXIX.—No. 3272.

OCTOBER 31, 1905.

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Memorial to the late H. A. Hunt, F.S.I.....	Mr. F. E. E. Schenck, Sculptor.
Pit-Kerro, N.B., and War Memorial, Alloa.....	Mr. R. S. Lorimer, A.R.S.A., Architect.
Design for St. Martin's Church, Worcester.....	Mr. G. H. Fellowes Prynne, F.R.I.B.A., Architect.
Shops in a Provincial Town.....	Mr. T. Myddelton Shallcross, Architect.
Front for a House in Sloane-street.....	Mr. E. W. Filkins, Architect.

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### The Opening of Kingsway.



THE arrangements for the ceremonial opening of Kingsway by the King and Queen, on Wednesday last, were exceedingly well made, and everything passed

off with the ease and precision which generally characterises royal ceremonies in this country, where we are fortunate in having a sovereign who, at such functions, is always punctual, businesslike, and courteous. A special feature on this occasion was the presence of the members of the Paris Municipal Council, who, as visitors, were allotted the front seats among the spectators. It may be questioned whether the arrangements were not in one sense a little too convenient for dramatic effect. A couple of temporary decorative gates had been placed across Kingsway, north of the marquee; but when the psychological moment for declaring the street open arrived, instead of a progress to open the gates, a movable pillar with a gilt ball on the top of it, and connected by an electric wire with the gates, was brought up to the King (who seemed much amused at this little bit of jugglery), and on turning a key in this the gates opened outside. This was ingenious, but it was rather an effect *manqué*; the opening of the gates was not a prominent event, and by many of the spectators could not be seen at all;

and the provision of temporary gates merely for the purpose of being symbolically opened seems rather foolish. A Royal Procession to the entry of the street, with an announcement "I declare this street open," duly emphasised by the sound of trumpets, would have been a more natural and at the same time a more dignified and effective manner of signalling the situation.

The address read by Mr. Cornwall, which has been given more or less fully in all the daily papers, touched more particularly two points: the great importance at present of clearing insanitary areas, and the desire of the County Council that the architecture of the new streets should receive their earnest and careful consideration. As to the importance of the first point there can be no two opinions; and there can be no doubt that the London County Council have done and are doing much in this direction. A considerable portion of the centre of London is becoming completely altered and re-organised; new streets are being driven through congeries of slums or of streets which, once wholesome and even fashionable, have sunk from their first estate and become begrimed with the dirt, and even are redolent with the smell, of the refuse of many years. In the part of London directly connected with Kingsway it is difficult to know where one is, so much have the ancient landmarks disappeared. But it is slow work, nevertheless. It was mentioned in the address, and is shown in Mr. Gomme's admirable historical pamphlet, presented to the audience at the ceremonial; that the

proposal for a new street on the line of Kingsway was laid before a Select Committee as early as 1836, and that it was one of the schemes discussed by the new Metropolitan Board of Works at its foundation in 1855. Yet it has taken all this time to get the necessary property acquired and the line of street laid. And how long have we been promised a new street through the region of Seven Dials, and a clearance of all that infected neighbourhood; one may use the word, for every one going up St. Andrews-street knows the smell of Seven Dials. What would Napoléon have said to a similar dilatory system in Paris? "There were a number of old buildings," he said to a visitor at St. Helena, "useless and in the way of all improvement; I blew them all away—pff!"—making the action of blowing a thing away. Despotism (of an enlightened kind) certainly has its advantages in the securing of public improvements.

The claim made in the address, that the Council are giving earnest care and consideration to the architecture of the new streets, is not quite so well founded: It is hardly correct even to say that Aldwych and Kingsway form the most extensive improvement since the construction of Regent-street in 1820. We should have said that the Holborn Viaduct merited that place. At all events the comparison is not a fortunate one, for Regent-street was really a great architectural scheme, not only a line of street improvement; it was carried out consistently from end to end on a dignified design, which we have now nearly succeeded



in destroying. Some of the architecture already erected on the line of Aldwych is no doubt superior to Nash's, but there is not the slightest evidence so far as to any settled attempt at a complete and consistent design either for that street or for Kingsway. In Mr. Gomme's pamphlet the visitors were duly reminded of the fact that the Council had, five years ago, inaugurated a competition among eight selected architects for the best design for street architecture with a view to the treatment of these two new streets; that Mr. Norman Shaw had undertaken to advise them in the selection, without any fee, being willing to place his services "at the disposal of a body engaged in the congenial occupation of beautifying the architecture of the City in which one dwells." All this reads beautifully, no doubt, but the account omits to say that the whole competition was a complete *fiasco*; that nothing came of it; that the Council paid 2,000*l.* of the ratepayers' money in competition fees to architects who, and whose designs, were never made use of in any way; and that this lamentable result came about through sheer commercial greed on the part of the less educated majority of the Council, who found, or thought they found, that it would be more difficult to let plots for building on if there were a demand made for keeping the façade subservient to a general design. Architectural dignity, in the avowed search for which 2,000*l.* had been paid, was abandoned for mere considerations of business. It was not in Mr. Gomme's function, as Secretary, to criticise his Council, but we have no doubt he knows this as well as we do; and in view of that bit of history it hardly does for the County Council to say too much about its anxiety for the higher architectural treatment of the two new streets.

In regard to another matter into which commercial considerations, affecting the ratepayers rather than the Council, have entered—we mean the question of the alignment of the north side of the Strand between St. Mary's and St. Clement Danes—we think the Council have vindicated their action in declining to modify the line of street as at first laid down. Mr. Gomme tabulates the four suggested schemes, those of Mr. Thornycroft, the "Strand Improvement Committee," the Institute of Architects, and the Council's own line, giving the value surrendered and the loss per annum incident to each scheme. Comparing these with the appearance of the street as existing, we are confirmed in our first opinion, that the improvement was not worth the cost it would entail, and that in fact Mr. Thornycroft's scheme, which was apparently suggested by other than merely architectural considerations, would even have had a bad effect, as leaving a waste of open street much wider than was required for purposes of traffic.

One of the most satisfactory illustrations shown in connexion with Kingsway is the section of the street as arranged by the Council's engineer, showing the tramway subway with its landing platform in the centre, and the large arched tunnels on each side of it constructed as subways for pipes, with the main sewers formed beneath these. That is the way

to construct a street, so as to leave pipes easily accessible and with plenty of room to arrange them; it is a first beginning, and it is to be hoped that it is established as a precedent to be followed in all new streets for the future.

We must, finally, congratulate the Clerk to the Council on the admirable and finely illustrated pamphlet which he has produced in regard to the history and statistics of the site and the streets; a history which, *inter alia*, explains and justifies the names, so happily found, of Kingsway and Aldwych. The County Council are fortunate in having in Mr. Gomme a Clerk who is both a man of business and an accomplished archaeologist.

#### TRADES UNIONS AND THE LAW.

AT the Miners' Federation held at Blackpool recently, one of the principal resolutions was that the Federation should "continue to press forward the Trades Unions and Trades Disputes Bill, making trades unions' funds secure, and placing them again in the position the Federation understood them to be in under the 1871 and 1876 Trades Union Acts." We have frequently pointed out the very salutary effect that the recent decisions have had on labour disputes, and the benefit that has ensued to employers, employees, and the trade of the country generally since trades union leaders have had to realise that illegal action on their part is followed by the consequences imposed on every other public body or individual in the State—pecuniary responsibility. Nevertheless, amongst the majority of the speakers there seemed to be a grave misapprehension on what the law really is.

In the first place, it is popularly assumed that the present liability of the trades unions has been imposed by the decision of the legal members of the House of Lords and not by the Legislature, and that their legal position has been differentiated from their statutory status under the Trades Unions Acts of 1871 and 1876. It is hardly necessary to state that a study of the statutes will show such an opinion to be entirely erroneous. The trades unions by the Act of 1871 were protected from a principle of the common law that they were unlawful merely because their purposes might be deemed in restraint of trade. The words of sections 1 and 2 are:—

"The purposes of any trade union shall not by reason merely that they are in restraint of trade be deemed to be unlawful so as to render any member of such trade union liable to criminal prosecution for conspiracy or otherwise, or so as to render void or voidable any agreement or trust."

The definition of a trade union in section 16 of the Act of 1876 is as follows:—

"Any combination, whether temporary or permanent, for regulating the relations between workmen and masters, or between workmen and workmen, or between masters and masters, or for imposing restrictive conditions on the conduct of any trade or business, whether such combination would or would not, if the principal Act had not been passed, have been deemed to have been an unlawful combination by reason of some one or more of its purposes being in restraint of trade."

It only remains to observe that the Act of 1871 contained powers enabling the trades unions to sue and to be sued in respect to their property.

It is this legislation, directly and indirectly, upon the trades unions a certain amount of protection from the law which prevented the trade, which has been common to trades union leaders as a law, to them to do illegal acts with complete impunity as far as punishment is concerned. Throughout the speech at the Congress it was assumed that the employers were now more favoured by the law than the unions, and it was stated that "black lists" were circulated which prevented the from obtaining employment anywhere. The unions, however, cannot be ignorant that the courts will hold the masters responsible for illegal combination or action equally with the unions, and the right course for the unions to adopt is to see that action is taken where damage has been suffered by such illegal action, and not to make it merely the ground of a party cry to obtain freedom from liability for their own funds in case of illegal action. If the Legislature is so situated in the hands of the capitalists as the speakers at such meetings are fond of asserting, they may rest assured that in no case are they likely to obtain a one-sided immunity; but what is sauce for the goose would be made sauce for the gander, and such a course would tend to little less than anarchy.

What degree of coercion can be exercised by the unions in trade disputes is a question difficult of determination, and which has led to much litigation; from a recent decision in the House of Lords it would seem that an indiscriminate circulation of "black lists" which prevented a man obtaining employment would certainly be held illegal. It is not for us in these pages to attempt to lay down the law governing this subject, but we may quote what was said by Sir W. Erie when treating of trades unions:—"Every person has a right under the law as between himself and his fellow subjects to full freedom in disposing of his own labour or his own capital according to his will. It follows that every other person is subject to the correlative duty arising therefrom, and is prohibited from any obstruction to the fullest exercise of this right which can be made compatible with the exercise of similar rights by others." These words have recently received approval in the House of Lords, and a study of such cases as *Allen v. Flood* shows with what careful impartiality the law is administered. It is of primary importance that the trades union leaders should disabuse themselves of the idea that the Trades Union Acts legalised all forms of actionable interference with the rights of others, or that the recent decisions have in any way derogated from the privileges conferred by these Acts.

ARCHITECTURAL ASSOCIATION DAY PRIZE WINNERS.—In the list of the Architectural Association prize winners, published last week, an error occurs in regard to the name of the winner of the prize for "the best work" (last studio during the whole of the season) (last year). As given in our issue the name is printed as "S. R. Adams." It should be Maurice S. R. Adams.

CARNEGIE LIBRARY, S.W. 11.—The new public library and reading-room at 20, White Bridge was formally opened on Saturday last week. The library and reading-room were erected under the supervision of the engineer, Mr. A. S. Wiles.



## NOTES.

Winchester  
Cathedral.

WE regret to learn that the serious statements made in the daily papers as to the further defects discovered in Winchester Cathedral—statements which we generally receive with a certain scepticism, or at all events with caution—are substantially correct. The principal subsidence and defect exists in the three bays of De Lucy's work (circa 1200) forming the south-east corner of the presbytery, extending from the later work of the south chancel aisle to the Lady Chapel, and including Bishop Langton's chapel. The further excavations that have been made reveal here a very serious dislocation of the wall and foundations, the footings of the buttresses having gone, leaving the buttresses hanging on instead of supporting the wall. The groining of the three bays adjacent to the defective wall is found to be seriously cracked, the line of the ribs in some instances assuming a convex instead of a concave curve, and the masonry of the vaulting surfaces has lost all true bond, or possibly (as in the case of some of the Peterborough masonry) never had any. The statement of a local paper that the walls appear to be very much like a shell—an outer wall and an inner wall between which rubble has been poured in, we have no doubt is quite correct; exactly the same state of things was found, it may be remembered, in the case of the crossing piers at Peterborough: A meeting of the Chapter and of some eminent laymen is about to be called by the Dean to consider the matter. The Dean and Chapter are acting under the advice of Mr. T. G. Jackson as consulting architect, and Mr. J. B. Colson, the official architect to the fabric.

THE New Vyrnwy Aqueduct.

NOTHING like finality is to be expected in waterworks construction for the supply of the rapidly growing cities of the world. In every hand we hear of the acquisition of new catchment areas, and the execution of extensive works for the collection and storage of drinking water. Some great centres of population, such as Glasgow, Manchester, Liverpool, and Birmingham, have succeeded in securing gathering grounds that will yield abundant supplies for many years to come. But even these favoured cities are compelled to spend huge sums from time to time for the purpose of bringing in the increased quantities of water demanded by the growth of their respective populations. Liverpool furnishes the most recent example of the kind by the completion of the second aqueduct from Lake Vyrnwy at a cost of nearly 785,000*l*. The inadequate supplies from the Rivington reservoirs during the past summer show that the Water Committee were wise in undertaking the construction of this second conduit some three years ago, and its successful completion has placed an additional daily supply of from 14,000,000 to 15,000,000 gallons at the disposal of the inhabitants. Although no great difficulties have presented themselves in this case, the laying of a

42-in. pipe line 67½ miles long necessarily provides ample opportunity for the exercise of engineering skill and administrative ability. Various rivers, canals, railways, and bogs have had to be crossed, and finally the pipe enters Liverpool from beneath the Mersey. The engineer, Mr. J. Parry, is to be congratulated upon the completion of the undertaking in the short period of three years, and also upon the somewhat unusual fact that the actual cost has been less than the estimated expenditure.

The National  
Physical  
Laboratory.

WE had an opportunity last Saturday of inspecting the National Physical Laboratory at Bushy House, Teddington. Considerable additions have recently been made to the plant and apparatus, and many of the departments are now in thorough working order, carrying out researches the results of which are of great importance both to engineers and to physicists. Dr. Stanton has perfected an ingenious testing machine which subjects material to rapid repetitions of stress first in one direction and then in the other. When his researches are completed we shall know whether metallic "fatigue" has any importance or not. Many engineers have attributed the fracture of shafts to metallic fatigue, and it will be of importance to know whether it is due to this cause or to resonance, or probably to a combination of both. Mr. Paterson has perfected the methods of measuring the candle power of lamps, and has reduced commercial photometry to an exact science. Researches are being made for radio-activity in minerals, and the effects of extreme cold on the properties of matter are also being investigated. The metallurgy department, under Dr. Carpenter, has done excellent work in photographing through a microscope the surface of steel at the temperature of solidification. Very elaborate apparatus in metrology has been set up, and the screw measuring and dividing engines perform their functions admirably. The tide-predicting machine which is founded on Lord Kelvin's design is a marvellous example of the application of pure science to practice, enabling the tides at the various ports in India to be predicted several years in advance. In the electrical department Mr. Campbell has perfected his apparatus for making researches in iron, and has also perfected the methods of measuring inductance and capacity. New buildings are now in course of erection for the electrotechnical department, and we hope that a special room will be built for the accurate photometry of arc lamps by Professor Blondel's method.

Concrete-Steel  
Groynes.

EXPERIENCE has proved in a very conclusive manner that long groynes, of small height but capable of being raised as required, are most successful for the accumulation of drifting material and the building up of foreshores so as to form natural defences for threatened lands. One trouble is that the timber groynes adopted hitherto have suffered from drawbacks which have militated against the application of the system.

Among the drawbacks in question are the liability to decay and to destruction by the teredo, the difficulty of rapid construction both on the dry shore and beyond low water mark, and the trouble involved by additions at the top after beach material has accumulated and by adjustment at the bottom in the case of "under-runs." The Owens-Case reinforced concrete groynes constitute a considerable improvement on timber construction. They are impervious to the attack of worms, do not decay, and by their weight are far less liable to displacement. This ingenious type of groyne consists of piles with an  $\Gamma$  section into the grooves of which slabs of concrete-steel are loosely fitted. The slabs adjust themselves to under-runs, and by using piles of suitable length provision can be made for the addition of further slabs to increase the height of the groyne as required. Concrete-steel is likely to be largely used for sea-coast protection works, and we are glad to find that civil engineers are beginning to recognise its advantages.

Electric  
Power  
Distribution.

THE opening of the Lancashire Electric Power Company's supply station last week is a notable event, as it is the first company in this country to supply power by means of overhead wires at a pressure of 10,000 volts. One of the groups of wires leaving the power station is carried by means of overhead wires a distance of one mile, and then by underground cables for another twelve miles. Another group of wires is carried on poles for four miles, it will then go underground for six miles, and finally be overhead again for five and a half miles. Presumably the Board of Trade have given their sanction, and there will probably soon be many more systems of overhead wires at even higher pressures. In California there are several such systems, but the lengths run to hundreds of miles, and the pressures to 60,000 volts. Under no possible circumstances can overhead wires be beautiful, but one incidental advantage accruing from electric supply is the abolition of factory chimneys. The Acme Spinning Mill is the first mill in Lancashire which has no chimney. The 1,240 horse-power required to drive its spindles is supplied by this new company, and the use of this method of driving has revolutionised the appearance of spinning factories. The electric motors are fixed to the ceiling, and, as the driving is "direct," there are no belts. Hence, not only is the floor space economised, but the lighting of the workrooms is considerably improved. The capital cost of installing the spindles is about ten per cent. cheaper than when steam is used, and thus a considerable economy is effected. From many points of view the electric driving of workshops is desirable, and so electric power companies should not be hampered by unnecessary restrictions. It seems to us, however, that for distances of a few miles the extra cost of underground mains would not seriously hamper a supply undertaking. There would certainly be less liability to a breakdown, less cost for maintenance, and much greater safety for large birds,



### THE decision of the Vacation Court in the case of Barff and others v. Mann, Crossman, & Paulin, Ltd. (*Builder* reports, p. 403) is worthy of note.

The plaintiffs were applying for an interim injunction restraining the defendants from obstructing the light to a block of buildings known as Nos. 145 to 160, Blayton's-buildings, in Hoxton, to be used as artisans' dwellings in self-contained flats. It appeared that the block as to certain windows had been erected from dates beginning as early as June 1, 1885, whilst the windows to other floors had been completed at various subsequent dates, and that the whole carcase was roofed in and boarded by September 21, 1885. The writ in the action was issued September 8. The defendants contended that no action could be brought until twenty years had expired from the time the building was properly roofed in. The court supported this contention, and the action was dismissed without prejudice to the plaintiffs' right to commence a fresh action. The Prescription Act, 1832, in sect. 3 enacts that "when the access and use of light to and for any dwelling-house, workshop, or other building shall have been actually enjoyed for the full period of twenty years without interruption the right thereto shall be deemed absolute and indefeasible. . . ." Sect. 4 provides that the "period" is to be the term next before action brought, but it also provides that nothing is to be deemed an interruption unless it has been acquiesced in or submitted to for one year, and it has therefore been contended that a period of something over nineteen years confers the right to light. It was, however, held in the year 1895 that even if the right could not be interrupted after the expiration of something over nineteen years, the action cannot be brought before the expiration of the full period of twenty years. As regards the second point, it has also been decided—practically since the year 1869—that although the dwelling-house need not be occupied or fit for occupation, yet the building must practically be structurally complete outside for the right to light to attach.

### The Hall-road Collision.

AFTER considering the evidence relative to the serious accident that occurred in July last on the Lancashire and Yorkshire Railway near Liverpool, Colonel Druitt came to the only possible conclusion, that inadvertence and neglect of regulations were the sole causes. The moral is the very familiar one that punctuality and speed are less important than safety. It does not appear that the points were at fault, that the corridor type of carriage used is more liable to be telescoped than the ordinary carriage with separate compartments, or that the risk of fire is greater with electric than with steam traction. While admitting the substantial correctness of the two latter points, we must emphasise the contention that telescoping and fire are extremely undesirable occurrences against which it is the duty of railway companies to make more adequate provision by the adoption of steel carriages with non-flammable fittings and upholstery. The carriage based on the mail coach of the

Georgian epoch has not yet died the natural death which ought to have taken place a generation or two back. It still lives to witness better vehicles, but even these are not worthy of the twentieth century, in the respect that they are ready to crumple up and to burst into flame on the last provocation. Except where competition compels or the Board of Trade insists, railway people seem to live twenty-five years behind the times.

### Cavalry Barracks.

THE Secretary for War recently congratulated the people of Norwich on having gratuitously provided a site for cavalry barracks in that town. Not to be outdone in this form of patriotism, subscriptions are now being received at Chester in order that this town may likewise present the Army Council with a site. The subject is naturally causing criticism. We have nothing here to say on the general question as to whether this town or that should be a cavalry centre. But it is obvious that a site for barracks requires care and forethought in its selection, and should not be left to a number of amateurs. It is important that it should be in a healthy and open situation, so that it can be thoroughly sanitary. Again, the present and future character and wants of the adjacent buildings must be considered. We may very fairly ask why sites for work-houses and other municipal institutions should not also be presented by towns. The truth is that localities in this matter are actuated not so much by patriotism as by various interested motives, such as the increase of trade to shops and public-houses, and various similar reasons. It is certain, however, putting these reasons on one side, that barrack sites should be selected by responsible and skilled officials of the Government and paid for at the proper value.

### The Royal Strand Theatre.

THE site of the Strand Theatre will shortly be cleared for the erection of a tube station by the Great Northern, Piccadilly, and Brompton Railway Company. The house was originally used for the exhibition of panoramas painted by Reinagle and Thomas Barker; in 1831 it was converted into a theatre for Rayner the comedian and Mrs. Waylett the singer, and Douglas Jerrold's early plays were brought out there. In those days the great patent houses enjoyed close monopolies which were jealously protected, and Rayner, whilst defying the Lord Chamberlain, adopted the expedient of conducting the house as a "subscription theatre," no tickets being sold at the door. Some forty years ago the theatre became one of the most popular in London with the performance of burlesques written by H. J. Byron and by Sir Francis Burnand, in which William Farren, Rogers, Clark, Honey, Miss Ada Swanborough, and Miss Marie Wilton (Lady Bancroft) played a principal part. After a fire on October 21, 1866, the house was reconstructed from plans and designs by C. J. Phipps, and the front has since been remodelled for the widening of the Strand. The property, which covers an area of 7,523 ft. superficial, was offered for sale in November, 1892, and withdrawn

after a bid of 41,000l., the rent being 1,850l. per annum for an unexpired term of twenty years.

Lord Nelson's **NELSON** will be much in our minds to-day, in connection with his own ship in Portsmouth Harbour recently greeted the French Squadron, whose officers, with the graceful courtesy of their race, saluted his statue in Trafalgar-square. So exalted and single-hearted was the ruling principle of his life that it seems to preclude all minor considerations, and yet our readers may care to be reminded of the two or three places which are associated with Nelson's sojourn in and near London. In August, 1805, he quitted his lodgings in Travestreet, Strand, for Merton Place, on the Wandale, in Surrey, which he had bought a few years previously from a Mr. William Axe. Lady Hamilton arranged the grounds and the interior of the house for him. He writes in his private diary for September 13:—

"At half-past 10 drove from dear Merton where I left all which I hold dear in the way to go to serve my King and my country." He planted, it is said, the mulberry tree in the garden of a double cottage in Pincoot-road, Merton, which he built for his coachman and gardener. The stables and entrance-lodge stood near the present "Nelson Arms" public-house. A row of houses, Nelson-place, marks the site of the house, to the west of Abbe House. The grounds, sold by Lady Hamilton's trustees, and since known as Nelson's Fields, were divided into numerous small holdings. Lord and Lady Nelson were living at No. 141, or No. 147, New Bond-street, in 1797, when the mob, celebrating Lord Duncan's victory at Camperdown, demanded that the house should be illuminated. On being told that Admiral Nelson lay the severely wounded and suffering general, the ringleader replied:—"You shall hear no more from us to-night." Haslewood (his executor) relates that the rupture with Lady Nelson occurred in the house in Arlington-street where she lodged during the winter of 1800-1. At that time the Hamiltons were living at No. 23, Piccadilly, and there was born Horatia, Mrs. Ward, who died in 1835. In the waiting-room of the (old) Colonial Office, in Downing-street, Nelson and Wellington met, on the only occasion in their lives.

### The Chapel of St. Michael and St. George.

THE Chapel of St. Michael and St. George (George, at St. Paul's), is that in which Stevens's Wellington monument was long half buried, with the light at the back of it. Some notice of it has recently appeared in the daily papers, following on a semi-private inspection for members the other day. It is still, however, in a very unfinished state, but there is some good work getting done there under the direction and from the designs of Mr. Samuel Clarke; sufficient to show that when completed it will be a very rich and beautiful chapel of its kind. The semi-circle of stalls round the east apse is now completed; the stalls are carved in teak by Mr. J. E. Knox and show very good work in keeping with the general character of the cathedral.



theless with a certain modernity of style, and not a mere reproduction of ornament of the Wren period. An effective incident in these stalls is the insertion of some square panels of old decorative iron-work, belonging to the cathedral and formerly in the choir, as perforated panels in the fronts of the desks. The work is flat in character and very refined in design, and suits its present position very well. The window has been designed by Mr. Clarke altogether in white glass so far as at present seen; if it is intended to introduce some colour into the coat-of-arms portion, now covered up, that would be a good addition to the window and an appropriate employment of colour. The vaults are being treated with gilding, and four octagonal panels in the centre of the ceiling are to be filled with plaster panels containing coats-of-arms surrounded by very fine and bold mantling, which will have a good decorative effect when in position. The altar and a good many other things are still wanting, but we hope to see before long the completion of the whole, which will form an important addition to the interior beauties of St. Paul's.

Institute  
of Oil  
Painters.

THE present exhibition is one of the best which the Institute has had for some years past, and they have certainly been fortunate in their last choice of a President, Mr. Frank Walton, whose principal work (325), an evening landscape with no title but a line of poetry, is itself quite a poem in feeling, besides showing admirable execution; his two other small landscapes (326, 328) are also very good. There are not many figure pictures of importance; Mr. Robert Fowler's life-size "Pandora" (10) is a good sculptural figure in the conventional colour which this artist usually employs in nude figures; Mr. John White's "Kilmeny" (203) is an original and effective illustration of a now little read poem; Mr. Frampton's "Annunciation" (110) is that kind of sham early Renaissance picture of which Mr. Spencer Stanhope set a fashion; Mr. Kennington's "Instruction" (209) is pretty and his "Morgiana" (271) brilliant, but they hardly claim higher epithets; and Mr. Stock's large and seriously intended picture, "The Uplifting of Psyche" (308) hardly realises its aim. A small highly finished figure by Mrs. Murray-Cookesley, however, called "Flight" (115), representing a woman of some uncertain antique period, standing in a doorway clad in a sumptuous costume, deserves attention for its exceptionally careful painting. But in the main the landscapes are the strong point of the exhibition, and there are a good many fine ones: Mr. Van der Weyden's "In the Shadow of the Ramparts" (42), Mr. Herbert Marshall's "Whitehall" (53), with a fine London sky effect; Mr. Wetherbee's beautifully composed work "The Pool" (70)—a kind of Salvator Rosa on a small scale, only better; Mr. Robert Little's "Caerlaverock Castle" (107) and "Glencoe" (66); Mr. W. H. Bartlett's "Neaping Home" (127), one of his Irish coast pictures; Mr. H. Hughes-Stanton's "Twilight" (140); Mr. Reid's "Steady, Johnny" (157), including good figures, but essen-

tially a "marine"; Mr. Hill's "On the Sand Dunes" (298); Mr. Montague Smyth's fine picturesque mass of old building, "The Old Sluice Gate, Wisbech" (161); Mr. Leslie Thomson's "Anglesea Coast" (249); and Mr. Aumonier's "Summer" (266) one of the best pictures we have seen of his, and filled with a real summer glow; too often nowadays we see landscapes labelled "Summer" which have not a ray of sunshine in them. We presume we should be expected to mention Mr. Parton's large picture, "In the Meadows of Normandy" (180), which is what we should call a vignette on a large scale. There are a good many small landscapes, among the unpretending works hung near the skirting, which will be found worth looking for and looking at, though we have not space to mention their names here.

The New  
English  
Art Club.

LIKE some other exhibitions, the new English Art Club has taken refuge in the room of the Alpine Club, where the light is indeed excellent, but the access bad and inconvenient and the aspect of the room depressing. We have endeavoured to find out why it is that some pictures in this exhibition which are undeniably clever, nevertheless entirely fail to attract one—indeed have rather the opposite effect; for instance, Mr. Tonks's "Portrait" (31) of a man sitting on a sofa, with a little wooden doll of child by him playing with cards; the child is treated merely as a kind of "property" thrown in; the figure of the man is well drawn and composed and there is character in it; yet is it one of the most uninviting of portraits. The reason perhaps lies in the entire absence of charm, either of colour or expression; for charm seems to be the quality that the typical New English artist carefully eschews as a temptation of the Evil one, though he does not always produce such wanton hideousness as in Mr. John's "Mother and Child" (3). Mr. Rothenstein's "An Exposition of the Law" (21) is a grave work painted in a serious spirit; but there again is that same heavy and dull effect resulting from the apparently deliberate rejection of life and brightness. The most forcible "New English" painter is an Italian, Signor Mancini, whose out-door "Portrait" (25) of an old man set off by some brilliantly painted accessories, shows what pictorial quality in a work of this kind really is, and is a peril to some of the English members, whose dull and loaded works it fairly kills. Mr. Orpen's nude study of "A Spanish Woman" (26), her face hid by the mass of her hair, is a really powerful piece of figure drawing; his "Lottie of Paradise Row" (74), a half-length of a flower-girl, is clever, certainly, but again has no pictorial quality. Mr. Muirhead's "Woodland Landscape" (78) is a fine picture—there is light and air there at any rate; so there is in Professor Brown's "The Road by the Cliff" (13). Mr. Mark Fisher's bright and powerful landscape, "The Manor Farm" (30), hardly seems in place among its surroundings; his other work "A Sheep-fold, November" (76) partakes the general heaviness of the atmosphere. The late Mr. Tomson's "The Coming

Storm" (44) is a powerful but rather overdone effect—the clouds too solid; and Mr. Sydney Lee's "The Ruined Church" (5), seen by limelight—we beg pardon, moonlight—is too like a stage effect. Among curiosities of the collection are a badly drawn "Cupid and Nymphs" (96); "Morning" (86) represented by a young lady with a very long body and very short (or very badly fore-shortened) legs, sitting on the edge of her bed; a portrait of a lady with a doll's head (18); two French landscapes (34, 55) which look as if they came out of a doll's house; "High Street, Oxford" (101), with all the buildings crooked; Mr. Brabazon's shapeless blots of colour which it is the fashion to accept for sketches of architecture; and the scrawls of town scenes (64, 67)—for they can hardly claim the title of sketches—exhibited by a prominent and very outspoken art critic. There is no reason why a man should not be a good art critic without being able to paint himself; but he would be wiser in that case not to exhibit his own works; they are not calculated to add to the weight of his criticism.

At the Dutch Gallery, 39, The Old Bond-street, there is on view a collection of drawings and paintings by Professor Legros, and drawings by Miss Dorothea Landau. Professor Legros' works consist to a considerable extent of drawings with a monochrome wash effect, in a style which he has often used, and which permits of the rapid realisation of an idea in landscape composition and figure character. "Le Liseur" (13) is a typical example; a landscape composition framed between two clusters of tree trunks, at the foot of one of which is a figure reading. Among the separate figures that of "L'Incendiaire," showing a man stealing away in fear and haste from the scene of his crime, has a power that reminds one of Blake. "Le Petit Abandonné" (7) is a pathetic head of a boy. "L'Orage" (15) is a fine sketch in oils; "Paysage" a slightly washed landscape sketch reminding one of the "Liber Veritatis," only in a different spirit from Claude. There are 41 works of different kinds, all of them more or less original and effective. Miss Landau's drawings of drapery, figures, and portrait heads, are good and capable work, and the frame of "Various ideas for Pictures" (65) is interesting, and contains sketches of figure groups that would be worth working out into finished compositions.

FALCON-SQUARE CHAPEL, E.C.—The Board of Charity Commissioners have formulated a scheme for the regulation of the Charity, which consists of the Falcon-square Congregational Chapel and trust property in the parish of St. Olave, Silver-street, E.C. The chief changes introduced by the scheme relate to the disposal of the site of the chapel and the adjoining warehouse, and the application of the rent and net proceeds towards the erection—at a maximum outlay of 18,000*l.*—of a church at Harrow, to be called the Silver-street Congregational Church, with schools and a manse, and towards an endowment for the purpose of Congregational extension in London. The chapel site covers over 5,632 ft. super, having a frontage to Falcon-square and extending to Windsor-court in the rear. It is to be let by auction upon a ninety-nine years' building lease with an option of the purchase of the freehold. It is said that the chapel, one of the oldest within the limits of the City, was originally founded by some Nonconformist friends of Milton.



# THE INSTITUTE OF ARCHITECTS AT NEWCASTLE-ON-TYNE.

THE visit of the Royal Institute of British Architects to Newcastle terminated on Saturday last, and it is satisfactory to record that the proceedings were in every way successful. The open-minded spirit displayed by the Institute in holding the annual dinner in other centres than the metropolis cannot be too highly commended. Such a policy must surely tend to strengthen the relationship between the parent body and the allied societies. At the same time the members of the Northern Architectural Association are to be congratulated on the realisation of an event which they had hoped for last year, and which had to be unavoidably postponed. Thanks to the energy of their Hon. Secretary (Mr. A. B. Plummer), arrangements were made to show the members of the Institute as much of Newcastle and the neighbourhood as time would allow. The President journeyed down from London with a goodly party of members on the afternoon of the 12th inst., and arrived in time to attend a reception given in honour of the Institute by the Mayor and Mayoress of Newcastle in the Grand Assembly Rooms. A large and distinguished company of ladies and gentlemen attended, the number present being about four hundred.

On Friday morning some impression of Newcastle from an architectural point of view was obtained by the members on their hurried walk to the Fish Quay, as the programme provided for an early start at 9.30, and time was limited, to view the buildings in the streets, to which we will return later. A steamer, placed at the Institute's disposal by the River Tyne Commissioners, was boarded by a large party, augmented by members who had arrived from Edinburgh, Glasgow, Leeds, and other centres. The starting point was beneath the shadow of the high-level bridge, that mighty structure of Stevenson's genius, for which one's admiration is increased after a close inspection of its detail and construction viewed from below. The tall, graceful piers rising from bases of massive masonry and terminated in a refined and appropriate manner, connected with lattice girders of exceedingly simple and direct construction, were most impressive. Indeed, the view of the whole surroundings, with its blackened pile of picturesque buildings rising up from the river on all sides, is one not likely to be forgotten. Adjoining are other vast engineering feats; for example, the swing bridge and the new railway bridge now in course of construction. Apparently little attempt is being made in this instance to combine utility with artistic effect. After proceeding up the river beyond the Elswick Works, the steamer returned and continued the journey down the river to Grangemouth. The earlier part of the voyage was favoured with bright sunshine, but the wind was exceedingly cold; nevertheless the majority of the party remained on deck and manifested the greatest interest in the many works on the banks. The whole Tyneside would appear to be a vast workshop, and all kinds of up-to-date appliances for building and loading ships seem to be used. Several of the shipbuilding yards have peculiar overhead erections to facilitate the handling and placing in position of heavy iron plates. Passing Yarrow a distant view was obtained of the ancient church associated with the memory of Bede the Venerable, who was buried here in A.D. 735. A landing was effected at the north pier at Tynemouth, and the party had the experience of witnessing a heavy sea rolling in and occasional clouds of spray dashing over the structure. The authorities had provided a covered-in truck to prevent the visitors getting a wetting, which conveyed the party up into the "Haven." The old Priory buildings were inspected with close interest, but, as time was rather limited, the shelter of the Lady Chapel was sought, where Canon Hicks, vicar of Tynemouth Priory, gave a short history of the edifice, and Mr. W. H. Knowles explained by means of a plan the existence of a Norman church on the site of the present Priory building erected in the XIIIth century. Foundations of the former church have recently been exposed, and could easily be traced. The eastern part of the choir, with its beautiful lancet and elliptical windows, is the principal fragment that remains of what

at one time must have been a very stately pile. Unfortunately, the latter part of the excursion was attended by a heavy fall of hail, but much appreciation was expressed with the morning arrangements. The party returned to Newcastle by electric train.

At the invitation of the Northern Architectural Association, the visitors had luncheon in the Grand Assembly Rooms. Mr. James T. Cackett, President, was in the chair. In the afternoon the members visited several of the historic buildings in the city under the guidance of Mr. A. B. Plummer and Mr. R. O. Heslop. The cathedral was first on the list, with its graceful open-work tower, which must be familiar to all travellers passing through Newcastle. Before entering the cathedral the memorial to the late Queen Victoria, by Mr. Alfred Gilbert, claimed attention for a few minutes; a monument replete with beautiful modelling and subtle detail; its daring originality cannot but arrest attention. In the interior of the cathedral we have another example of rare genius. The work of a modern designer of rare genius. The rood screen, pulpit, and choir stalls, the work of the late R. J. Johnson, were examined with great interest. The consistency of the whole scheme, beautifully designed and carved, was remarked upon by many present. It was stated that the carvings were entirely executed in Newcastle, and are the work of Mr. Ralph Hedley. Another beautiful piece of local craftsmanship was a silver cross exhibited in the sacristy by the vergers. Many interesting points about the structure of the interior of the cathedral were pointed out, notably the existence of an early capital and column incased in the great piers of the transept, and the evidence of the nave arches having been raised, at a later date than the building of the church, by the cutting away of the original masonry. A rare font of Purbeck marble, surmounted by a beautifully-carved canopy, also claimed attention. Surprise was expressed that Purbeck marble could be obtained in such large blocks. On leaving the cathedral, the visitors proceeded to the old castle, and were conducted to the battlements and to the lowest apartments, and eventually into the library of the Society of Antiquaries, where a brief history of the castle was given. Mr. Parker Brevin, one of the members of the Society, also gave an interesting description of some of the historic relics in this chamber. The castle was originally protected by a double wall and deep ditches, and the entrance was under a gatehouse, which still exists within a stone's-throw on the town side of the keep. Some members of the party were conducted over this latter building by Mr. Brevin; here are collected numerous Roman remains found in the locality. At the Guildhall the beautiful carvings above the mantelpiece in the Merchants' Court were much admired, also the paintings in the Mayor's parlour. Trinity House was next visited, and the small chapel, with its finely-carved pews, then, finally, All Saints' Church, with its curious Flemish brass on the wall.

Ultimately the party adjourned to the new rooms of the Northern Architectural Association, where tea was partaken of. After a short address by Mr. J. T. Cackett, Mr. John Belcher, in a graceful speech, formally declared the building open.

The Northern Architectural Association is in a very flourishing condition. It consists of seventy-eight members, seventy-two associates, and seventy students, and has been established since 1858.

The President explained that they had recently acquired the freehold, thanks to the generosity of their late President (Mr. William Glover), who had given, roughly speaking, about 970*l.* towards that object. Mr. Glover had also presented them with 500*l.*, the interest of which was to be devoted to educational purposes. After tea, the Laing Art Gallery was inspected, a new building, erected at the cost of 20,000*l.*, from designs by Mr. J. T. Cackett and Mr. E. Burne Dick. It is unfortunate that the principal front of this dignified building faces a side street, but no doubt the architects had to make the most of the limited site at their disposal. The facade is well balanced, and the effect of the blank wall over the rich doorway is highly pleasing.

Returning to a general consideration of the architecture of Newcastle, the visitor cannot

but be favourably impressed with the aspect of the city viewed from its low-lying terraces. Starting from the open space in front of the handsome station entrance and proceeding up Grainger-street, the entrance and built of stone, many points of interest can be noted. Close at hand is the descending in a long, graceful curve in the direction of the river, famed for the architectural character of its buildings. Perhaps the most pleasing view of the city is seen by looking up from the lower end and catching a glimpse of the theatre and the tall Corinthian columns erected in memory of Earl Grey. The horizontal character of the buildings in this street combined with the broad and tall perspective of classic treatment, is truly delightful. The street was carried out as a speculation of one Richard Grainger, in the early part of last century, from the designs of four architects—Benjamin Green, John Dobson, John Wardle, and John Walker; it seems probable that, of these, Dobson was the largest contributor. The additions to this street of late years cannot be said to harmonise with its original architecture—one building particularly seems quite out of sight—neither can one admire the fussy appendage under the Theatre Royal.

It is a pleasure to find in Newcastle some really good architecture of modern date—for instance, the two banks designed by the late R. J. Johnson; they are buildings of distinction, and, while displaying no features of striking originality, they bear evidence of the master hand. On the whole, the facade of Messrs. Lloyd's bank is perhaps the more pleasing of the two.

At 7.30 the annual dinner took place, and was attended by upwards of 150 members and guests, Mr. John Belcher, A.R.A., in the chair. A report of the dinner and the speeches is given separately.

The programme for Saturday comprised a visit to Durham and Hexham Cathedrals, but, as the majority of the party elected to go to the former cathedral, the excursion to Hexham was abandoned.

The morning turned out dull, and some disappointment was expressed at the absence of sunshine on arriving at Durham station, which no doubt would have added to the enchantment of the panoramic view of the cathedral and castle buildings seen from this point.

Mr. Hodgson Fowler, M.A., the architect of the diocese, conducted the members into the interior of the building, and gave an exhaustive account of the fabric, together with a short history of the foundation. Like many other of our old cathedrals, the building has suffered under the treatment of the so-called restorer. About the commencement of the present century, under the superintendence of Wyatt, the whole cathedral underwent a process of chiselling, and some 3 in. of the entire surface was removed in order to make it more uniform, and mouldings and projections were cut down and altered. Evidence of this was pointed out by Mr. Fowler before entering the building, and the difference between the old and the new surface could be easily traced at the base of one of the western towers.

In his historical notice, Mr. Fowler said about the year 1000 A.D. Bishop Aldhun built a stone church, to which the body of St. Cuthbert was transferred from a kind of wooden building where it had been first placed, and ninety years later the early church was transformed and the foundation-stone laid by Bishop Carlisle of what is partly the existing structure. During these operations the body of St. Cuthbert was laid in the cloisters of the monastery. Carlisle built the choir and the first two arches of the nave and one of the triforium. The second Norman Bishop, Flambard, carried on the nave which he had laid out, and by the year 1145 A.D. the vault of the nave and the north and south doorways were completed. Then Bishop Pudsey about 1150 began to build a Lady chapel at the east end of the cathedral, which twice fell down during construction, owing, it is said, to the interposition of St. Cuthbert. The chapel was then transferred to the west end, where, under the name of the Gaithe, it still exists.

The Chapel of the Nine Altars was visited, and Mr. Fowler explained the connection to a sort of raised platform at the



of the High Altar; here a large slab marks the spot where the remains of St. Cuthbert are deposited. The tomb was formerly surmounted by a kind of erection similar to the Percy Shrine, but this was destroyed in the time of Henry VIII. This is one of the most interesting spots in the cathedral, and a good point from which to view the early English work of Bishop Poore. Some years ago under this platform the foundations of the Norman apse to the choir were laid bare, proving that it was round and that the aisle terminations were square on the outside. There is no old glass in the cathedral, except a few fragments remaining in the south aisle windows. A description of the old glass, however, can be found by referring to an ancient book called the "Rites of Durham."

A detailed account was given of the Galilee Chapel, and on passing to the chapter-house through the cloisters attention was drawn to the ancient Norman door, with its richly ornamented arches of rare design.

An account was given of the restoration of the chapter-house, and the data given by the architect for each constructive feature were listened to with much interest. The monks' dormitory, a room 194 ft. long and 41 ft. wide, was also visited, as well as the library and crypt under. Mr. Fowler finally conducted the party along an outside terrace walk under the Galilee Chapel for the purpose of viewing the massive and curious buttresses supporting the western walls of the fabric. An adjournment was made for lunch, and at 2.30 the members assembled at the entrance to the castle.

The castle was formerly the residence of the "Prince" Bishops of Durham, but in 1837 it was handed over to the Bishop of Durham for the benefit of the University. We are told on the authority of Symeon that William the Conqueror destroyed the palace of the Saxon bishops and ordered it to be built as a castle, on his way to Scotland in 1072 A.D. The crypt chapel probably dates from that period; it is remarkable for its graceful columns and delicately-carved capitals, somewhat difficult to distinguish in the obscure light of this interior; the original herring-bone pavement is worth noting. A gallery on the ground floor leads to the Black Staircase, erected by Bishop Cosin in A.D. 1665; this spacious and richly-carved staircase ascends three or four stories in easy flights, and communicated with what is called the Norman gallery; at some later date the staircase has evidently shown signs of giving way, as circular wooden supports have been added to strengthen the projecting corners. To the left is the Great Hall (A.D. 1284-1311), a large but uninteresting apartment about 100 ft. long by 36 ft. wide; over the south end is the trumpeters' gallery. More interest, however, was taken in the kitchen and buttery hatch, with its quaint oak timbers bearing the name of Bishop Fox A.D. 1499. On leaving the castle the party passed under the ancient gateway, the work of Bishop Pudsey, hung with massive doors of solid oak and iron interwoven in a curious manner.

Hearty thanks were offered to Mr. Fowler for his kindness in explaining the many features of interest encountered in the day's proceedings, and it was felt that the time was too short for a proper inspection of what is perhaps one of the most fascinating groups of ecclesiastical buildings in this country.

**HOME FOR BOYS, BELFAST.**—The new home for boys at Nazareth Lodge, Ravenhill-road, was opened on the 18th inst. by his Eminence Cardinal Logue. Mr. John Fegan, the builder, has carried out the work from plans by Mr. J. J. McDonnell, architect, and the other contractors were Messrs. James Baxter & Co., plumbing and gas-fitting; and Messrs. Riddells, Ltd., heating, steam, and cooking appliances.

**CHURCH RESTORATION, EAST RETFORD.**—The restoration of the East Retford parish church has now been completed. The work, which has been carried out under the direction of the architect, Mr. W. Southall, includes the repaving of the aisles with Minton tiles, and the whole of the stonework has been cleaned and repaired, the plaster stripped off the chancel walls and the old stonework, the roof thoroughly overhauled, and the portion over the organ-chamber covered with lead. The organ has also been overhauled by Messrs. Bringley & Foster, of Sheffield.

# THE ANNUAL DINNER OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The annual dinner of the Royal Institute of British Architects was held on Friday evening, the 13th inst., in the Assembly Rooms, Newcastle-on-Tyne. Mr. John Belcher, A.R.A., President of the Institute, was in the chair, and he was supported on the right by the Duke of Northumberland, Sir Aston Webb, R.A., the High Sheriff of Durham, Mr. H. T. Hare (Vice-President R.I.B.A.), Sir George Hare Philipson, M.D., Sir Walter R. Plummer, M.P., Mr. John Slater (London), and Mr. J. P. Spencer (Mayor of Tynemouth); and on the left by the Bishop of Newcastle (Dr. Lloyd), Mr. J. T. Cackett (President of the Northern Architectural Association), Mr. John Beattie (Deputy-Mayor of Newcastle), Mr. Leonard Stokes (Vice-President R.I.B.A.), Mr. Edwin T. Hall (Vice-President R.I.B.A.), Mr. George Renwick, M.P., Mr. T. E. Colcutt (London), and the Deputy-Mayor of Gateshead (Alderman L. H. Armour). Amongst others present were the following:—Messrs. W. J. Locke (secretary R.I.B.A.), John W. Simpson (London), A. N. Prentice (London), A. W. S. Cross (London), H. Temperley (Newcastle), W. H. Knowles (Newcastle), Jesse Horsfall (Tadmorden), P. F. Chisholm (London), Geo. Sherrin (London), G. B. Bulmer (President of the Leeds and Yorkshire Society), Maurice B. Adams (Chiswick), Leonard Martin (London), F. W. Marks (London), F. W. Rich (Newcastle), John Cash (London), H. C. Charlewood (Newcastle), G. P. K. Young (Perth), J. Garry (West Hartlepool), R. Burns Dick (Newcastle), Sir Alfred Gelder (Hull), Messrs. H. O. Trenchard (President of the Edinburgh Architectural Association), Butler Wilson (Leeds), H. Davis (Scarborough), W. Lister Newcombe (Newcastle), W. A. Waddington (Manchester), C. H. Brodie (London), E. R. Barrow (London), J. M. Henry (Edinburgh), A. H. Crawford (Edinburgh), Malcolm Dillon (Mayor of Jarrow), Edmund Woodthorpe (London), J. W. Boyd (Newcastle), G. T. Brown (Sunderland), W. Milburn (Sunderland), H. Oswald (Newcastle), S. D. Robins (Newcastle), John White (Newcastle), Geo. Reavell (Alnwick), W. St. L. Crowley (London), M. G. Martinson (Birmingham), G. R. Smith (South Shields), J. J. Burnet, A.R.S.A., Alexander Graham (hon. secretary R.I.B.A.), the Mayor of Wallsend (Mr. Harrison), Arthur B. Plummer (hon. secretary Northern Architectural Association), S. Perkins Pick (Leicester), Stockdale Harrison (Leicester), F. E. L. Harris (Manchester), Henry White (Penzance), Joseph Oswald (Newcastle), C. E. Bateman (Birmingham), Robert Cochran (Dublin), H. J. Blanc, R.S.A. (Edinburgh), J. Walton Taylor (Newcastle), R. Elsey Smith (Edinburgh), A. W. Tanner (London), J. W. Benwell (Carlisle), J. B. Mitchell-Withers (Sheffield), C. B. Flockton (Sheffield), F. M. Dryden (Newcastle), J. W. B. Boyd (Newcastle), G. D. Oliver (Carlisle), C. C. Hodges (Newcastle), W. D. Carie (London), J. Bruce (Newcastle), W. Hope (Newcastle), Harry Barnes (West Hartlepool), C. F. Newcombe (Newcastle), Roland Rich (Newcastle), the Mayor of South Shields, Alderman J. M. Winter (Tynemouth), J. W. Dyson (Newcastle), J. W. Herring (Sunderland), T. R. Milburn (Sunderland), G. A. T. Middleton (London), R. B. N. Haswell (London), M. H. Graham (Newcastle), J. W. Wardle (South Shields), and W. E. Fenwick (Newcastle).

The customary loyal toasts were proposed by the President, and duly honoured.

The Duke of Northumberland proposed "The Royal Institute of British Architects and Allied Societies." He said the duty had been imposed upon him of submitting the toast of the evening. Speaking for the allied societies, he should say that they offered a hearty welcome to the Institute. They welcomed them there to the north country, and so far as he could understand the proceedings of that day, they had done their best to show their visitors as much of Tyneside as they could. The local associations were a matter of great interest to the Institute. It was by strengthening these associations that the real work of the Institute was carried out. And if he was to speak—which he supposed was his proper function—for the general public,

who belonged neither to the Institute nor to the associations, all he could say was that they recognised very warmly the good work which both were doing, and they were very glad to see them making themselves acquainted, as far as possible, with the requirements of all parts of the country, and, on the other hand, placing their knowledge and their experience at the disposal of the people. He sometimes thought that for the young man who first adopted the career of an architect there must be food for great discouragement. He did not think that any architects could hope to do much better—say, in ecclesiastical architecture—than their predecessors did 500 years ago. Perhaps he was prejudiced because he lived in a castle, but he very much doubted, so far as the æsthetic side of military architecture was concerned, whether they would do much better than some gentlemen of former days in that direction. When they came to rather later times, and looked at their fine old manor-houses—though they might give them a few less steps to go up and down, and he did not doubt that their sanitary arrangements would be better—he very much doubted, if they would pardon the scepticism, whether they would give them anything more picturesque or more thoroughly English. Therefore he would say to the young architect that if he reflected in this way he might be a little bit discouraged. But if he would go on a step further he thought he would find that there was a great field for his ingenuity and his study, even in this matter-of-fact XXth century. He saw there present the representatives of many great municipalities. He would venture to suggest that England in the old days did not shine particularly in her great public buildings. Of course, there were some very fine public buildings. They had got a little hall called Westminster Hall, of which they were very proud, and other buildings of that sort. But he thought that, as compared with foreign nations, we were in ancient times rather deficient in our public buildings. He believed in that direction there was a great field for ingenuity and genius. But there was a still larger field for their efforts in what perhaps at first sight seemed a humbler line, but one which he believed was at least as important as any other in which they could engage; he referred to the housing of the mass of the population throughout the realm. That was a problem which was not always submitted to the architect. It was too often left to the builder. He presumed that it was at least one of the functions of the Institute to so mould and educate public opinion, and still more to educate the opinion of the profession, as to secure that standard of building which should provide the people of this country with dwellings equal to the civilisation which they had professed to have attained to. And, if he might say so with all respect to them, it was a problem they had not solved. Whether it was capable of solution he did not know. He could only say, as one who had tried to a certain extent to build houses, he had found that to build a good sanitary, comfortable house for the working classes of the country, at a price which would pay a reasonable return on the outlay, was, he would not say impossible, but very difficult indeed. It seemed to him that in this direction there was a large field for the genius of the rising generation of architects. If they had not any chance of exceeding the ability of their ancestors in the æsthetic side of the art, there were claims upon them which they had not in those days, when people cared very little how the lower classes of the population were housed; and they had now at their disposal all sorts of appliances and all sorts of materials which those who preceded them had not. There was one more opening which he would allude to now, and that was the opening which was afforded by the zeal of the Board of Education. The Board of Education imposed upon local authorities a very large number of buildings, and he did not think that the Board always grasped the full necessities of the case. He would suggest that the members of the Institute and those whom they trained might very well devote, as no doubt they did devote, a great part of their attention to assisting local authorities in their efforts to meet the requirements of the Board of Education at some reasonable rate, and without the



necessity of disfiguring the landscape with horrible structures of which he did not think any of them would approve. He could only, in conclusion, express, on behalf of those for whom he spoke, their very deep sense of the services which their Institute rendered not merely to art, but also to the practicalities and the absolute and essential necessities of life. It was by the exertions which they had made, it was by the success of their efforts to ally themselves with the various local associations, it was by their energy in paying such visits as those to the various parts of the country, that they confidently believed they were securing a high standard of architectural work and architectural science. There was no doubt an unlimited field for their exertions in the future. He was perfectly certain of this, that there was no body of men upon whom the welfare of the country so much depended as those who had charge of the buildings in which we lived and the buildings in which we had to transact our business. He would not detain them longer, but would give them, in the most hearty manner, the toast of "The Royal Institute of British Architects and the Allied Societies."

The President responded. He said he had to thank the company on behalf of the Institute for the way in which they had honoured the toast. They appreciated the manner in which his Grace had spoken of their work and those matters which concerned them so deeply—the housing of the poor, education, and other matters they all had very much at heart; and no doubt the words he had spoken would bear fruit. As the representative body, the Institute realised its responsibilities, and it recognised that any real advance in their position as architects would be as the members of the allied societies and of the Institute stood shoulder to shoulder. Art flourished best in an atmosphere of peace, and their work would excel as they cultivated cordial and brotherly relations. They might have differences of opinion sometimes, but these, he thought, might be regarded as a sign of healthy vitality. They might differ, for instance, with respect to the subject of registration, but they were all agreed that the education and training of the architect was absolutely necessary. Ample provision was being made for that. All they had to do was to find sufficient inducement for the qualification. The council of the Institute had no intention of allowing this matter to rest, and they had already appointed a sub-committee of coming to consider the possibility of coming to some conclusion which might if possible satisfy all. He regretted that the Mayor, having had to attend another function, was not able to be present with them that evening. But he publicly thanked his Worship and the Mayoress for their kind reception of the members of the Institute on the previous evening. It was satisfactory for them to feel that they were in close touch with the municipal authorities everywhere; that, owing to the nature of their work and training, they were able to give good counsel and advice and assistance; and that they were able to co-operate with them in those public works which were for the good of the community at large. They were always willing, as architects, to furnish voluntarily advice and assistance in such matters as occasion might arise. He would like also to thank those gentlemen who had done so much to make their visit pleasant. Newcastle was a city of great interest to them. It had been regarded, he believed, as a dull, black place, but they had found it full of picturesque beauty. The first objects that caught their eyes as they approached the city were the old Norman "Keep" and the lantern tower of St. Nicholas's Cathedral, whose beautiful corona was not excelled by any of its rivals. The buildings which rose from the water's edge in serried ranks were worthy of being seen and studied from various points of view. Looking down from that wonderful engineering achievement, the railway viaduct, whether by day, or in the dusk of the evening, when the lights of the shipping mingled with the lights upon the shore and the hillside, the view was romantic and fascinating. The bridge itself embodied all that was attractive in engineering work. Its boldness, its daring, its directness of purpose, all appealed to them. He had no

doubt that when Stephenson's work was in progress it must have very much astonished the citizens of Newcastle, and have alarmed them lest it should destroy the appearance of their city. But he could not help feeling that the bridge was really an addition to its attractiveness as much, perhaps, as its usefulness had added to the importance and prosperity of the city. He expressed his thanks for the great pleasure they had derived from their visit, and for the hearty welcome they had given them.

Mr. J. T. Cackett, President of the Northern Architectural Association, responded on behalf of the Allied Societies. He said the objects of the allied societies and of the Institute were the same—the encouragement of the association of architects throughout the country, and to consider, in the second place, the possibility of advancing the knowledge of the art and science of architecture. But there was this difference between them—that they of the allied societies worked in a very much humbler sphere. The R.I.B.A. worked in the metropolis of the world, and the Northern Architectural Association worked in the metropolis of the north. So far as the subject of education was concerned, they had excellent facilities at the College of Science for the passing of the curriculum of the Royal Institute; and, in addition, the Northern Architectural Association held classes and offered prizes, and they were advancing very steadily, he might say, in the way of education of the future generation of architects. He had no doubt that the allied societies were also making progress in this direction. There was another difference between them, and it was one to which he should like to allude—the President had already referred to it—that the London County Council was consulting the architects with regard to new streets and thoroughfares and so on in the metropolis. It was very pleasant to note the results of that consultation and the effect of the advice that had been given. He expressed the hope that all local authorities would adopt the same principle. He was sure that nothing but good would follow.

Sir Aston Webb, R.A., proposed the toast of "The Guests." He said he was honoured by being entrusted with the "other toast of the evening." They were all delighted to see their guests there. But he had this curious feeling: somehow or other he felt very like a guest himself rather than a host. They had been so kind to them and had shown Newcastle to them so well that he really thought they had been their hosts and the members of the Institute had been their guests. But for the moment he would ask them kindly to consider themselves as their guests. They were grateful to the Duke of Northumberland for having come there that night and for having spoken as he had done. It would ill become him in that northern city to say anything about his Grace, but they in the south also knew him as the wise and sagacious President of the Royal Sanitary Institute, and that in many other ways he was always ready to take a deep interest in and to devote his time to the welfare of the people. They were honoured also in having representatives of the Church and the State and the municipalities. The Church, in which they recognised a generous and discriminating patron, was represented by the Lord Bishop of Newcastle. They thanked him also for having come there. They had had the delight of visiting the cathedral that day and of seeing for themselves the tower which had always the enthusiastic admiration of architects as being a unique example in the daring of its construction and in the grace and beauty of its design. And they had all delighted in the exquisite wood-work of the interior by the late Mr. Johnston, admirably carried out by Mr. Ralph Hedley. He felt sure that any city should be and was proud of having two citizens who could beautify their city by work which would remain, he was sure, the object of admiration for centuries to come. They had also representatives of the city in the members of Parliament, whom they also thanked for having come. Architects, he supposed, were not especially active in politics, but they certainly, as Englishmen, admired the self-denying labours of their members of Parliament, and condoled with them in the late hours they had to keep. There were some

among them who were rather inclined to add to those labours by asking Parliament to take some interest in their affairs. Personally, he was bound to say that, he thought they had already enough to do, and perhaps it would be better if they tried instead to manage their own affairs. As his Grace said, that was another story. They had also representatives of the great municipalities there that night, and he thought, as the Duke of Northumberland had said, that they naturally did look—to the municipalities for the greater portion of their work, for the great builders of the future would be the great municipalities. He had heard it whispered that Newcastle had its castle in the air, and that some day it would take form in the shape of a new town hall. But, at any rate, they took an interest in almost all the work which their municipalities had to do, and they recognised the care that they took for relieving the poor and for providing clean, healthy, and sanitary dwellings. They looked to them also, and believed that in time they would turn their attention to the beautifying of their towns. Architects believed that it was the duty of the municipality not only to attend to hygienic matters but also to provide spots of beauty in every town, where men could come out and breathe the air and see the sky and the green trees, the fountains, and the flowers in their beauty and colour—some spot where men could pass through with a smile. He was afraid that in some of our towns at present men were apt to pass through with a sigh on their lips, or something even worse; and they hurried through them without any feeling of hope, but left them without regret. There was a dull monotony about our towns, though architects were ready to place their services at the disposal of municipal corporations; and each city had its own men of taste, architects and others, who were able and willing to advise them on these public improvements. They certainly hoped that in future their municipalities would avail themselves of that advice, and that, even if they had to come upon the rates for something, the aesthetic side should not be altogether forgotten. They welcomed all their guests. He gave them the toast of "The Guests," coupled with the name of the Lord Bishop of Newcastle (Dr. Lloyd).

The Bishop of Newcastle responded to the toast. He said, speaking on behalf of all those whom they had been kind enough to invite, he might say they considered it an honour and delight to have been there with them that evening. Personally, it was no little pleasure to him to be associated in that or in any other way with such a noble profession as he believed theirs to be. Some of his best friends in life had belonged to their profession, and he owed a great deal, in more ways than one, to those of their profession whom he had had the pleasure of knowing. But, apart from that, he thought we did owe a very great debt of gratitude to their noble profession; certainly, speaking for his own part, Church folk, and clergy amongst church folk, most of all. What did they not owe to those who had devoted their noblest conceptions to the ennobling of the human kind? He had said that their profession was a noble one, for surely anything was noble which tended to the elevating and ennobling of other people. And if it be true, as he held it to be true, that a thing of beauty, whatever it might be, and wherever they might have it, had an ennobling influence, then he thought that architecture must hold the very highest place in these highest fields of beauty. He believed—indeed, he knew it from his own experience to be a fact—that beautiful buildings in the most abject surroundings of poverty and misery had a very far-reaching and ennobling effect. And he thought a beautiful church must have the most ennobling effect of any building they could put up. A beautiful building, however, almost unconsciously, to the passer-by, and it was this that made them so indebted to their profession. He should even be tempted to envy the possessor of the mind and heart that could conceive any great thing—the brain of science when he felt himself on the brink of a great discovery, the joy and excitement of feeling that he was not only to be a discoverer, but that by his discovery he was to exercise



an enormous influence for good amongst his fellows; the musician who could conceive beautiful pieces of music; and the painter who could conceive some magnificent picture; and the architect who could conceive in his mind some magnificent idea, like some beautiful cathedral. He was sure they would sympathise with him when he said he pitied very much the architect who had a great idea in his mind and was not allowed to work it out, or if, when the work was growing under his hand, in the middle of it fresh ideas came to him he was not enabled to embody them. That must be a very irritating thing, and one of the chief difficulties to men of their position. He urged that in the work of educating the younger men who were entering the profession they should keep before them a high ideal. The higher the profession, the greater the fall if they allowed themselves to get down from the high ideals. It should be their aim to think not what they could get out of it, but what they could put into it. He did not mean to preach to them, but it was a matter he felt very deeply himself. He thanked them very warmly, on behalf of the guests, for the kind way in which they had received the toast and for the kind invitation they had given to their guests.

The proceedings then ended. During the evening music had been provided by the orchestral band of the Northumberland Hussars.

#### NOTES ON NEW BUILDINGS IN LONDON.

##### II.—THE "COUNTRY LIFE" OFFICES IN TAVISTOCK-STREET, W.C.

It gave the writer of these "notes" a great amount of pleasure to see the successful and pleasing architectural treatment of the facade of this building fronting on to Tavistock-street, which adds a note of cheerfulness to the somewhat depressing effect produced by the buildings in the vicinity of Covent Garden Market.

The facade comprises four stories in height, with a range of seven voids, is built of small red bricks of a pleasingly subdued tone, with Portland stone for the rusticated basement story, and the same material is skillfully employed for the window dressings, cornice chimneys, and the main entrance, and the whole shows a welcome and harmonious treatment of modern English Renaissance. The ornament is introduced with restraint, in good taste, and helps to give a feeling of refinement to a somewhat severe though stately-looking facade. From the pavement level springs the rusticated basement story, which is carried up to the level of the top of the key-stones of the windows at the ground-floor level, giving a feeling of strength and stability which is most agreeable; and here one's attention is drawn to the superb examples of the stone-carver's craftsmanship in the delicately-designed key-stones to the windows of the ground-floor level, which represent the products of Mother Earth in a charming manner.

The windows at the mezzanine level, with their semicircular heads and sills and architraves, have a decorative and pleasing effect in striking contrast to the long though well-proportioned windows of the principal story, which are a prominent feature of the facade, and one cannot fail to appreciate the use of small panes of glass in the sashes. The windows of the upper story are treated simply and effectively, and directly above them the cornice, with its simple horizontal lines of moulding, has a restful effect, but somehow one feels that the plain brickwork between the cornice and the eaves deserves a more ornamental treatment.

Growing out of the tiled roof in a most natural manner are two big chimney-stacks—good examples of how such features can be treated, and in this instance giving an inspiring influence to the facade when looked at from the pavement just opposite the junction of Burying-street and Tavistock-street, and a sense of perspective to an otherwise subdued-looking street front.

And now one cannot help admiring the most striking feature of the design: the main entrance, with its round head and ornate fanlight, the whole framed in by a pleasing combination of pilasters surmounted by a semicircular pediment and cornice, with

delicately-carved caps and frieze linking together the pilasters, and reaching up to and claiming the centre window of the principal story, with its pointed pediment as part of the composition which has the happy effect of emphasising the main entrance in a refined and pleasing manner. The brilliant green colour of the doors rather suggests the title of the favourite publication which will issue through the portal to its numerous readers. And, in conclusion, one cannot but feel grateful to the architect who has succeeded in designing an interesting and satisfactory addition to London street architecture. There is a stamp of truth about the building which reminds one of the motto of the Architectural Association: "Design in beauty, build in truth."

#### THE PORTABLE STEAM CRANE.

The portable steam-balance crane is used most extensively by contractors, builders, and timber and stone merchants for coaling vessels, for unloading cargo, in steel works, in harbour construction, and on permanent ways. There are two broad types in which it occurs—the vertical, or older type, and the horizontal. The difference is that in the first-named the longitudinal axis of the cylinders are situated either vertically or at a slight inclination; in the latter they are set horizontally. This difference alters the whole arrangements of the gearing and the shapes of the frames. In the vertical cranes the gearing is situated high up, and the side frames, or cheeks, are tall; in the horizontal, the gearing is low down, and the cheeks are correspondingly low. The first is more convenient in one respect, being more roomy and capacious for the arrangement of gearing; the second is better for the attendant, because he is able when standing at the lever-box to see the whole of the mechanism of the crane below him, and the movements of the load better than with cranes of the vertical type, in which tall side frames and girders somewhat obstruct the sweep of vision. The vertical cranes are the more costly. We will give our first consideration to these.

The portable, or locomotive, steam crane of vertical type is usually constructed in powers between 1 ton and 20 tons. Powers under 3 tons, or over 10 tons, are, however, not nearly so often constructed as those which lie between 3 tons and 10 tons. Very small cranes are not economical, and there is a want of stability in portable-balance cranes which renders them undesirable for very heavy loads. The elements of instability are due to the gauge and to the radius of the load. The gauges most common are 4 ft. 8½ in. and 7 ft., and foreign gauges, including the metre, are sometimes called for. The radius of the load will range from about 15 ft. to 30 ft. The overturning of these cranes is due to the want of proper precautions for the ensuring of stability. The truck can be prevented from upsetting by the use of blocking girders, or rail clips, and the weight of the load on the jib can be counterbalanced by the mass of the crane, the boiler, and tank, and additional weights.

Essentially the steam crane consists of a pair of side frames, or cheeks, which carry the engines and gearing, a jib for lifting and lowering, a centre pillar, or post, round which the frames and jib revolve, or slew, and a travelling truck.

The side frames are usually separate castings, bolted to certain cross girders standing between the frames at right angles. The girders carry some of the essential working parts, as rollers for slewing, brackets for vertical shafts, which actuate slewing and other motions, attachments for levers, etc. The cylinders, generally two in number, are bolted to the side frames, and actuate the lifting and other gears directly or through intermediate gear. In some of the horizontal cranes side frames are dispensed with, and a massive casting of the boxed type takes its place, carrying the whole of the gear for lifting, slewing, and other movements, together with cylinders and boiler.

The base of a steam crane is either a fixed foundation or a travelling truck. In either case the centre pillar, or post, is stepped into the centre of a massive casting and firmly fixed therein. The whole of the superstructure slews round and upon this. The foundation is always massive. If it is

fixed, the main casting is firmly bolted to a foundation-plate, bedded several feet in concrete. If travelling, the centre casting into which the post is stepped is enclosed in a rectangular framing of timber, wrought-iron, or steel, provided with suitable bearings for the axles of the running wheels. The travelling motion is operated from the engines on the side frames in light cranes. In heavy cranes there is generally a separate pair of cylinders and gearing for travelling.

Generally some extra balance is required in order to ensure the stability of the crane when working. When a crane is fixed—that is, when it does not travel, but merely slews—this balance is a constant quantity. But when a crane travels also on a truck or carriage the balance is only calculated for lifting the full load in the direction of the wheel base and to a few degrees only on each side of it. As the crane is slewed diagonally across the wheel base it would be upset by reason of insufficient balance. Hence, an artificial wheel base is devised by the use of blocking girders, or of rail clips, by which the stability of the crane is assured. Light loads, however, much below the maximum capacity of the crane can be lifted right across the truck at right angles with the wheel base without upsetting occurring.

Where there is a good permanent way, rail clips afford the most convenient means for holding the crane down. If the rails are loosely laid, as in many contractors' yards, then blocking girders are safer, though cumbersome. With a narrow gauge and a long jib girders should always be preferred to clips.

The clips are hung from the lugs cast or bolted on the truck just over the rails. They are loosely shackled, but held against the rails by a coupler, or link, and are instantly detachable.

The blocking girders consist simply of H irons, or joists, slid along between straps bolted to the truck. Timber wedges being driven between the underside of the joists and the ground effectually block the crane. The same effect is secured by using screws, having their bearings in brackets which stand out from the truck sides, the ends of the screws being brought to bear upon blocking laid upon the ground, or directly upon the ground itself.

It is not necessary to block a crane when the longitudinal axis of the jib is in line with the longitudinal axis of the truck, nor even when they are several degrees out therefrom. The only exception to this occurs in cranes having unusually long jibs carrying maximum loads. But, as the jib is slewed round, an angle is reached at which the crane will upset unless blocked. This is a matter for experiment, and the girders must be long enough to ensure stability under the maximum load lifted at the maximum radius. When rails have to be laid down specially for a crane or cranes, the gauge may be made wide enough to dispense with the necessity of blocking.

To prevent the load on the jib at a long radius from tilting the upper framework heavily forward, so causing excessive pressure, or friction, on the front rollers, there is a space usually left at the back under the boiler to receive supplementary, or balance, weights. The quantity required varies greatly in cranes of different radii and loads.

Jibs are constructed of timber and of iron and steel. A lattice jib of steel is the most durable, and a swan-necked, or bent, jib usually the most convenient, because the load can be brought in closer to the crane when raised to its maximum height.

The jib of a crane may be fixed or movable; in the latter case it is a derricking jib, and in a steam crane there is special derricking gear for lifting and lowering it within the limits specified. This is an extremely useful arrangement, enabling the crane to take a larger or smaller sweep, so covering an extensive area of ground, and thus increasing its usefulness. The derricking motion is operated by the engines.

The weight of the whole of the crane superstructure is carried upon the top of the post and upon rollers running on a circular path, or race. Practically the weight is carried on the rollers, severe pressure on the post coming only when the load tends to tilt the crane at the top. Four rollers are generally used—one in front, one at back, one bearing on each side against the post. The last



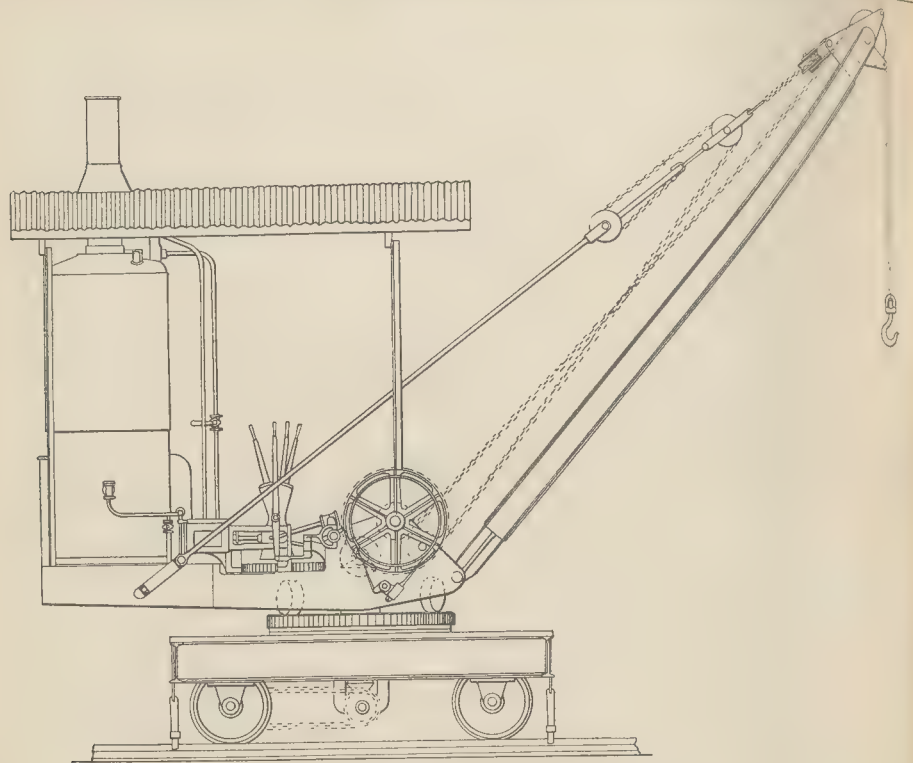


Diagram of Portable Steam Crane: "Horizontal" Type.

two, however, do not sustain pressure, but simply steady the superstructure. But in large cranes there are often two rollers at the sides, travelling on the race. In large cranes also it is a frequent practice to substitute two rollers at front and back for the single ones used in the smaller cranes. This gives the superstructure a more steady motion. The wear on these and on the race is very severe, hence steel is used largely instead of cast-iron, which wears very rapidly, involving frequent renewal in the case of cranes subject to constant use and severe duty. The same remark applies to most of the gearing, but especially to the pinions, which run at high speeds, and wear rapidly if in cast-iron.

The steam pressure used on cranes is not high, seldom exceeding 80 lb. per square inch. Ordinary vertical boilers and multi-tubular modifications of that type are invariably used, being cheap, easily attended to, and not being very liable to get out of order. It is conducive to economy of fuel, of durability of the plates, and to the comfort of the attendant to lag the boiler with wood or with sheet-iron.

The boiler is placed at the extreme hinder end of the crane upon a suitable footplate, and its weight acts as a portion of the counterbalance to the fore part of the crane with the jib.

It has the following fittings and mountings:—A safety valve of the common or of the lock-up type, or both, blow-off tap, water gauge, try cocks, pressure gauge, man-hole, mud holes, and fire-door ring for fire bars. The ashes are raked on to the footplate on which it stands.

The double engines are of simple type; quick running, driving the engine shaft through cranks, or crank discs, in which the pins are set at right angles. Eccentrics for forward and backward motion are keyed on the engine shaft, a pair for each engine, to operate the slot-link reversing motion, the levers for which are brought to the lever-box adjacent to those for actuating the movements of the gearing. The link motions

are usually of wrought-iron or steel, case hardened. The cylinders are lagged with sheet-steel or with wood.

The steam pipes are usually made of wrought-iron, copper being too expensive for average use, and being charged for as an extra. The steam is taken from the safety valve casing, where it is driest.

All properly constructed modern cranes have provision for simultaneously operating all the motions. Travelling and slewing, and either lifting or lowering, if done by the crane, can be done at one time without reversing the engines. To alter the direction of travel, or lower by gear, reversal of the engines is necessary. The simultaneity of movement is effected by means of arrangements of friction clutches, driving bevel, and spur wheels, everything being operated from the engine shaft, and the reversing levers are all located in one box on the left-hand side of the crane where the attendant stands.

In cranes exposed to much weather the whole of the superstructure, excluding the jib, is covered in with a house of corrugated-sheet. Much rust and wear are thereby prevented.

Cheap portable cranes for temporary works are bought in large numbers by contractors, and special types are manufactured to supply this demand. The "contractor's crane" is not a good piece of machinery regarded from the engineer's point of view, and some of the best firms do not care to manufacture it. Many firms make it, however, and the result of keen competition is evident in the cheap, roughly constructed, and noisy steam cranes of from 2 tons to 10 tons capacity, which occur in such numbers in the construction of docks, railways, and large public works. Considering how roughly these cranes are made, how roughly they are used, and how they are sometimes overloaded, the marvel is that accidents are not more frequent.

Yet these cranes, in spite of their faults, fulfil a very useful place. If a contractor wants any number of cranes, between half a dozen and fifty, and requires those cranes, moreover, for only a single contract lasting

a few months or a year or two, the price charged for high-class cranes by the best makers would involve too great an outlay. After a large contract is finished the cranes, with the rest of the plant, are often sold in preference to storing them. Hence, these are bought for temporary service only, just to do a certain amount of work and no more, conditions entirely different from those which exist in cranes bought for permanent service in a private yard. The result is that a first-class crane will cost a third as much again as a contractor's crane of similar power. But when the latter is worn out, the former will be requiring nothing beyond a few triling renewals and repairs.

**SIR HENRY TATE MEMORIAL.**—At the opening on October 11, of the Tate Library (formerly the Oval, Bristol), was unveiled a bust of the late Sir Henry Tate. The bust, executed in bronze by Mr. Thomas Brock, R.A., rests upon a pedestal in the middle of the garden, which Lady Tate, in fulfilment of her husband's behest, has purchased and laid out for the public benefit; the garden is close to the library built by Sir Henry Tate.

**THE MILAN INTERNATIONAL EXHIBITION, 1906.**—We are officially informed that the King of Italy will offer prizes to the extent of 1,000,000 to exhibitors at the Milan Exhibition. This amount will be divided as follows:—1, A prize of 200,000 for automatic safety couplings for railway rolling stock; 2, a prize of 40,000 for the best method of testing high-voltage electric currents without danger to the operator; 3, a prize of 40,000 for the best and most original exhibit of machinery or manufacturing process; 4, a prize of 200,000 for the best established method of distributing healthy and pure milk in centres of population; 5, a prize of 40,000 for the best type of popliteal dwelling adapted to the climate of Northern Italy; 6, a prize of 200,000 for motor boats. In addition to the foregoing there will be given a national prize of 200,000 to the institution or private society which in the last ten years has been most successful in the work of reclaiming waste lands, tides, and pasturage.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lead Ethel Green Guardians 2,870*l.* for poor law purposes; Chelsea Borough Council 3,500*l.* for contribution to cost of street improvement (sanction to loan); Finsbury Borough Council 2,278*l.* for construction of convenience; Lambeth Guardians 4,550*l.* for poor law purposes; Lambeth Borough Council 9,827*l.* for paving works; Lewisham Borough Council 2,660*l.* for purchase of horses; St. Pancras Borough Council 1,874*l.* for electric lighting; and Woolwich Borough Council 11,820*l.* for town hall and offices, and 16,275*l.* for electric lighting purposes.

**Removals from, and Additions to, the List of Contractors Selected to Tender.**—The Education Committee reported as follows, the recommendations being agreed to:—

"We submit recommendations dealing with the cases arising since our last report to the Council on July 19, 1905, concerning the additions to, or removals from, the Council's selected list of contractors to be invited to tender for works to schools. In each proposed addition to the list the usual inquiries have been made by the solicitor and the architect (Education Committee) as follows:—

(a) That the name of Stimpson & Co., of Canham-road, Battersea, be removed from the list of contractors selected to tender for new schools and enlargements.  
(b) That the name of G. Godson & Sons, of Pembroke Works, Kilburn-lane, be added to the list of contractors selected to be invited to tender for the erection of new schools and additions to schools.  
(c) That, subject to the conditions named below, the names of the following firms be added to the list of contractors to be invited to tender for structural alterations, repairs to school buildings, etc.:—(i) G. Godson & Sons, Pembroke Works, Kilburn-lane; (ii) John Christie, 2, Richmond-road, Tooting-road station, structural alterations to the value of 2,000*l.* One year on probation as from July 24, 1905.  
(d) That the name of J. A. Stayner, of 206-B, Berners-street, be retained on probation for one year as from June 22, 1905, on the list of contractors to be invited to tender for repairs to buildings, etc.  
(e) That the name of Newell & Lusty, of 24 and 26, Wilson-street, Poplar, be added temporarily to the list of contractors to be invited to tender for repairs to buildings, etc., on probation for one year as from September 25, 1905.  
(f) That the names of the following firms be added to the list of contractors to be invited to tender for providing and fixing iron staircases:—(i) P. A. Norris & Co., of 11A and 12, St. Andrew's-hill, Queen Victoria-street; (ii) Merryweather & Sons, Ltd., of Greenwich-road.  
(g) That the applications of the following contractors to be placed on the list of contractors selected to tender for works as follows in connection with London County Council schools, be declined:—(i) Smith & Co., Carpenter's-road, Stratford; (ii) structural alterations, repairs to buildings; (iii) W. Montre-Smith, Son & Co., Isledon Works, 395, North-road, structural alterations, cleaning, and painting; (iv) C. Pearce & Son, 47, Scott-road, Safford, heating apparatus; (v) The Nautilus Fire and Heating Company, 34, Berners-street, heating stoves, stoves, ranges, etc.; (vi) A. T. Peyton, 28, High-street, Lewisham, cleaning, painting, etc.; (vii) Cord Brothers & Co., 65, Chelverton-road, Putney, painting, plumbing, etc.  
(h) That the application of B. E. Nightingale, of Albert-embankment, the re-instatement of his name on the list of contractors selected to tender, be declined."

**Tramways.**—On the recommendation of the Highways Committee it was agreed:—

"That authority be sought in the session of Parliament of 1905 to enable the Council to construct new tramways as follows:—(1) From the 'Plough' (Clapham Common, London County Council tramways), via Lavender-hill (London County Council tramways), to Seven Sisters-road (existing tramways); (ii) from Seven Sisters-road (existing tramways), via Ambury Park, to Upper Clapton-road (existing tramways); (iii) from Algate (existing lines), via the Tower-bridge Northern Approach to the point near the Tower-bridge; (iv) from the Lea-bridge-road (existing tramways), via Lea-bridge-road, to Upper Clapton-road (existing tramways); (v) from Tooting-broadway (London County Council tramways), via Mitcham-road, to the county boundary near Tooting Junction railway station; (vi) from High-street, Streatham (London County Council tramways), via Streatham High-road, to the county boundary at Norbury, with the Lea-bridge-road, Bournevale-road, and Stanthorpe-road; (vii) from the Marble Arch, via Edgware-road, Maids Vale, and High-road, Kilburn, to the county boundary at Cricklewood."

The Highways Committee also reported, and it was agreed:—

"That authority be sought in the session of Parliament of 1905 to enable the Council to construct new tramways as follows:—(1) From the 'Plough' (Clapham Common, London County Council tramways), via Lavender-hill (London County Council tramways), to Seven Sisters-road (existing tramways); (ii) from Seven Sisters-road (existing tramways), via Ambury Park, to Upper Clapton-road (existing tramways); (iii) from Algate (existing lines), via the Tower-bridge Northern Approach to the point near the Tower-bridge; (iv) from the Lea-bridge-road (existing tramways), via Lea-bridge-road, to Upper Clapton-road (existing tramways); (v) from Tooting-broadway (London County Council tramways), via Mitcham-road, to the county boundary near Tooting Junction railway station; (vi) from High-street, Streatham (London County Council tramways), via Streatham High-road, to the county boundary at Norbury, with the Lea-bridge-road, Bournevale-road, and Stanthorpe-road; (vii) from the Marble Arch, via Edgware-road, Maids Vale, and High-road, Kilburn, to the county boundary at Cricklewood."

The Highways Committee also reported, and it was agreed:—

"That the execution of the tramways construction works between the open approach to the existing terminus in Theobald's-road, and the existing terminus in Theobald's-road, be transferred from the Works Committee to Messrs. J. Mowlem & Co., Ltd.  
(b) That the expenditure sanctioned on July 11, 1905, in respect of the tramways construction works to be executed under the direction of the Works Committee, be reduced from 19,000*l.* to 17,300*l.*"

**Improvements.**—The following is a summary of proposals by the Improvements Committee, which were also agreed to:—

Improvement.	Estimated cost of the Improvement.			Estimated net amount to be charged as for street improvement, deducting contributions, and the sum (if any) to be charged to the tramways account.	Annual charge on the rates for interest on and repayment of debt calculated on the net amount to be charged as for street improvement.		The annual charge for interest decreases each year by—
	Property.	Paving works, excluding the cost of laying down and paving the tramway track.	Total.		Amount.	Equivalent to a rate in the £ of—	
		£	£	£	£	d.	£ s. d.
(i.) Mitcham-road (Tooting High-street to Tooting-junction) ..	Wandsw'th £16,000	12,200	28,200	18,800	930	00536	10 7 1
(ii.) Edgware-road, High-road, Kilburn, and Shoot-up-hill (Marble Arch to Cricklewood) .....	St. Marylebone — Paddington £58,000 Hampstead £23,500	2,350 10,150	94,000	62,667	3,099	01786	34 10 5
(iii.) Lea Bridge-road (Lea Bridge-road to Lower Clapton-road).	Hackney £17,500	3,100	20,600	13,734	679	00391	7 11 4
(iv.) York-road, Falcon-road, and Lambeth-road (Wandsworth to Westminster) .....	Wandsw'th £12,000 Battersea £5,000 Lambeth £45,150	2,570 900 4,030	69,650	46,434	2,296	01323	25 11 7
(v.) Streatham High-road, Glenelton-road, Bournevale-road, and Stanthorpe-road (Streatham to county boundary) .....	Wandsw'th £77,000	20,200	97,200	59,600	2,935	01661	32 18 6
Total .....	£254,150	£55,500	£309,650	£201,235	£9,939	05727d	110 13 11

**List of Rates of Wages and Hours of Labour.**—The Works Committee reported as follows, the recommendations being agreed to:—

"In the Council's list of rates of wages and hours of labour the rate of pay of French polishers is 8d. an hour. There is no agreement in force between the association of employers and the trade union with regard to the rate of pay for this class of employee, but we are satisfied that the rate in practice obtained in London is 9d. an hour. We recommend that the Council's list of rates of wages and hours of labour be amended by the substitution of 9d. an hour for 8d. an hour as the rate of pay for French polishers."

**Trees in Kingsway.**—On the recommendation of the Improvements Committee it was resolved to authorise an expenditure not exceeding 300*l.* in connexion with the planting of trees in Kingsway and Aldwych. Up to the present 124 trees have been planted in those thoroughfares, and it is calculated that 115 will be necessary to complete the work. The total cost of providing and planting the 240 trees and providing iron tree-guards will be 825*l.*

**Paving of Kingsway and Aldwych.**—Mr. Dew asked the chairman of the Improvements Committee why one portion of Kingsway and Aldwych was being paved with wood and the remaining part with asphalt. Mr. Horniman replied that a certain portion of the new thoroughfares came within the Borough of Holborn and the other portion was in the City of Westminster. It was usual to consult the different local authorities as to the material they wished new roads to be paved with, because hereafter they would have to maintain the thoroughfares. That course was followed in this case, and one authority desired wood and the other asphalt.

## APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

## Lines of Frontage and Projections.

**Hammersmith.**—A projecting sign at the Art Metal Works, Scrubs-lane, Willesden (Messrs. Caslake & Co.).—Consent.

**Woolwich.**—A building on a site abutting upon the northern side of High-street and eastern side of White Hart-lane, Plumstead (Mr. J. O. Cook for the directors of the London and Provincial Banking Co.).—Consent.

**Lewisham.**—Porches to twelve houses in

Tannafold-road, Sydenham (Mr. F. S. Eldridge).—Consent.  
**St. George, Hanover-square.**—Retention of a

al.	Estimated net amount to be charged as for street improvement after deducting contributions, and the sum (if any) to be charged to the railways account.	Annual charge on the rates for interest on and repayment of debt calculated on the net amount to be charged as for street improvement.		The annual charge for interest decreases each year by—
		Amount,	Equivalent to a rate in the £ of—	
	4	5	6	7
	£	£	d.	£ s. d.
200	18,800	930	00536	10 7 1
00	62,667	3,099	01786	34 10 5
00	13,734	679	00391	7 11 4
50	46,434	2,296	01323	25 11 7
00	59,600	2,935	01691	32 18 6
50	£201,235	£9,939	05727d	110 13 11

projecting balcony at No. 47, Upper Grosvenor-street, St. George, Hanover-square (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

**St. George, Hanover-square.**—A projecting stone porch and balcony at No. 51, Upper Brook-street, St. George, Hanover-square (Mr. R. G. Hammond for Mr. J. Garlick).—Consent.

**Strand.**—Two projecting oriel windows to a building on the western side of Kingsway, Strand (Messrs. D. Cubitt, Nichols, Sons, & Chuter for Messrs. W. H. Smith & Son).—Consent.

**Hackney, Central.**—Buildings on the southern side of Darnley-road, Hackney, between No. 1, Darnley-road and No. 222, Mare-street (Messrs. W. Bradford & Sons).—Consent.

**Paddington, South.**—A water-closet on a lead flat in front of No. 37, Gloucester-square, Paddington, to abut upon Radnor-place (Messrs. Gilroy & Co. for Mr. C. Oliversen).—Consent.

**Hampstead.**—Bay windows to two houses on a site approached from the western side of Branch-hill, Hampstead (Mr. C. B. King).—Consent.

**Marylebone, East.**—A two-story addition to No. 49, Avenue-road, St. Marylebone, to abut also upon Acacia-road (Messrs. Anscombe & Rigland for Mr. J. W. Jubber).—Consent.

**Poplar.**—An iron and glass alter in front of the Prince's Theatre, East India Dock-road, Poplar (Messrs. Owen & Ward for Mr. C. Soumes).—Refused.

## Width of Way.

**Battersea.**—Additions to No. 110, Church-road, Battersea (Messrs. J. A. J. Woodward & Son for Mr. J. Draper).—Consent.

**Hackney, North.**—A deviation from the plans approved for the erection of buildings on the east and west sides of a roadway leading out of the north side of Farleigh-road, Hackney, between Nos. 3 and 5, so far as relates to an increase in the heights of the building on the west side of the street (Mr. G. H. Capper for Mr. A. C. Jackson).—Consent.

**Limehouse.**—An addition to a building on the south side of Hunt's-mews, Glamis-road, St. George-in-the-East, with external walls at less than the prescribed distance from the centre of the roadway of Hunt's-mews (Mr. J. M. Knight for Messrs. Meredith, Drew, & Co.).—Consent.

**Dulwich.**—A two-story building at the rear of No. 184, Cranberry-grove, Dulwich, to abut upon Stories-road, with external walls at less than the prescribed distance from the centre of the roadway of Stories-road (Mr. A. Laycock).—Refused.

The recommendation marked † is contrary to the views of the local authority.

**CHRIST CHURCH, WATFORD.**—A new church has been consecrated at Calford Lane, which will for a while serve as a chapel-of-ease to St. Andrew's. The fabric, constructed of red brick, after designs by Messrs. Hudson & Hunt, of York-place, Baker-street, will contain 800 sittings, and will cost about 8,000*l.* The site is given by Lord Essex.



## ARCHITECTURAL SOCIETIES.

**THE ARCHITECTURAL ASSOCIATION OF IRELAND.**—On Tuesday last the eighth annual meeting of the members of the Architectural Association of Ireland was held at 15, South Frederick-street. Mr. Henry Allberry occupied the chair. The annual report stated that the last session was from every point of view one of the best since the Association was re-established in 1896. The total increase in membership during the year was thirteen, bringing the roll up to 138. The papers read had been interesting and instructive. As usual, the competition for the prizes offered was disappointing. The President's prize and the Vice-President's prize produced only one competitor each; the travelling studentship two; and the Institute prize three. The drawings, designs, and models were of considerable merit, and indicated an improvement in the standard of draughtsmanship and design in the younger members. Regret was expressed that no steps had as yet been taken by the senior body to establish an Irish examination for qualification for membership of the R.I.A.I., which, it was hoped, would have the effect of aiding the Association in its educational work. On the motion of Mr. Sparrow, seconded by Mr. Beckett, the report was adopted. Consideration of the financial statement was postponed owing to the inability of the Treasurer to be present. The President then delivered his inaugural address, in which he dealt with the general work of the Association and the beneficent results which had already followed from its revival. The members were quietly working to devise the greatest educational benefit that they could from the Association with the additional desire to uphold the standard of the profession in the country. Much progress had been made in architectural education during the last eight or nine years in Dublin, and even in Ulster a society of architects had been established; but they must all deplore the increasing tendency to call in extraneous assistance whenever a building of any importance had to be designed. Attention had recently been called to the number of buildings which had lately been carried out by English and Scotch architects in this country; and there was a rumour that the design of the buildings for the forthcoming Dublin Exhibition would emanate from across the Channel. Architects in good practice ought to heed the signs of the times and take thought for their successors by helping forward their education. Their policy should be that of the open door, welcoming all competition, and those who had to pay had the right to employ whoever they wished; but if they wanted proper work done, with local materials, and in the manner best calculated to suit Irish taste and ideals, let them employ an architect who knew his work, knew the material in which he designed, and one who had drawn his inspiration from the needs of his own country. It was proposed to establish a museum in connexion with the Association, in which would be placed samples of good, bad, and indifferent building materials. The method of treating them by craftsmen would be shown. During the meetings which considered the question the Association had been in touch with the Dublin Development Association, and Irish materials would be given a prominent place, for it was a knowledge of the materials ready to hand that proved the trained architect, and incidentally exercised an influence beneficial to his clients. In the fostering of local industries an architect could play a prominent part. Not only could he give an impetus to home manufactures by specifying their goods, provided they were equal in value and quality to imports, but by using the building materials of the locality for which he designed he was able to preserve a continuity of the distinctive style of the district. It being beyond question that material had a most important bearing on architectural design.

**MANCHESTER SOCIETY OF ARCHITECTS.**—A number of suggestions as to the way in which Manchester, from an architectural point of view, might be made a more presentable city were offered by Mr. J. H. Woodhouse, the President of the Manchester Society of Architects, at a meeting of the Society in the Chartered Accountants' Rooms on Thursday last week, in the course of his presi-

dential address. He drew attention to the fact that the Corporation had under consideration the publication of a combined catalogue of the whole of the architectural books in the various libraries of the city, which were available for either loan or reference. That, he said, was the result of a suggestion by Professor Capper, and would be welcomed and greatly appreciated by all members of their Society. If a taste for good architecture could be formed in the minds of the majority of the citizens, then possibly the ruling authorities would be encouraged to give their consideration to all that tended to improve our environment. In the matter of environment it had always been a cause of considerable annoyance to him to note that, after the authorities had spent thousands of pounds in street improvements, it should be within the power of the landowner to erect his building thereon with just so little consideration for architectural treatment, and no more, as would enable him to secure a desirable tenant, or it might be that the principal object he had in view was to catch the eye of the passer-by. In that he was too often successful in inflicting on a man of taste a severe shock by the vulgarity and lack of refinement of the building. Our principal thoroughfares in country as well as in town were terribly robbed of any charms they might possess by the necessity of the present overhead system of tram traction. While not expressing an opinion on the various methods of electric traction, he would say that those towns where other methods had been adopted had artistically done a wise thing. It would be a pleasure to many to learn that the small plot of land in Victoria-street, at the bottom of Cateaton-street, had been retained as an open space. There would then be secured to the public an interest in the old Hanging Bridge, and a valuable view of the cathedral from the lower end of Deansgate would be retained. A matter which affected the community at large was the strong trend of the present-day practitioner towards erecting our city buildings in permanent coloured materials. Was it too much to hope that the neglect of and indifference to the advantages of colour in the external treatment of our buildings by some of our practising architects would soon be a thing of the past? He suggested, in order to secure for the benefit of the citizen a higher ideal in the artistic treatment of the city, that a small qualified advisory committee should be appointed, to whom should be referred all matters of an artistic character.—*Manchester Guardian*.

## Fifty Years Ago.

FROM THE *Builder* OF OCTOBER 20, 1855.

## LONDON DRAINAGE OF THE PERIOD.

The evidence of connexion between the well-water and the loss of life seems so conclusive as scarcely to admit a doubt; and the question that at once arises is, what was the position of the well and the condition of the water? On this point we have the report of a practical man, and well-known inhabitant of the parish. Mr. Jeht, York.

What do we find? The well adjoins the vault of No. 40, Broad-street; through this vault proceeded the main drain of the house, constructed on the old plan of a flat bottom, 12 in. wide, with brick sides, about 12 in. high, and covered with old stone. There was a deposit of soil about 2 in. thick in the drain, and on clearing this away the whole was found to be in the condition of a sieve, through which the house-drainage must have percolated a considerable time. In the front area there was a common open convenience, with a cesspool 3 ft. deep, intended for a trap, but misconstrued, and fully charged with soil. "Upon removing the soil, the brickwork of the cesspool was found to be in the same decayed condition as the drain, and which may be better comprehended by stating that the bricks were easily lifted from their beds without any the least force; so that any fluid could readily pass through the work, or, as was the case when first opened, over the top course of bricks of the trap into the earth, or made ground immediately under and adjoining the end wall eastward, this surface-drainage being caused by the accumulation of soil in, and the misconstruction of,

the cesspool, which was intended to prevent effluvia and vermin coming into the house from the main sewer in the street, but which, in fact, it facilitated rather than prevented. And its effect was to force the drainage fluid-matter into the parish well, by preventing it from running down the current of the house drain. To place the matter beyond a doubt, Mr. York had two spaces of the brick steining, 2 sq. ft. each, taken out, and the ground dug out between the cesspool and the well, when its black, saturated, and swampy condition, clearly demonstrated the fact.

Without reference to the assertion that matter from a choleraic patient who early died in the house thus found its way into the well, or the theory which this would materially strengthen, we have here a state of things prejudicial to health in the highest degree, and which, nevertheless, may be paralleled, we do not hesitate to say, in hundreds of places in the Metropolis. Shall we not take warning from past events?

## Illustrations.

## SCULPTURE RELIEF: "MINING."



HIS vigorous design in sculptural relief occupied a prominent place on the wall of the Lecture-room at the last Academy Exhibition.

The panel represents the interior of a gallery in a mine, and is one of a series of panels which are to be placed on the staircase leading to the Ball room in the Grosvenor Restaurant at Glasgow.

Mr. Albert H. Hodge is the sculptor. Another of the panels of the same series, entitled "Science and Art," is illustrated in our issue of September 24, 1904.

## MEMORIAL TO THE LATE H. A. HUNT.

THIS is a memorial to the late Mr. H. A. Hunt, the eminent surveyor, designed and modelled by Mr. F. E. E. Schenck, who sends us the following notes on his work.

"The design of this memorial is in the style of the French XVIIIth century, and illustrates the chief interests in the life of the late Mr. Hunt. In the centre is a medallion portrait; his great interest in the Church is symbolised by the cross in gold, and the patron saint of his particular church (St. Margaret) in the niche above.

The two spandrels in low relief illustrate, on the left, teaching, and on the right, his profession, surveying. The seated figure below in high relief represents literature, thus symbolising his great interest in education. The two coats of arms in colour are those of Mr. Hunt and the City of Westminster. The insignia of the Freemasons denote his connexion with that order.

The figures are in bronze, and the frame is in oak, and has been placed in the board-room of the Westminster School, 53, Palace-street."

We may observe that Mr. Schenck has taken what we think is in nearly all cases the best course in a personal monument—he has avoided the aesthetic difficulty of the realistic figure in modern dress, which has been a stumbling-block to so many sculptors; and confined the portraiture to a head only in a medallion, filling up the remainder of the sculpturesque design with symbolical figures and emblems.

## WORKS BY MR. R. S. LORIMER, A.R.S.A.

The illustration is from a series of photographs sent to us by Mr. Lorimer, four of which refer to one work, "Pit-Kerro," an old house recently altered and to some extent restored.

The illustration lettered "A" shows the Entrance Lodge, Pit-Kerro. "B" is the view of the house from the garden. "C" is the door to the chapel. "E" is the Kirkcaldy old tower as restored.

"D" is the South Aisle at W. M. erected at Alloa. The "A.R.I.B.A." after the name on the plate is correct, but we should also have added "A.R.S.A." Mr. Lorimer being an Associate of the Royal Scottish Academy.



Mr. Lorimer sends us the following notes on the work:—

**"PIT-KERRO, FORFARSHIRE.**

The original house of Pit-Kerro consisted of an oblong, with stair turret at the back, as shown restored at E. About seventy years ago the house was brought into line with the taste of the period by having the steep roofs and upper part of the angle turrets demolished.

The house was then covered with a low-pitched roof, with the upper windows below the wall head. The floor levels were also amended with. The pediments of the original dormer windows were found broken up and built into the modern wall head.

A few years ago this roof was removed and the walls taken down to about the level of the corbelling of the turrets. The upper portion was then built, and the house otherwise added to, as shown.

The chapel, the door of which is shown in the illustration 'C,' is approached from the ground floor corridor. Advantage was taken of a fall in the ground to sink the chapel floor some 5 ft., thus gaining considerable height in the ceiling. The figure over the door is of wood, painted and gilded, and was executed by Messrs. Clow, of Edinburgh.

A shows the new entrance lodge, etc., of Pit-Kerro. The ironwork was made by Mr. Thomas Hadden, of Edinburgh.

**SOUTH AFRICAN WAR MEMORIAL, ALLOA.**

D shows a war memorial recently erected at Alloa. The group was modelled and carved by Mr. Birnie-Rhind, R.S.A., and the whole monument executed in Prudham stone.

**ST. MARTIN'S CHURCH, WORCESTER.**

The illustration shows the exterior view from the south-east of the proposed new Church of St. Martin's, Worcester. The main object of the design has been to get a lofty and effective building that would accommodate about 900 adults at a very reasonable cost, and to trust to the general grouping of proportion, rather than to detail, for effect.

The general form of the plan is a nave, 93 ft. long by 51 ft. wide, divided into five bays. Broad processional passages are placed on either side, leading into the north and south transepts, that on the south side terminating into an apsidal-ended chapel. A broad stone staircase leads from the north side of the chancel into the basement, where, taking advantage of a fall in the ground, extensive clergy and choir vestries and a large parish room have been formed under the north chancel. The organ-chamber is placed on the north side, and a good-sized vestry is provided conveniently close to the chancel.

The baptistry is at the west end of the nave, and is flanked on either side by a porch, over the whole of which is formed a small western gallery, which extends the whole width of the nave, and to which access is gained by two turret staircases, one on either side. Externally these turrets are carried up the whole height of the building.

The chancel is 42 ft. long by 27 ft. wide, with an altar raised nine steps from the nave floor level.

The roof, which is carried at one level throughout the nave and chancel, is of barrel form, with the addition of a coved cornice for future decoration.

One of the main features of the design is the tower, which is placed almost centrally on the south side of the church, the principal entrance being formed in the base.

The materials intended to be used are hammer-dressed local stone facing, laid in Roman courses externally, and local red stone facings internally, the dressings being of Doulton stone.

Geo. H. FELLOWES PRYNNE.

**SHOPS IN A PROVINCIAL TOWN.**

This drawing, which was hung in the F.S.A. Academy Exhibition of this year, shows a perspective view of two shops which are to be erected in a provincial town upon the reposition by the owner of certain land about to expire.

A plan was sent to us by the architect, but too late for publication.

The architect's aim has been to meet the demands of modern shopkeepers for extensive window space by such constructional methods as should express themselves, and should impart a simplicity and directness to the treatment of the design.

Increased area of shop front is gained by the introduction of bays, which also lend themselves to the grouping of the several classes of goods offered for sale in more effective display than is commonly attained by the haphazard commingling of various descriptions of articles behind a single sheet of glass in one plane.

The stonework is to be Portland stone, the woodwork teak, and the windows filled in with lead glazing, in teak-wood and wrought-iron frames, excepting the shop front, which is to be filled in with plate-glass, in teak-wood framing.

Spaces are arranged in the construction of the building for notifying the names and businesses of the shopkeepers, to be formed in mosaic; and these panels, it is hoped, will impart a decorative effect to the construction of the building, and take the place of the more usual signboard after-thoughts.

The floors and roof are to be formed with steel joists and concrete, the former covered with wood-block paving, and the latter with vulcanite.

The estimated cost of the building is 3,514*l.* T. MYDDELTON SHALLCROSS.

**DESIGN FOR HOUSE, No. 68, SLOANE-STREET.**

This design, by Mr. E. W. Filkins, which was exhibited at the last Royal Academy, shows the front of an intended rebuilding of a house at No. 68, Sloane-street. The plans were all made, at an estimated cost of 7,000*l.*; but owing to legal difficulties the scheme fell through.

The elevation was to be in red brick with Portland stone dressings, the roof being covered with green Westmorland slates.

The front is a pleasing piece of simple street architecture, not without a character of its own.

**COMPETITION.**

DRILL HALL, BURY, LANCs.—In the recent competition among architects for the erection of a new drill hall at Bury the following awards have been made, viz.: First premium, Mr. A. Hopkinson, Bury; second, Mr. G. H. Willoughby, F.R.I.B.A., Manchester. The estimated outlay will be about 10,000*l.*

**Books.**

*Waverley Abbey.* By HAROLD BRAKSPEAR, F.S.A. (Guildford: The Surrey Archaeological Society, 1905.)

This most interesting and valuable contribution to our knowledge of the planning and arrangement of a Cistercian monastery is the outcome of four years' patient digging and measuring, and interspersed among the pages of descriptive notes are a large number of photographs and plans. A complete plan of the whole of the buildings of the monastery, so far as any traces have been found, coloured to show the differences in date of the various parts, is inserted in a pocket at the end of the book, and is in itself a sufficient proof of the amount of care, time, and labour that has been expended upon this work of exploration. The beautiful situation, and the picturesque ruins situated near the bank of the Wey a few miles south of Farnham, were known to many. It was not, however, until 1898 that steps were taken, with the kind co-operation of the owner of the land, to endeavour to trace the foundations of the church and monastery. This particular establishment derives a special interest from the fact that it was the first monastery of the Cistercian order built in England, an order that was subsequently to build some of the finest monastic churches in the country. The first church at Waverley, the foundations of which Mr. Brakspear has unearthed, was a building of the simplest possible character, a long and narrow nave, without aisles, a shallow presbytery, and transepts with a single chapel in each arm. A portion of the nave was occupied by the choir stalls and pulpitum. Surrounding the cloister (on the south side of the church) were the usual

conventual buildings, the frater having been apparently, in the first instance, parallel with the church, as it was at Cleve Abbey, in Somersetshire, when rebuilt in the Perpendicular period. In later years, the frater followed the almost universal arrangement and position of the Cistercian plan, and was placed at right angles with the church and with the cloister walk, from which it was approached.

In 1203 a new church was begun, and records in the "Annals of Waverley" have fortunately preserved details of the progress of the works. To enable the early church to be used for service until its grander successor was sufficiently advanced for consecration, the foundations of the new church were laid sufficiently far north and east to clear it almost entirely. The north wall of the old nave was to become the south wall of the new nave, or rather its aisle, and the only alteration necessary to the old church was a shortening of its presbytery, for the chapels, three in number, of the new south transept. This interesting example of enlargement is shown by Mr. Brakspear in a plan on page 22. In 1278 the new church "was hallowed in honour of the glorious Virgin Mary, Mother of God, by Dan Nicholas, of Ely, Bishop of Winchester." Hardly less interesting, and considerably more complicated, are the various alterations and additions that were made in the conventual buildings surrounding the cloister, and in other parts of the monastery within the precinct. All are carefully described by Mr. Brakspear, and we must refer our readers to his interesting descriptions and plans. The gable of the dorter still stands overlooking the Wey, and the vaulted Lay Brothers frater is still fairly perfect, and has an elegant vaulted roof. There is but little else now visible above ground, and the excavated portions have had to be filled in again. Excellent photographs, however, are given of the chief portions discovered, and these, together with the plans, and the very clear and concise descriptions will give the intending visitor a good idea of the former extent of the buildings, and also form a book of very considerable and permanent value to all interested in the preservation of a record of the planning of our monastic institutions.

*Southwark: The Cathedral and See.* By GEORGE WORLEY. (London: Geo. Bell & Sons, 1905.)

The new diocese of Southwark, having been formed out of portions of the existing dioceses of Rochester and Winchester, the fine Church of St. Saviour's, on the Surrey side of London Bridge, is now added to the list of our English cathedrals, and is the subject of the latest addition to Messrs. Bell's series. In 1540 the Priory, to which the church was attached, was dissolved, and in 1614 "the church was purchased" from James I. for the sum of 800*l.* The building was after this apparently allowed to get into a bad state of repair. The vaulted stone roof of the nave had already fallen in the second half of the XVth century, and had been replaced by one in oak. The Lady chapel had become a bakehouse, and, subsequently, a stable. Galleries were erected in the beginning of the XVIIth century. In 1838 the nave, or what remained of it, was taken down and rebuilt in brick, and this hideous structure remained until 1889, when it was removed to make way for the restoration of the nave by Sir Arthur Blomfield, the foundation-stone being laid by the Prince of Wales in July, 1890, and the building completed within seven years.

The details and points of interest have all been fully considered and described in the letterpress, an excellent ground-plan is given of the building, and numerous photographs of the building as it is, and reproductions of old engravings. In the foundations of the original nave, a plan of which was published in the *Builder*, April 11, 1891, the second pair of columns from the west are shown considerably larger than the others. The new nave has its columns of equal diameter, but the remainder of the new work has followed the lines of the old work as closely as was possible. Among the interesting illustrations are photographs of the wooden bosses from the old nave (now in the north transept), and of the arms of Cardinal Beaufort in the south transept.



**Cassell's Building Construction**; comprising notes on materials, processes, principles, and practice. By Professor HENRY ADAMS, M.Inst.C.E. (London: Cassell & Co.)

Messrs. CASSELL & Co. deal, as a rule, rather with popular than with scientific publications; but the name of Mr. Henry Adams as the author of this serial publication seems a guarantee that it is intended to be a work of scientific value; though, from the opening paragraph in which building construction is referred to as "a subject of universal interest," one may conclude that it is intended also for the general reader.

In the introductory notes it is pointed out that in the diagrams that will be used in the series a special form of sectional shading has been adopted and is to be adhered to, for each material presented: key specimens are given. This is a good idea, but not quite complete; it would surely have been possible to have invented two separate shadings for two such different materials as "brass and brickwork," and two separate ones for "steel and stone," instead of making one shading serve for both. This may be thought a trifling matter; only, when the system was adopted, why not make it complete? Professor Adams suggests that diagrams are more useful than small models in building construction classes; models to a small scale, he says, "show no more than a diagram can show, and are generally incorrect in some particulars, especially in the fastenings." This is quite true (the latter remark especially), yet we think they are of value as supplementary to diagrams, in enabling a student more fully to grasp the actual relation of parts.

The publication is in small "Parts," at 3d. each; we are not informed in how many Parts it is to be completed, a statement which should be (and generally is) given at the outset of a serial publication. The present portion deals in a very practical manner with the subject of "Timber used in building construction"; giving shipping marks, methods of conversion, directions for selection, diagrams of the most usual and important kinds of defect, and a great deal of other important rudimentary information stated with practical brevity and clearness. This is followed by a chapter, on the same plan, on "Iron and Steel used in building construction."

So far as one can judge from a single issue this seems likely to be a useful practical publication issued at a very low price. When it is complete we may have more to say of it.

**Odd Time Tables.** By H. W. ANDRAS, F.I.A., Actuary to the Provident Life Office. (London: C. & E. Layton.)

THESE tables show the number of odd weeks and days from any date to the next quarter-day, and the proportion of yearly amounts for the odd time. The tables are two, one for weeks and one for days, giving the proportional fractional of small sums per year, beginning at 6d. and ending at 100d. Decimals of pence are given. The amounts are said to be "calculated by C. & E. Layton's improved arithmometer," but we presume that Mr. Andras's name and position count for part of the claim on the reader's confidence. The tables are likely to be very useful to those who have to deal largely in payments for odd periods, and are also useful for calculating insurance premiums.

#### BOOK RECEIVED.

**GARDEN CITY AND AGRICULTURE.** By Thomas Adams. (Simpkin, Marshall, & Co. 1s.)

**COMPENSATION AWARD, CHARING CROSS-ROAD, W.C.**—As umpire in the case of "the Marquis of Salisbury v. the Charing Cross, Euston, and Hampstead Railway Company," Mr. E. H. Bousfield (of Messrs. Edwin Fox & Bousfield) has made an award of 11,070l. in respect of a compulsory sale of Nos. 42-4-6, Charing Cross-road, for a station of the new tube railway near Cranbourn-street. The valuations ranged from about 7,300l. to 15,000l., and Mr. B. P. Anson Breach and Mr. L. R. Vigers acted as arbitrators for the claimant and the company respectively. Mr. Pilditch, surveyor to Lord Salisbury's property in London, Mr. James Green, and Mr. Rowden acted as experts for the claimant.

#### TRADE CATALOGUES.

THE Leeds Fireclay Company send us a handsome album showing views of the interiors in Messrs. Waterhouse & Sons' large and well-known building for the Prudential Assurance Company in Holborn. The Burmantofts faience appears to have been used almost throughout the interior of this large building; and the series of photographs show how it can be used both for a permanent and washable interior decoration, and for forming a clean and bright lining to such situations as corridors, stairs, engine-rooms, etc. We are not sure that this is not its most valuable application, for the facility for producing elaborate architectural ornament in this material has been carried, in this as in other instances, rather too far; while to obtain a permanent and durable clean wall-surface in a room for practical purposes (with some massing of plain colour if desired) is an advantage of which no one can have any doubt. The album is, however, an interesting souvenir of what is in many ways a remarkable building, and the photographs convey the idea that the work has been carried out in a most careful and finished manner.

We have received from Falk, Stadelmann, & Co., of Farringdon-road, London, a catalogue of the "Aureola" Luminous Electrical Radiators. The special feature of these radiators is the highly-burnished copper reflector. This reflector is easily kept bright and clean by means of a dry cloth. The large radiators have two switches, so that the heat can be regulated. Where electric power can be had cheaply this method of heating can be advantageously employed. The freedom from dust has a distinct hygienic value, and the decorations and furniture keep clean much longer than when coal fires are used.

We have received from A. P. Lundberg, of Liverpool-road, London, a catalogue of electrical accessories. The catalogue is a most interesting one, as many novelties are described. A clear description is given of the system of intermediate wiring, and the proper method of installing it is pointed out. The duplex tumbler switch for controlling a two-filament lamp, or for changing over to another circuit, should prove useful. We can recommend the catalogue to all interested in house wiring.

Messrs. John Bryden & Sons send us a neat little catalogue in which particulars and prices are given of dinner service, luggage, and goods lifts of simple design for hand operation. The writer of this price list has not attempted to turn it into a scientific treatise of persuasive character. On the contrary, he has stuck closely to business, and gives nothing more than the practical details which are likely to be appreciated by busy professional men and intending purchasers.

#### Correspondence.

##### THE CHEAP COTTAGE.

SIR,—There has been of late a very considerable amount of both correspondence and review on the subject of workmen's cottages, and especially on the so-called "cheap" 150l. kind; but to infer, as some have done, that architects have not keenly studied the subject before is quite at variance with the evidence of the many drawings and descriptions published in the professional journals during the last forty years. The old axiom that what costs nothing is worth nothing is true of this matter as of many others, and "cheap" things as a rule are generally "nasty," more or less. There is very little novelty in either the plans or elevations of those at Letchworth, excellent though many of them undoubtedly are, and it is to be hoped that the scheme which has produced them may pave the way not only for further development, but also for an arrival at some tangible agreement with local governing bodies, which seem to block the way at present to what has become an urgent public necessity. This difficulty seems to be non-existent at Letchworth.

The limit of 150l. is indeed low if available anywhere and everywhere, which does not thus far appear to be proven. In my own experience that amount has been quoted as a constant in a neighbourhood where cost of bricks, haulage, etc., makes it an im-

possibility, and in simple cottages, too, it can be borne in mind. What an enormous amount of work is done at an, in any place. Experience is a factor that cannot be neglected, and the fact that so few names of our best men are concerned about it goes to show that no one is prepared to attempt to work miracles in the matter. Surely the true cheap cottage is one that is convenient and comfortable to live in, and water-proof, pleasing without being pretentious, and the cost of upkeep as small as possible. It is to be added due consideration of the future prospect and health of the occupant, and the little things.

Sacrifice must be made of what is returned to and retention of the farm labourer on the land is ever to be brought about. This is well worthy the efforts of the profession, and I do not think they are unimpaired of it or, under reasonable conditions, either unable or unwilling to cope with it.

I fail to see a reason for whitewashing a brick building externally; it cannot make it warmer, drier, more beautiful, more durable, or more truthful, and must occasionally require to be done again, and that costs money.

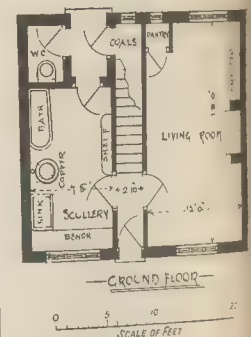
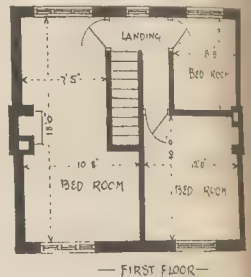
E. SWINFEN HARRIS, F.R.I.B.A.

##### GARDEN CITY PRIZE COTTAGE.

SIR,—With reference to the successful design for the 150l. cottage for the above, published in your issue of the 23rd ult., I venture to think that this excellent design could be improved and made still more valuable, and I take the liberty of enclosing herewith a sketch plan showing my suggestions. These you will consider consist of the following:—

The lobby leading into the living-room is dispensed with, and the entrance to the cottage is arranged in the orthodox way.

The pantry or larder is placed in the bridge.



room, as I consider it would be more convenient than in the scullery.

A portable copper is shown in place of the brick-enclosed one, with the fire for same out at a height of 4 ft. 6 in. from the ground, and a sink at 4 ft. 6 in. and could be put into the bath.

The rearrangement of the plan carries out the largest of the three, and is suitable for a family of four, and is made into a more comfortable family purposes.



As the expense of the lobby is avoided, and straight stairs are used in place of winders, there would be a saving in these two items, which would pay for the bath, and therefore the cottage could be built at the same cost as in the original design.

I trust these suggestions may be of some value in helping forward a solution of this very important question.

ERNEST FERRY.

#### HOVE LIBRARY COMPETITION.

Fig.—I am sure everyone connected with this competition is indebted to you for making public the peculiar and unsatisfactory turn events have taken in connexion with it.

It seems to me the assessor rather lost sight of the fact that there are degrees of excellence in these matters, and a competition of this size is not likely to attract the leaders of the profession. Among seventy competitors there must be some fair designs at least, to put it at the lowest estimate, and considering the amount of labour and expense (the latter must reach several hundreds of pounds) these designs represent, they seem very hard and churlish to withhold the premiums.

Competitions very properly are the means amongst other things of bringing young members to the profession to the front, and their efforts in this case cannot surely be such utter rubbish as not to deserve some acknowledgment and encouragement. There was no onus on the Hove Corporation to carry out any of the designs, only to award the premiums.

The result is very unsatisfactory to the Hove Corporation, as after much time and expense has been given to the affair they have no designs they can appropriate. It also discredits the Institute in the eyes of the public. The Hove Corporation issued excellent conditions in accordance with the Institute regulations; so far as I know they did all they ought to do, and in a satisfactory manner. They have gone to the President himself for an award, and the upshot of the whole thing is a fiasco. I was reading the other day of a similar case.

Everyone admits the Institute has done a very great deal to improve competitions, and no one can reasonably object to their conducting them when placed in their hands in the way they think best. But I submit it is unreasonable and miserable to render a competition null and void because the assessor happens to be at the tip-top of the profession (may I say, most cheerfully so), and does not think the designs are the very best that can be produced.

Considering the very singular and unprecedented nature of the award, surely the least that can be done is to provide each competitor with a copy of the assessor's report and to publicly exhibit the designs, as promised in the conditions. I trust Mr. Belcher will see his way to have this done; competitors look to him for assistance.

ANOTHER COMPETITOR.

#### AYLESBURY ELEMENTARY SCHOOLS COMPETITION.

Fig.—The letter in your last issue referring to the Aylesbury Schools Competition raises a point of great importance. When an assessor has been appointed by the President of the R.I.B.A., competitors ought at least to feel confident that the design selected will be the one which fulfils most closely the conditions set down by the promoters. Unfortunately they cannot do so. The Aylesbury case is not an isolated one. The Rochester Technical Institute Competition was assessed in a similar manner. Surely it is the first duty of an assessor to state that the conditions of the competition are fulfilled in the design sent in, and, other things being equal, to give the preference to designs which show a reasonable prospect of being executed for the sum allowed.

The Institute Council must see that more care is exercised in the appointment of assessors, or that better experience will soon teach promoters of competitions not to be so rash as to bind themselves to accept their awards.

ANOTHER A.R.T.B.A.

#### METROPOLITAN ASYLUMS BOARD.

The following fortnightly meeting of the managers of the Metropolitan Asylums Board was held on Saturday last week at the offices of the Board, Victoria Embankment, E.C.

**Southern Hospital.**—Among the correspondence read was a letter from the Local Government Board with regard to a proposal to provide accommodation for coal and coke at the Southern Hospital at a cost of £500, stating that so elaborate a building should not be necessary. The matter was referred to the Works Committee.

The Local Government Board also wrote regarding the following works—Alterations to the Asylum; provision of fire exits at South Western and Eastern Hospitals; and the re-erecting of boilers at the Park Hospital.

**St. Mary's Asylum.**—The Works Committee reported that Messrs. Bromley & Batstone had satisfactorily completed their contract for electric

wiring, fire-alarms, etc., at this asylum, at a total cost of 2,383l. 2s. 1d., the contract having been for 2,444l., the extras including the wiring of the chapel, boiler-house, and laundry. The Committee submitted an estimate, arrived at by Messrs. Thomas Dinwiddie & Sons, of 200l. for the erection of a porter's lodge at the asylum.

**Joyce Green Hospital.**—Having failed to find a varnish capable of resisting sulphur fumes, the Committee reported that they had authorised the omission of the internal varnishing from the contract of Mr. W. J. Simms & Sons for cleaning and painting works at this hospital.

**South Eastern Hospital.**—The Committee reported having approved a plan, prepared by Messrs. T. W. Aldwinckle & Sons, for additional coal storage and a pump and heater room at this hospital. It was agreed to provide a tramroad for heavy traffic at the hospital, at a cost of £500.

## The Student's Column.

### STEAM BOILERS AND PIPES.—XVI.

CHIMNEYS (continued).

IN the formula given last week we have a set of simple and convenient rules giving results that are approximately correct for chimneys connected with boiler flues of moderate length and used under almost any conditions, apart from those arising out of mismanagement of the boiler or faulty construction of the boiler setting and main flue. Examination of formula (16) will show that in any given installation the only possible cause of variation in the theoretical velocity of the cold air and of the hot gases is to be found in differences of temperature. This is demonstrated by the cases stated below, where the values have been calculated from the densities given in Table XVII.

(a) Reduction of the external temperature improves the draught if the internal temperature remains unaltered.

Example (15).—

Outer Chimney	(D - d)	√(D - d)	(D)
Air.	(D)	(D)	(d)
Deg. F.	Deg. F.		
62	600	0.507	0.712 2.022
32	600	0.535	0.731 2.168

(b) Reduction of the external temperature accompanied by reduction of the internal temperature impairs the draught unless the temperature of the atmosphere is reduced proportionately to that of the chimney gases.

Example (16).—

Outer Chimney	(D - d)	√(D - d)	(D)
Air.	(D)	(D)	(d)
Deg. F.	Deg. F.		
62	600	0.507	0.712 2.028
32	500	0.487	0.697 1.949

(c) Increase of the external temperature unaccompanied by increase of the internal temperature reduces the draught, but it must be remembered that in many establishments the demand for steam is far less in hot than in cold weather, and where this happens the reduction in the draught power is of comparatively little importance.

Example (17).—

Outer Chimney	(D - d)	√(D - d)	(D)
Air.	(D)	(D)	(d)
Deg. F.	Deg. F.		
62	600	0.507	0.712 2.028
92	600	0.479	0.692 1.918

As already pointed out, the effect of the variations caused by differences of temperature is still smaller upon the velocity of the hot gases in the chimney than upon the head.

Example (18).—Applying the figures in Example (16) to a chimney 100 ft. high, we have the following results by formulae (9) and (23).—

Head in inches of water.

For 62 deg. and 600 deg.

$h_0 = 100 (0.507 \times 0.01466) = 0.743$  in.

For 32 deg. and 500 deg.

$h_0 = 100 (0.487 \times 0.01466) = 0.714$  in.

Theoretical velocity in feet per second.

For 62 deg. and 600 deg.

$v = 66.1 \sqrt{0.743 \times (2.028)} = 115$  ft. per sec.

For 32 deg. and 500 deg.

$v = 66.1 \sqrt{0.714 \times (1.949)} = 109$  ft. per sec.

As the actual velocities would be about one-fifth of these values, the difference is little more than 1 ft. per second, probably

less than the differences of velocity that might be expected to result from daily variations of the atmospheric conditions.

From the foregoing examples it is clear that so far as ordinary working is concerned general rules such as formulae (35) to (39) may safely be used for the design of chimneys. If the boiler flues are beyond the average length, or otherwise present more than the average resistance to the flow of the gases, special calculations should be made. The same course may also be followed when the flues are exceptionally short and present very little resistance to the flow of the gases.

The present is a suitable place to inquire into the effect of applying an economiser at the foot of a chimney, thereby reducing the internal temperature from, say, 600 deg. to 350 deg.

Example (19).—We will assume the economiser is to be applied to a chimney, 100 ft. high, connected with a boiler in which 900 lb. of coal are burned per hour. For the purpose of comparison, the practical velocities may be computed by formula (27), substituting therein the theoretical velocities for 600 deg. and 350 deg. as given in Table XXII.

Thus we get

For gases at 600 deg.

$v_0 = 115.8 \times 0.2 = 23.16$  ft. per sec.

For gases at 350 deg.

$v_0 = 74 \times 0.2 = 14.8$  ft. per sec.

These figures show that the actual velocity is reduced by 8.36 ft. per second, but against this we have compensation from two distinct sources.

In the first place, the coal consumption should be considerably reduced. Let us take the saving at 20 per cent., leaving the net consumption at  $900 \times (1 - 0.2) = 720$  lb. per hour. This means that the air supply will be proportionately reduced. Taking the quantity at 24 lb. per pound of coal, we have only  $(720 \times 24) = 17,280$  lb. per hour with the economiser, instead of  $(900 \times 24) = 21,600$  lb. per hour without the economiser.

In the second place, the volume of the hot gases will be reduced with the temperature from 640 cubic ft. to 489 cubic ft. per pound of coal.

Consequently the total volume to be carried away by the chimney is  $(728 \times 489) = 356,000$  cubic ft. per hour with the economiser, instead of  $(900 \times 640) = 576,000$  cubic ft. per hour without the economiser, or 98 cubic ft. per second in one case and 160 cubic ft. per second in the other.

Assuming the internal diameter of the chimney to be 3 ft., with a corresponding area of, say, 7 sq. ft., the velocity actually required will be  $(98 \div 7) = 14$  ft. per second or 0.8 ft. less than the velocity which we have already seen the chimney is capable of providing.

Without the economiser the required velocity is  $(160 \div 7) = 22.86$  ft. per second or 0.3 ft. less than that actually given by the chimney.

The net upshot of these figures is to show that, instead of reducing the efficiency of the chimney for carrying away the gases from the boiler, the application of the economiser may actually result in a slight improvement.

Of course, some extra friction is caused by the presence of the economiser in the main flue, but this is more than counterbalanced by the general reduction of friction through the whole chimney and flue system owing to the lower velocity of the gases.

We now see that for ordinary use sufficiently exact guidance is afforded by the four equations

$$(35) A = \frac{C \times 0.08}{\sqrt{H}} = \text{area for a given coal consumption and chimney height.}$$

$$(37) H = \left( \frac{C \times 0.08}{A} \right)^2 = \text{height for a given coal consumption and chimney area.}$$

$$(38) v_0 = \frac{C \times 0.18}{A} = \text{velocity for a given coal consumption and chimney area.}$$

$$(39) C = \frac{A \times \sqrt{H}}{0.08} = \text{coal consumption for a given chimney area and height.}$$

Table XXIV. has been calculated by these rules, and the following examples will show the convenience of the table to the architect or engineer who has to design new chimneys or to decide upon the suitability of existing chimneys for duties greater than those for which they were originally intended.



TABLE XXIV.—THE PROPORTIONS AND CAPACITY OF CHIMNEYS. TEMPERATURES OF THE HOT GASES AND OF THE EXTERNAL AIR 585 DEG. AND 62 DEG. F., THE LENGTH OF THE BOILER FLUES EQUAL TO THE HEIGHT OF THE CHIMNEY, AND THE AIR SUPPLY ABOUT 23 LB. PER POUND OF COAL.

Height of Chimney.	Practical Velocity.	Coal per sq. ft. of Area at Chimney Top.	Area of Chimney Top per lb. of Coal.	
$H = \left( \frac{C \times 0.08}{A} \right)^2$	$V_s = \left( \frac{C \times 0.18}{A} \right)$	$C = \left( \frac{A \sqrt{H}}{0.08} \right)$	$A = \left( \frac{C \times 0.08}{\sqrt{H}} \right)$	$A_1 = \left( \frac{C \times 0.08 \times 144}{\sqrt{H}} \right)$
ft.	ft. per sec.	lb. per hour.	sq. ft.	sq. in.
10	7.11	39.53	0.0253	3.643
15	8.54	48.40	0.0206	2.975
20	10.06	55.90	0.0178	2.576
25	11.24	62.50	0.0160	2.304
30	12.32	68.47	0.0146	2.103
35	13.31	73.96	0.0135	1.947
40	14.23	79.06	0.0126	1.821
45	15.09	83.66	0.0120	1.717
50	15.91	88.41	0.0113	1.629
55	16.68	92.70	0.0107	1.553
60	17.42	96.81	0.0103	1.487
65	18.13	100.78	0.0100	1.429
70	18.82	104.58	0.0095	1.377
75	19.48	108.25	0.0092	1.330
80	20.12	111.80	0.0090	1.288
85	20.74	115.24	0.0086	1.249
90	21.34	118.60	0.0084	1.214
95	21.93	121.83	0.0082	1.182
100	22.50	125.00	0.0080	1.152
105	23.04	128.01	0.0078	1.124
110	23.56	131.01	0.0076	1.094
115	24.12	134.02	0.0074	1.074
120	24.64	136.98	0.0073	1.053
125	25.15	139.76	0.0071	1.032
130	25.65	142.52	0.0070	1.010
135	26.10	145.14	0.0068	0.992
140	26.62	147.90	0.0067	0.973
145	27.09	150.51	0.0066	0.956
150	27.54	153.03	0.0065	0.941
155	27.90	155.50	0.0064	0.929
160	28.44	158.00	0.0063	0.911
165	28.80	160.52	0.0062	0.897
170	29.32	162.90	0.0061	0.884
175	29.74	165.25	0.0060	0.871
180	30.17	167.64	0.0059	0.858
185	30.60	170.02	0.0058	0.849
190	31.00	172.27	0.0058	0.836
195	31.41	174.52	0.0057	0.825
200	31.82	176.76	0.0056	0.814

Example (20).—A chimney is required for a Lancashire boiler, 24 ft. long by 7 ft. diameter, having a grate area of 30 sq. ft., and in which it is intended to burn 14 lb. of coal per hour per square foot of grate. The height of the chimney must not be less than 80 ft., this dimension being fixed by the by-laws of the local authorities in the district where the chimney is to be built. See if this height will be sufficient, and find the necessary area of the chimney.

The coal consumption is  $(30 \times 14) = 420$  lb. per hour. As a trial the minimum height of 80 ft. may be taken to represent that of the chimney. Opposite 80 ft. in Table XXIV. we find in column 4 that each pound of coal consumed requires a chimney area of 0.009 sq. ft. Hence, to burn 420 lb. of coal per hour the area of a chimney 80 ft. high must be  $(420 \times 0.009) = 3.78$  sq. ft. This being a suitable area for the height, the diameter of the chimney top will be  $\sqrt{3.78 \div 0.7854} = 2.2$  ft., say, 2 ft. 3 in.

Example (21).—Assume that three 24-ft. by 7 ft. Lancashire boilers are to be installed instead of one, as in the preceding example, and that two of these boilers will be in regular service at the same time.

Proceeding as before, we find the area for an 80 ft. chimney would be  $(30 \times 14 \times 2) \times 0.009 = 7.56$  sq. ft. This area represents a diameter of  $\sqrt{7.56 \div 0.7854} = 3.1$  ft., say, 3 ft. 3 in.

If preferred, the chimney might be made 90 ft. high, the area would then be  $(30 \times 14 \times 2) \times 0.0084 = 7.056$  sq. ft., and the diameter  $\sqrt{7.056 \div 0.7854} = 3$  ft.

Example (22).—Required the possible coal consumption for a chimney 150 ft. high measuring 4 ft. square at the top.

By Table XXIV. each square foot of area is capable of carrying away the gases from 153.03 lb. of coal per hour, and, as the actual area is 16 sq. ft., the capacity of the chimney is  $153.03 \times 16 = 2,448$  lb. of coal per hour.

Example (23).—Required the velocity necessary to carry away the products of combustion from 600 lb. of coal per hour, the internal diameter of the chimney being 2 ft. 6 in. and the area 4.9 sq. ft.—say, 5 sq. ft.

The duty of each square foot of area is  $(600 \div 5) = 120$  lb. This is very little less than the value of 121.83 in column 3 of Table XXIV, and the required velocity may be taken at 22 ft. per second. Under

average working conditions this will be given by a chimney 95 ft. high, but in special cases the practical velocity should be calculated by formula (24).

Example (24).—An architect is commissioned to build a new wing for an infirmary, to increase the existing heating system by 2,000 sq. ft. of radiation surface, to increase the existing hot water supplies by 250 gals. per hour, and to provide for an electric light installation of 8,000 candle-power.

The existing boiler plant includes two 30-ft. by 7-ft. 6-in. Lancashire boilers, each having a grate area of 37.5 sq. ft., in which the coal consumption is about 14 lb. per square foot, and, as only one boiler is employed at a time, the total coal consumption is  $(37.5 \times 14) = 525$  lb. per hour. To provide sufficient steam for the new apparatus it is necessary to lay down a third boiler, so that two boilers may always be in operation.

The existing chimney is 100 ft. high, with an internal diameter at the top of 3 ft., the area being, say, 7 sq. ft. Examination of Table XXIV. shows that this chimney is capable of dealing with  $(125 \times 7) = 875$  lb. of coal per hour. It has to be ascertained, however, whether it will suffice for the coal consumption necessitated by the further apparatus contemplated, in addition to the existing consumption.

Let us say that an approximate estimate gives 3,100 lb. as the quantity of steam required per hour for the new plant.

Then, taking the evaporative duty of the new boiler at 8 lb. of water per pound of coal, we have  $(3,100 \div 8) = 387$  lb. of coal per hour, or, adding a margin of one-third for contingencies, say, 500 lb. of coal per hour.

Adding this to 525 lb. already burned per hour, the total consumption is 1,025 lb. per hour, or  $(1,025 \div 7) = 146.4$  lb. per square foot of chimney area.

Table XXIV. shows that the height of the chimney ought to be increased to a little more than 135 ft., and, if this should prove to be inadvisable for structural reasons, it will be necessary to have recourse to mechanical draught, in order to carry away the products of combustion when the boilers are working at their full capacity.

CHURCH OF ST. GEORGE, HORNSEY.—Mr. J. S. Alder has prepared the plans and designs of a new church in Priory-road, to contain 700 sittings, for the erection of which a fund has been opened

## GENERAL BUILDING.

ROMAN CATHOLIC CHURCH.—A new Roman Catholic church has just been opened at Ashington. It is situated on the main thoroughfare at the corner of the main Park-road, and is a brick building with windows and doors, 115 ft. long and 32 ft. in width, amounting to accommodation for 600 worshippers. It is provided with a side chapel and an organ loft, a cloister 12 ft. wide and 33 ft. long, a church with the processional way, an altar in the Gothic style, the carved work of Messrs. Bayaert & Son, of Brussels. The same firm supplied the altar and organ, and installation of one of the new positive organs by Messrs. Bowden & Co., Newcastle. The building, a feature of which is the design of couplings set on brackets which support the Messrs. R. & G. Brown, Amble, being the builders and contractors. The electric fittings were installed by the Northern Electric Co., Newcastle, and the heating accommodation being by Messrs. England Furnishing Co., of Darlington. The thousand pounds is the estimated cost of the church.

CATHOLIC CHURCH, MALVERN.—The Roman Catholic Bishop of Birmingham opened a church which has just been completed at Malvern, by the Order of Benedictines, next to a monastery. It has been built according to last designs prepared by the late Mr. Paul Pugin, the work being carried out under the direction of Mr. Sebastian Pugin Powell, who has about 7,000. The church is intended for about 300 people, and is dedicated to Our Lady and St. Edmund King and Martyr.

CHURCH, LONDON.—The Mayor of London recently opened a new church building, which have been erected from the designs of Messrs. Spalding & Spalding by Messrs. J. Jarvis & Co. The total sum required for the work is about 10,000.

CHURCH, CHILVELY, STOCKPORT.—On the 14th inst., the foundation-stone of the new church of St. John, at Whitehouse, Cheshire, was laid by Messrs. Huby & Cooper, Whaley Bridge, architects, and Mr. C. W. Johnson, the contractor for the work.

CHURCH RESTORATION, HEADFORD.—The opening after restoration of the south aisle and ancient chantry in the old Parish Church of Headford and the dedication of a new altar, glass window in the nave took place a few days ago. The work was carried out under the supervision of Mr. Bodley, architect, Messrs. Franklin, of Oxford.

ST. NICHOLAS, CARLISLE.—The Bishop of Winchester recently re-opened and dedicated the ancient chapel of St. Nicholas, Carlisle, Castle, Isle of Wight, which has been restored as a national memorial of the restoration of the activity of Charles I. within the castle. Mr. Percy Stone was the architect for the work.

CHURCH OF ST. EDWARD, LEYTON.—A church as a chapel-of-ease to the parish church, has been opened at a cost of 3,000, and is the site. Mr. G. E. S. Stratfield is the architect, and the church is a fine example of the style, with a nave and chancel, with a vestry which, with the area beneath it, can be seen with revolving shutters for parochial meetings with accommodation for 500 persons.

CHURCH, SLOUGH.—The memorial stone of a new church, to be known as St. Paul's, was laid at Slough recently. The church occupies a site of 10 acres, and is a fine example of the style, with a nave and chancel, with a vestry which, with the area beneath it, can be seen with revolving shutters for parochial meetings with accommodation for 500 persons.

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will space as it is intended eventually to colour, and these will be finished with cement. The roof will be covered with dark red Brossley tiles. All the ceilings will be boarded, and in the main parts the whole of the timbering in wrought iron will be visible. The seats, which are arranged to accommodate 684 adults, are to be made of Canadian oak. Messrs. J. E. K. and J. P. Cutts, of London, are the architects who have designed the church, and under whose superintendence the contract is being carried out, at a cost of £3,271, by Mr. H. Flint, of High Wycombe. Mr. W. Howard is the farmer in charge of the work.

**NEW CHURCH, BEN RHYDDING.**—The digging of the foundations for this church was commenced in December last, and the church is now ready for consecration. At present the building consists of nave and chancel, with seating accommodation for 240, but when the extension of the nave and the front porch, which was laid out on Saturday last week, is completed there will be accommodation for 350. Mr. H. S. Chorley (Donson & Chorley, Leeds) is the architect. The structure is built of local stone, with random rubble. There is only one side aisle. The floor is of wood blocks, and the aisles are of black and white stone. The roof is of slate. Messrs. Dean, Puse, Biley, masons; Mr. T. Smith, Ilkley, carver; Mr. Fred Myers, Ben Rhydding, plumber; Mr. Messrs. Watson & Worsnop, Leeds, slaters. Mr. E. A. Bridge was clerk of the works.

**WESLEYAN CHURCH AND SCHOOLS, MIDDLETON.**—On the 11th inst. the Park Wesleyan Methodist Church and Schools in Linthorpe-road were opened. The church, which was built at a cost of £9,500, was formally opened. The new buildings are classic in style. The tower at the corner rises to a height of 80 ft., and the exterior is built with red pressed brick, covered with buff terra-cotta dressings. The church consists of nave and transepts, with recessed organ and choir, and a small gallery. The entrance is through a porch, which is the end of the church over the entrance. The seating capacity is for about 700 persons. Attached to the church are six vestries for the use of ministers, choir, and society classes. The ceiling of the church is paneled and enriched with fibrous plaster. The windows are glazed with leaded lights. The woodwork is pitch pine, with the exception of the rostrum, which is of American walnut. Next to the schoolroom with an entrance from Linthorpe-road is the millroom. Four classrooms are connected with the school. There are yet to be built an infants' schoolroom and six other vestries, making a total of fourteen vestries for the use of the church and school. The architects were Messrs. Morley & Son, of Bradford, and the contractors for the work were: Messrs. Bastiman Bros., brickwork; Messrs. J. and R. Muscull, slating; Messrs. L. Taylor & Sons, painters; fibrous plaster supplied by Messrs. Horne, of Sale; Messrs. Station Bros., joiner work; Mr. D. Patterson, masonry; Messrs. Baker Bros., plumbing, electric lighting, and heating; and the leaded lights were made by Mr. W. Blythe, of Ilkley.

**MEMORIAL CHURCH, BURSLEM.**—The foundation-stones of the new Woodall Memorial Church have just been laid in Melton-road, Burslem. The building will be erected according to the plans of Messrs. A. R. Wood & Son. The church will have a nave and side aisles, the nave being 63 ft. long and 33 ft. wide, and 32 ft. high, with a vaulted ceiling and separated from the aisles by arcades of stone columns and arches. At the front end of the nave a gallery will be placed, while at the opposite end accommodation will be found for the choir, and the pulpit will be situated at one corner of the nave. There will be two entrance porches, right and left of the gallery, with stone staircases leading to the main gallery. On the west side of the church there will be three vestries with lavatory accommodation. Internally, the church will be finished with stone dressing, the windows filled with stained glass, and the walls will be plastered. The ceilings of both the nave and aisles are of a simple form and groined up to the clerestory windows. The floors will be of wood blocks on concrete, and the floors of the porches and staircases will be of encaustic tiles. The choir end of the church will be raised above the nave floor 2 ft., and the nave floor itself will have a fall from the west towards the choir of 9 in. The seating will be open benching executed on unvarnished oak. The church will be heated by means of low-pressure hot water, and lighted by means of electricity. Features of the interior will be the large mullioned windows of the clerestory and the main gables, which are to be filled with stained glass. The accommodation will be as follows:—Nave, 250; choir, 135; choir, 60; gallery, 90; giving a total of 535. The front of the church will stand back 6 ft. from the road. It will be of red pressed brick with red Hollington stone dressings freely used in strings, mouldings, pilasters, and tracery. The tower is to be 12 ft. sq. and 60 ft. high. The main cornice, surmounted by a copper-clad dome. The large gable end of the nave will be clad with a stone tracery window. A bust of the late Mr. Woodall, to be executed by Mr. Stanley Thorogood, will occupy a position

in the front elevation of the church. Messrs. W. Grant & Sons are the contractors for the building, their tender being about 4,000l., and Messrs. W. & R. Mellor are supplying the stonework.

**PRIMITIVE METHODIST CHURCH, WEST HARTLEPOOL.**—The foundation-stones have just been laid of a Primitive Methodist church in West Hartlepool. The new church, which will face into Grange-road, will be of North Ormesby metallic red facing bricks, relieved with Stockton Stone Company's dressings. The church will accommodate on the ground floor and gallery about 650, and the buildings include all the necessary adjuncts to church and Sunday school work. Messrs. Harry Barnes and C. F. Burton, of West Hartlepool, are the architects, and Mr. E. M. Twiddle, contractor.

**METHODIST CHAPEL, HOPKINSTOWN.**—The foundation stones of the new Trinity English Calvinistic Methodist Church (Presbyterian Church of Wales), Hopkinstown, Pontypridd, were laid recently. The building, which is of native stone, dressed with Forest of Dean red sandstone, is estimated to cost 1,700l., and provides accommodation for 250 people, with a schoolroom in the basement of a side extension. Mr. Arthur L. Thomas, Pontypridd, is the architect, and Mr. Julien, Pontypridd, the builder.

**SCHOOLS, RHYMNEY VALLEY.**—Two new schools were opened by the Rhymney Valley School managers recently. The first, at New Tredegar, is 205 ft. long, and there is a mixed department for boys and girls, and a department for infants. Accommodation is provided for 350 boys and girls and 250 infants, making a total of 600, exclusive of the central halls. The heating throughout is by means of large open fireplaces. The buildings have been built by Mr. D. W. Davies, of Cardiff, at a cost of 10,000l., from plans prepared by Messrs. James & Morgan, architects, of Cardiff, who have been assisted in the superintendence by Mr. E. Evans, clerk of works, of Bargoed. The new infants' school at Cwmisfog is built on an elevated site, and is on the central hall system. It provides accommodation for 300 children, has five classrooms, each opening on to a central hall 75 ft. by 16 ft. The playground covers an area of 4,000 sq. yds. All the rooms are heated by open fireplaces, and ventilated by means of ceiling panels connected to extract ventilators in roof and fresh air inlet tubes. The contract was entrusted to Messrs. Lattey & Co., of Cardiff, at a cost of 6,000l., and carried out from designs prepared by Messrs. James & Morgan, architects, Cardiff. Mr. E. Evans, of Bargoed, was clerk of works.

**ROMAN CATHOLIC COLLEGE, LEEDS.**—The Collegiate School for Girls which has been raised by the Sisters of Notre Dame in Kingston-terrace, Leeds, was opened on the 12th inst. by the Marquis of Ripon, K.G., Chancellor of the University of Leeds. About 14,000l. has been spent on the building, which is four stories high and in the Gothic style. Above the ground floor, on which is the dining-hall, the assembly-hall and library are situated, and above these again are the classrooms and eight music-rooms, while the top floor contains a laboratory, art and drawing rooms, as well as a lecture-room in amphitheatre style. There will be accommodation for about 200 students. The architect of the building was Mr. Simpson, of Manningham; the principal contractors were Messrs. T. Hannan & Son, Leeds; the semi-marble flooring, the dados in the corridors, were carried out by Mr. S. McFarlane; and the sanitary arrangements by Messrs. T. Storey & Co., Leeds. Mr. John Reid discharged the duties of clerk of works.

**THEATRE, CARDIFF.**—The excavations for the new theatre in Park-place have been completed and building operations will now be commenced. Messrs. James Allan & Son have secured the contract for the work, and the architects are Messrs. Runtz & Ford.

**EXTENSION OF THE BUCHANAN INSTITUTION, GLASGOW.**—The additions which have been made to this institution were opened recently. The estimated cost, including removal of old buildings from the site, new range of outside latrines, drainage, and alterations, is approximately 5,000l. The architects are Messrs. Macdonnell & Rogerson, and the measurer is Mr. J. V. Warmerston.

**ELECTRIC POWER STATION, HANDSWORTH.**—The new electric light and power station at Piers-road, which is to supply Handsworth with illumination and motive power, was opened on the 9th inst. The scheme has cost between 49,000l. and 50,000l. Sir Alexander Kennedy and Mr. B. N. Jenkin were the engineers, the architects being Messrs. Herniman & Cooper.

**PUBLIC LIBRARY, GAINSBOROUGH.**—A new public library has been erected at Gainsborough at a cost of 4,000l. Messrs. Scorer & Gamble, Lincoln, were the architects for the work, the contractor being Mr. Sprakes, of Doncaster.

**BISHOP FRENCH MEMORIAL.**—A stained-glass window has been inserted in the chancel of St. Ebbe's Church, Oxford, in memory of Bishop French, of Lichfield, formerly rector. The three lights, designed and executed by Mr. T. W. Camm,

of Smethwick, contain the Ascension, figures of the late Bishop, St. Thomas, and St. Aidan, with the coat-of-arms of the University and the diocese of Lichfield.

**LIBRARY, ILFORD.**—Plans for a public library, at Ilford, Essex, have been prepared by Mr. H. Shaw, Surveyor to the Ilford Urban District Council, and tenders are to be invited. The proposed building will be erected on a site opposite the Great Eastern Railway station, out of a gift to the town of 10,000l. by Mr. Andrew Carnegie. The new central fire brigade station at Ilford is nearing completion, and will be opened on November 9. The estimated total cost is 8,000l. The plans of this were also prepared by Mr. Shaw.

**HALL, WEST HAM.**—The foundation stone has just been laid of a new hall for the parish of St. Mark, West Ham. The new building, with its fittings, will cost about 2,000l. The architect is Mr. Henry A. Saul, of Gray's-inn-square.

## FOREIGN.

**FRANCE.**—Work is to be undertaken shortly for partial reconstruction of the Pont des Arts at Paris, at a cost of 197,000 francs, to be divided between the State and the City of Paris.

—A monument was inaugurated last week at La Rochelle to the memory of the Orientalist painter Fromentin. It is the work of M. Ernest Dubois, sculptor, and M. Patouillard, architect, and is composed of a stone stele decorated with a palm and bearing a bust of the artist commemorated. At the base of the monument is an equestrian group of a mounted Arab. —A Society has been formed at Chinon with the object of preserving the numerous ancient monuments of that town, which was once a favourite resort of the Kings of France. —A large scholastic establishment has been completed at Chamboury, from the designs of M. Gilbert. —Some large reservoirs are to be constructed at Saint-Servan, near St. Malo, for the supply of drinking water to the town. The cost is estimated at 115,000 francs.

—A sum of nearly half a million francs has been voted for various works of architecture at the town of Cholet. Among the new buildings is to be a ladies' college. —At Crécy-en-Ponthieu, a few days ago, a monument was unveiled to the memory of Jean de Luxembourg, King of Bohemia, who was killed at Crécy on the French side. The monument is designed by M. Milvoe, architect, and bears a medallion sculptured by M. Fontaine. —The French Government has acquired, at a cost of 200,000 francs, the celebrated chateau of Azy-le-Rideau, one of the finest examples of French architecture of the XVth century. —A district school of architecture is shortly to be opened at Toulouse. —The fourteenth International Art Exhibition of the Principality of Monaco will be held at Monte Carlo from January to April, 1906. —A monument is to be unveiled shortly at the Parc Monceau in memory of Pailleron the dramatist. It comprises a stele carrying a bust of Pailleron, which a female figure representing "Comedy" is surrounding with garlands of flowers. M. Bernstaum is the sculptor. —There is talk of a new railway terminus at St. Malo, to be erected at a cost of nearly half a million francs. —The Municipality of Cherbourg have decided on the erection of an Art Museum. —The Municipality of Troyes has voted a sum of nearly four million francs for architecture and street improvements. Among the works contemplated is the rebuilding of the Hôtel de Ville. —It is stated that the city of Marseilles intends to open a competition among architects for the best laying out of a new quarter, in the rear of the Bourse, in place of the present insanitary streets and houses. —The death is announced, at the age of 70, of the painter Louis Douillard, a pupil of Hippolyte Flandrin and Gleyre. He exhibited first in the Salon of 1861, and obtained a medal in 1878. He was a painter both of portraits and historical subjects, religious subjects by preference. Among his works may be named "The Death of St. Thomas d'Aquinas"; "The Martyrdom of St. Sebastian"; "The Burial of St. Paul"; and a "Crucifixion". He also decorated a chapel in the church of St. Julien at Tours, and the high altar in the Chapelle de la Miséricorde, at Bayeux. M. Douillard was a member of the Société des Artistes Français.

**Belgium.**—A report has recently been drawn up by H.M. Consul-General at Antwerp (Mr. E. C. Hertslet) regarding the scheme of the Belgian Government for the extension of that port. The cost of the scheme, excluding the construction of the dry docks and the nine great subsidiary docks to the new canal dock, the cost of which will be borne by the town of Antwerp, is estimated at about 7,500,000l. The scheme will probably require ten years for its execution. —The Board of Trade have been notified that the municipal authorities of Antwerp are calling for tenders for the construction of a new Flemish theatre. The cost of the structure is estimated at 36,716l., and a deposit of 60,000 francs (2,400l.) is required to qualify any tender.







completed for them at Southampton. Its principal dimensions are:—Length, from point of sill to deck head, 87½ ft.; length occupied by keel blocks, 83 ft.; width of entrance, 90 ft.; width of dock at floor level, 90 ft.; width of dock at cope level, 125 ft.; depth of dock from cope to floor, 43 ft.; depth of water over sill at high water of spring tides, 33 ft.; depth of water over sill at high water of neap tides, 29½ ft. Since they took possession of the dock property in 1892, the South-Western Railway Company have reclaimed an area of nearly 100 acres, formerly known as the "Mudlands," and the new dock stands upon the easterly portion of this land. It is built almost entirely of Portland cement concrete. The entrance gables are covered by greenheart timber casing faces, strengthened by steel, and are secured and closed by direct-acting hydraulic rams, made by Armstrong, Whitworth, & Co. The plant provided for graving purposes includes a travelling electric crane—said to be the largest in existence—capable of lifting more than 50 tons at a radius of 87 ft. The new dock is to be opened to-day.

**GRAMMAR SCHOOL ENLARGEMENT, STAFFORD.**—As a memorial to the late Sir Thomas Salt, the buildings of King Edward VI. Grammar School at Stafford have been enlarged. The work has been carried out by Messrs. Adams & P. J. Harrison, Stafford, from plans prepared by Mr. H. T. Sandy, architect, Stafford. The enlargement consists of the addition of a second story to the western block of the school buildings. The total cost, including alterations to the old buildings, has been £6,000.

**ARCHITECTURAL AND BUILDING WORK, SHEFFIELD.**—Among works completed during the year by the Sheffield City Surveyor's Department are the Queen's-road car-shed extension, for the Tramways Committee, at a cost of 21,830*l.*; Weldon-street Bridge, 14,000*l.*; and a wall round St. Philip's churchyard, 1,547*l.*, for the Improvement Committee; cottages at High Winbank, 3,840*l.*, and alterations to Worthing-road depot, 2,938*l.*, for the Health Committee; and Wincobank Police Station, 3,100*l.*, for the Watch Committee. The houses at High Wincobank have worked out at a cost of 264*l.* 8s. 2d. each. Reference is made in the Surveyor's Report to the discontinuance of the Works Construction Department. The whole of the materials and plant at Worthing-road were disposed of, and the buildings, excluding the offices, were taken over by the Health Committee. The building trade, according to statistics, appears to have had somewhat downward tendency; 1,262 plans were submitted during the year, a decrease of sixty-one, but an increase on 1,199 the average number submitted during the last five years. Twenty-nine street and sewer plans were approved. For new buildings 1,093 plans were approved, and plans were passed for 2,827 houses, an increase on the 2,338 of last year. Altogether 41,003 houses have been erected in Sheffield since the adoption of the By-laws in 1884. The portion of the Report dealing with tramway work shows that upwards of 38 miles of new tramways have been constructed since the Corporation took possession of the undertaking. Of this total 8 miles were single line, and over 30 miles double line. The Corporation have also laid other tramways, representing over 15 miles of track length; 7 m. 5 f. 9 in. c. of single line, and 7 m. 7 f. 2 in. c. of double.

**ROYAL SANITARY INSTITUTE.**—At an examination in sanitary science as applied to buildings and public works, held at Liverpool on October 13 and 14, four candidates presented themselves, and only Mr. K. W. Adcock (Bradford), was granted a certificate.

## CAPITAL AND LABOUR.

**THE LONDON BUILDING TRADE.**—In regard to the new Working Rule Agreements which have been signed by the London Master Builders' Association and all the trade representatives except joiners and plasterers, with whom negotiations are still proceeding, it has been arranged that there shall be but two periods of labour, one in summer, 39 weeks; and winter, beginning on the second Monday in November, of 13 weeks. Plasterers will commence work at the autumn as the other trades, but they will retain a four for dinner in the winter. The contract clause has been made universal, and no one can in future take place against a workman on the ground of his not belonging to a union—at least, the unions will disavow any such movement. Doubtful as to the respect to money and expenses, the workmen are sent to a distance, have been clearer; wages and regulations for men and on night gangs have been formulated; in a case provision has been made for the payment of any single rule without invalidating the rest. The negotiations were carried through with great energy and moderation, and it is hoped that the new agreement will be lasting and of benefit to all.

**NOTE OF THE BUILDING TRADES.**—Employment in the building trades continued dull in September, and on the whole was much the same as a month ago. Bricklayers report a

slight improvement, but with masons, carpenters and joiners and painters employment was rather worse. Compared with a year ago employment was slightly worse. With carpenters and joiners, however, it was about the same, and with bricklayers and plumbers, and masons and slaters in Scotland, there was a slight improvement. The percentage of trade union carpenters and joiners unemployed at the end of September was 7.1, as compared with 6.5 per cent. a month ago, and 7.0 per cent. in September, 1904. The percentage of trade union plumbers unemployed at the end of September was 8.9, the same as a month ago. In September, 1904, the percentage was 9.8. *—Labour Gazette, GLASGOW PLUMBERS.*—The Glasgow plumbers, after being out on strike for nearly six months against a reduction of a halfpenny per hour, have resolved to go back to work at the reduction. The wages will now be ninepence per hour. About two-thirds of the plumbers in the city are affected by the decision, the remaining third, who are members of another association, having agreed to the reduction at the outset.

## TO CORRESPONDENTS.

H. S. H. (the subject will be dealt with fully later on). NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## PATENTS OF THE WEEK.

### APPLICATIONS FOR PATENTS.

23,193 of 1904.—T. H. DENESSEN: *Presses for Use in the Manufacture of Tiles and the like.*

This invention relates to revolving presses, in which a device is used for cutting the burr from the edges of tiles, characterised by the feature that the cutter is located in a slot arranged in the pressing face of the upper working mould, and is connected by means of pins passing through this mould with a frame suspended by springs between the pressing head and its mould, the movement of this frame being effected by cam discs, which are turned through the intervention of toothed segments upon the crank shaft in such a manner that at the proper moment a quick downward and upward return movement of the cutting frame can take place.

25,584 of 1904.—G. H. BENTLEY, E. H. BENTLEY, and J. BENTLEY: *Joint for Earthenware and other Pipes.*

This relates to joints for earthenware and other suitable pipes, formed by a conical recess in the pipe socket, with an internal flange or shoulder at the mouth of said socket, and a conical recess in the spigot end of the pipe, such recesses (when pipes are in position) forming a dovetail or arrow-head chamber for the reception of cement or other binding materials.

1,444 of 1905.—M. J. ADAMS: *Sinks.*

The object of this invention is to provide a well or dish in a sink so that at will the sink may be used either as an ordinary sink, draining through a plug-hole, or if it is desired to hold up water, as in a wash bowl, the plug is inserted. A very trifling dish or slope will serve, or it may be necessary in some cases to use a more decided bowl for washing purposes, or a still deeper basin. In this latter form it is sometimes necessary to use a grating or cover over the basin. The plug, or waste exit, may be placed in any convenient position.

3,139 of 1905.—R. C. SHARP: *Kilns for Drying and Burning Earthenware Goods, Applicable for Drying Malt, Wet Crops, and the like.*

This relates to an apparatus for drying ceramic and other goods where a drying chamber or chambers is or are employed, the hollow walls of which form flues for receiving heated gases from

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

kilns or other sources of heat, and consists in that the said gases first enter at the exit end and then traverse one bottom flue or set of bottom flues on the same level and a set of drying chamber side wall flues, and when arriving at the other, or entry, end of the apparatus commingle with fresh hot gases from the kilns, whereupon the gases return through another bottom flue or set of flues and other wall flues to the exit end of the apparatus, where they enter a common receiving flue and then disperse into the interior of the drying chamber, and after returning to the entry end are withdrawn by a fan or equivalent means, the gases by their several flues thus travelling once simultaneously in opposite directions in the same wall, all in such manner that the drying chamber is evenly heated along the bottom and sides.

6,988 of 1905.—G. U. MERRILL: *Combined Strainer and Valve for Water Supply Pipes and the like.*

This invention consists in the combination of a casing having a plurality of substantially parallel passage-ways therethrough, hollow heads removably attached to the ends of said casing over the ends of said passage-ways, said heads being adapted to afford communication between said passage-ways and the ends of the pipe system in which the apparatus is installed, a shaft arranged in each head transversely of said passage-ways, valves inclosed, one in each head, between said shaft and said casing ends, and adapted to close off one passage-way while leaving the other free, and operative connecting means between each valve and shaft.

7,739 of 1905.—H. C. HEIDE: *Valve Mechanism for Water-heaters.*

This relates to an automatic valve mechanism for water-heaters wherein the fuel valve is automatically and reliably controlled by the pressure of the water supplied to the water-heater, being so arranged to act upon two fuel valves controlling members or pistons, in such connexion with each other, and to a fuel valve, that, on the reduction of pressure above the fuel valve opening member, the fuel valve will be opened, and retained open so long as the flow of water through the water-heater is greater than can be supplied past the fuel valve opening member through a restricted passage or its equivalent, under a difference of pressure at said opposite ends sufficient to prevent the fuel valve closing member from moving.

7,563 of 1905.—W. A. MERRALLS: *Rock Breakers and Pulverisers.*

This invention relates to a rock breaker and pulveriser, and consists of a grip-wheel having a grooved periphery fast on the shaft of the crushing cylinder, a bearing-plate mounted in the plane of the grip-wheel and having a grooved and eccentrically-curved periphery, and balls or equivalent anti-friction devices between the grip-wheel and the bearing-plate.

20,572 of 1904.—A. H. KIMMINS: *Rain-water Conductors or Drainage Channels for Street and Other Uses.*

This relates to a safety cast-iron rain-water conductor. The object of the invention is to fasten down quickly the lids of the trough by means of a stud to which is attached a plate. By inserting a square key into a square hole provided for it and turning the key partly round the plate is released from two retaining lugs, and so the lid of the trough may be lifted off for the purpose of cleaning. On replacing the lid and inserting the square key into the square hole and turning the key in the opposite direction the plate is brought under the lugs and the lid is thus fastened down again.

22,230 of 1904.—H. HOBSON: *Wash-down Water-closets, Sinks, and the like.*

This relates to an improved means for flushing water-closets, consisting in the combination with an ordinary sink and water-closet of a reservoir siphon arrangement located between the tank and the water-closet, and an additional siphon arrangement at the discharge side of the water-closet besides the one ordinarily used.

23,364 of 1904.—A. H. VAN DER VIJGH, H. VAN DER VIJGH, and G. VAN DER VIJGH: *Manufacture of Artificial Stone.*

This relates to the manufacture of artificial stone. According to the invention the slag sand is dispensed with and the percentage of purpice stone is greatly increased. Plaster of Paris is also replaced by Portland cement.

25,285 of 1904.—H. JAMES: *Wash-basins, Baths, Urinals, Water-closet Pans, and the like.*

This invention relates to wash-basins, baths, urinals, water-closet pans, and the like, and consists of a shutter or valve between the main interior of the said article and the outlet therefrom, the said shutter or valve constituting, when closed, a portion of the walls of the overflow passage, and when open allowing of the rapid escape of the contents from the said main interior to the said outlet, and when turned aside, or removed, affording unimpeded access to the



overflow passage without interfering with any trap there may be provided to intercept sewer gasses.

17,595 of 1904.—CONDUITS & FITTINGS, LTD., D. M. EDWARDS, and E. A. BROWN: Bends, Elbows, and Other Angle-pieces for Electric Conduits.

This relates to a divided bend, elbow, or other connecting fitting for tubular conduits, the sockets or end portions of which are each formed with one part containing a greater portion of the socket than the other part so as to prevent the tubes of the conduit from becoming detached.

### SOME RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT.

Oct. 6.—By STEPHENSON & ALEXANDER (at Caerphilly).

Caerphilly, Glamorgan.—"The Goodrich (Evergreen) Estate," f.g. rents 356l. 7s. 9d., reversions varying from 87 to 99 yrs. (in numerous lots) 59,264

Freehold cottage and garden 100

Oct. 7.—By SPELMAN (at Norwich).

Hetherworth, Norfolk.—Freehold holding with butchery, area 7 a. 1 r. 19 p., y.r. 37l. 655

A freehold occupation, 2 a. 2 r. 21 p., p. 298

Four pieces of pasture, 2 a. 3 r. 30 p., p. 210

Two freehold cottages 210

By STEPHENSON & ALEXANDER (at Cardiff).

Caerphilly, Glamorgan.—"The Goodrich (Evergreen) Estate," comprising farms, lands, etc., also the "Dowry Inn," area 1,073 acres, f. (in numerous lots) 40,314

By BENTLEY & SONS (at Pontefract).

Whitley, Yorks.—"Whitley Lodge Estate" and "Whitefield Close," 253 a. 0 p. f. 10,000

Two freehold closes of land, 14 a. 2 r. 18 p. 885

Oct. 9.—By G. B. HILLIARD & SON.

Battersea.—42, Just-st., u.t. 81½ yrs., g.r. 6l. p. 430

By MAY & ROWDEN.

St. John's Wood, 65, Loudoun-rd., u.t. 15 yrs., g.r. 6l. p. 500

By SAITERS & CO.

Crouch End.—38 and 39, Middle-lane, u.t. 71 and 49 yrs., g.r. 6l. 10s., y.r. 91l. 300

Camden Town.—62, Camden-rd., u.t. 25 yrs., g.r. nil, p. 610

By WALSH & SONS.

Holborn.—35, Verulam-st., f. p. 400

Stoke Newington.—19, Wolsey-rd., u.t. 44 yrs., g.r. 5l. 10s., y.r. 32l. 350

By DOUGLAS YOUNG & CO. (at Winchester House).

Battersea.—345, Battersea Park-rd. (s. with slaughter-house), f. y.r. 40l. 4,000

2 to 62 (even), Parkside-st., f. w.r. 800l. 12s. 10,120

1 to 61 (odd), Parkside-st., f. w.r. 118l. 1,100

331 to 337 (odd), Battersea Park-rd. (s.), f. y.r. 178l. 8,330

12 to 21 (odd), Kennard-st., u.t. 63 yrs., g.r. 27l. 10s., w.r. 150l. 1,030

25 to 39 (odd), Park-rd., u.t. 118l. 900

7 to 27 (odd), Savona-pl., and 1 to 11 (odd), Tidmore-st., u.t. 38 yrs., g.r. 21l. y.r. 2,000

390l. 2s. 380

189 and 177, Newington-rd., u.t. 34 yrs., w.r. 98l. 18s. 1,040

225, Wandsworth-rd., u.t. 24 yrs., w.r. 288l. 12s. 2,000

Rd.; 2 and 4, Simpson-st., u.t. 17 yrs., g.r. 90l. y.r. 280l. 9s. 1,500

Lambeth.—10, 9 to 98 (even), Vauxhall-walk (s.), u.t. 11 yrs., g.r. 164l. 20s., w.r. 180l. 350

51 to 77 (odd), Vauxhall-walk, f. w.r. 152l. 2s. 1,820

71 to 85 (odd), Vauxhall-walk (factory), f. y.r. 195l. 4,000

45 to 49, Walnut Tree-walk; 49, 50, and 51, St. Alban's-st., and the "Young Prince" h.h.; also g.r. 4l. 8s., u.t. 13 yrs., g.r. 27l. 3,100

3, York-st., u.t. 12½ yrs., g.r. 6l. y.r. 70l. 1,090

13 to 21, Over-pl., f. w.r. 132l. 18s. 1,100

3, York-st., u.t. 12½ yrs., g.r. 6l. y.r. 70l. 500

Clapham.—261, Clapham-rd., and 15, Northall-st., f. y.r. 77l. 10s. 1,140

263 to 273 (odd), Clapham-rd. 1 to 11 (odd), Lingham-st., 1 to 13 (odd), Northall-st., area 23,350 ft. f. y.r. 611l. 4s. 7,050

Brixton.—5, 6, and 10, Russell-gt., y.r. 90l.; also l.g.r. 18l. 15s., u.t. 16 yrs., g.r. 30l. 15s. 215

32 and 34, Talma-rd., u.t. 67 yrs., g.r. 12l. w.r. 75l. 8s. 520

80 to 42 (even), Talma-rd., u.t. 67 yrs., g.r. nil, y.r. 116l. 1,600

Somers-rd., etc., f.g. 25l., reversion in 44 yrs. 640

Bermondsey.—19 and 20, London-rd., u.t. 41½ yrs., g.r. 30l. 430

Kenish Town.—Malden-rd., "The Malden Arms," p.h., l.g.r. 100l., u.t. 39½ yrs., g.r. 50l., with reversion 280

Belgrave.—44, Eaton-ter. (s.), u.t. 12½ yrs., g.r. 3l. y.r. 42l. 260

Pimlico.—59 and 59, Pimlico-st., u.t. 32 yrs., g.r. 15l. y.r. 36l. 280

17, Pimlico-st., u.t. 9½ yrs., g.r. 3l. 8s., y.r. 30l. 100

Oct. 12.—By BARNARD & CO.

Hammer-smith.—14, Clifton-rd., u.t. 71 yrs., g.r. 6l. y.r. 30l. 360

By W. J. LONG & CO.

Wimbledon.—18, Latimer-rd., f. e.r. 38l. 450

By C. C. & T. MOORE.

Mill End.—31, Single-st., f. w.r. 26l. 265

By NEWBORN, EDWARDS, & SHEPHERD.

Islington.—32, Florence-st., f. y.r. 40l. 485

14, Oxford-ter., u.t. 45½ yrs., g.r. 8l. 485

Dalston.—2, 6, and 8, Montague-rd., u.t. 55 yrs., g.r. 18l. y.r. 108l. 930

Hackney.—88, Weymouth-ter., f. w.r. 32l. 10s. 230

Clapton.—129, Wood Clapton-rd., u.t. 57 yrs., g.r. 10l. y.r. 50l. 525

47, Mount Pleasant-lane, u.t. 48 yrs., g.r. 3l. 15s., e.r. 38l. 275

Rotherhithe.—584, Rotherhithe-st., f., w.r. 20l. 18s. 150

74, Paradise-st., a profit rental of 45l. 4s. 8d. for 75 yrs. 675

Deptford.—20, 22, and 24, Aldinger-st., also g.r. 6l., u.t. 34 yrs., g.r. 12l. y.r. 94l. 18s. 000

Rotherhithe.—83, Chilton-st., u.t. 30 yrs., g.r. 2l. 10s., w.r. 33l. 15s. 190

Bermondsey.—17 and 18, London-rd., u.t. 13 yrs., g.r. 5l. 10s., w.r. 65l. 445

23, 25, 27, and 29, Keeton-rd., u.t. 39 yrs., g.r. 10l., w.r. 140l. 8s. 1,025

Rotherhithe.—1 to 11, Clarendon-pl., u.t. 24 yrs., g.r. 30l., w.r. 343l. 120

Deptford.—13, 15, 17, and 19, Windmill-lane, u.t. 37 yrs., g.r. 8l., w.r. 122l. 4s. 805

By FRANCIS DOD & CO.

Clapton.—141, Elderfield-rd., u.t. 73 yrs., g.r. 5l., w.r. 42l. 18s. 330

Stoke Newington.—29 and 30, Victoria-rd., u.t. 39 yrs., g.r. nil, w.r. 70l. 4s. 410

6, Gordon-rd., u.t. 54 yrs., g.r. 6l. 13s. 4d., w.r. 58l. 10s. 330

By R. HUGH HENRY.

Old Ford.—111 and 113, St. Stephen's-rd., f., w.r. 59l. 16s. 580

70 and 72, Ford-rd., f., w.r. 57l. 4s. 590

Hackney.—8 and 27, Connor-st., f., w.r. 40l. 16s. 520

56, 57, 58, and 59, Havelock-st., u.t. 50 yrs., g.r. 12l. 12s., w.r. 98l. 12s. 520

4 and 6, Kenton-rd., u.t. 30 yrs., g.r. 6l. 10s., y.r. 84l. 610

Homerton.—7, 9, and 11, Church-rd., c., w.r. 88l. 8s. 885

Clapham.—12 to 11, Clarendon-pl., u.t. 55 yrs., g.r. 14l., y.r. 78l. 765

16, Cavendish-rd., f., p. 700

By ROBSON, RICHARDS, & CO.

Stamford Hill, Leabourne-rd., f.g. rents 59l. 12s., reversion in 65 yrs. 1,430

Moundsfield-rd., f.g. rents 40l., same reversion. 940

Castlemore-rd., f.g. rents 21d., similar reversion. 5,395

By HUMBERT & CO.

Stammore, Middx.—Ten freehold cottages, main rd., y.r. 162l. 10s. 2,000

East Molesey.—"Newlyn" and "Pitana," Wolsey-rd., f., y.r. 150l. 2,400

By SAITERS & CO.

Crouch End.—38 and 39, Middle-lane, u.t. 71 and 49 yrs., g.r. 6l. 10s., y.r. 91l. 300

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Finchley.—27, Widdowson-st., f., w.r. 6l., y.r. 140l. 675

By STEPHENSON & ALEXANDER.

Romford.—Squires Heath, The Manor House Estate, 52 a. f. 000

Battersea.—30, 32, and 34, Bunter's Ar. improved rental 45l. for 45 yrs. 190

Old Kent-rd.—Marlborough-st., 20 a. f. 445

Rotherhithe.—1 to 11, Clarendon-pl., u.t. 24 yrs., g.r. 30l., w.r. 343l. 120

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By HUMBERT & CO.

Stammore, Middx.—Ten freehold cottages, main rd., y.r. 162l. 10s





## COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENT.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.
*CENTRAL PUB. LIBRARY BUILD., MARE-ST.	Hackney Borough Council	50, 30, and 20 guineas

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Repairs, etc., Duketown and Trevill Schools.	Monmouthshire Education Com.	C. Danney, County Council Offices, Newport, Mon.
Team Labour, Stone Carting, and Road Watering.	Maldstone R.D.C.	M. C. Wane, Surveyor, Barmby, Maidstone
Sewerage and Surface Water Drainage.	Guildford Town Council	Borough Engineer, Tuns Gate, Guildford
Collecting Tank at Rodney Stoke & 200 yds. Piping	Street U.D.C.	A. P. I. Cotterell, M.Inst.C.E., 28, Baldwin-street, Bristol
Repair of Batteries at Grove Park Workhouse, Lee.	Greenwich Guardians	The Master
170 sq. yds. Cement Concrete Footpath, Garvaghy-rd.	Portadown U.D.C.	W. Wilson, Town Clerk, Town Hall, Portadown
Bearing Plates, Files, Wood Screws, Bolts, etc.	Bombay, etc., Railway Co.	C. Master, Gloucester House, Bishopgate-st. Without, E.C.
Beater Picks, Shovels, etc.	do.	do.
Ballasting, Paving, Flagging, etc., Newton Heath	Lancashire & Yorkshire Railway Co.	Engineer's Office, Hunt's Bank, Manchester
Bathroom, Lavatory, etc., at Receiving Ward	Holworthy Guardians	The Boardroom
Cement Floor in Dining Hall of Workhouse	do.	do.
800 Chairs	Bradford Corporation	F. Stevens, Town Clerk, Bradford
Guernsey Granite Spalls	Brentford Guardians	W. Stephens, Clerk, Union Office, Isleworth
150 Tons of Steel Bridge Girders	Great Western Railway Co.	Engineer, Paddington Station, London
Roadworks in Lane.	Tynemouth Corporation	J. J. Smillie, Borough Surveyor, Tynemouth
*ALTERA. & ADDIT. to SCHOO. WARLINGHAM	Surrey Education Committee	J. J. Smillie, Borough Surveyor, Tynemouth
*MAKING-UP ROAD AND BACK ALLEYS	Baling Town Council	Connel's Engineer, Town Hall, Ealing, W.
*RESLATING RPS. REPPS. TO BK. & ST. WORK	Holborn Guardians	Clerk to Guardians, Clerkenwell, E.C.
Reconstructing Portion of Hulme-st. Tunnel	Manchester Corporation	City Surveyor's Office, Town Hall, Manchester
Shop Premises at Pentre, Rhondda	Bacup Corporation	E. Jones, Architect and Surveyor, Porth
Cast-Iron Pipes	East Indian Railway Company	G. Liggle & Son, Engineers, 14, Victoria-street, Westminster, S.W.
Paints, Red and White Lead, Canvas, etc.	do.	Office of Company, Nicholas-lane, London, E.C.
Extension of Co-operative Store, Crook	do.	F. H. Livesey, Architect & Surveyor, 107, Newgate-st. Bishop Auckland
Stables, Loose Boxes, etc., for 19 Horses	do.	do.
Making-up Part of Clarence-road	Erdington U.D.C.	H. H. Humphries, Engineer, Public Hall, Erdington, Birmingham
Broken Stone	Stockport Guardians	W. H. Ward, Architect, Paradise-street, Birmingham
Laundry Machinery, Stepping Hill Infirmary	Glasgow Corporation	Office of Public Works, 64, Cochrane-street, Glasgow
Heat, Engineer, Fittings at Baths, etc., Springbank	Manchester Guardians	A. J. Murtagh, Architect, 23, Strutt-street, Manchester
Escape Staircase, New Bridge-street Workhouse	Edinburgh Corporation	R. Morham, Public Works Office, City-chambers, Edinburgh
Pavilion at Saughton Public Park	Selby U.D.C.	P. Griffith, Engineer, 54, Parliament-street, Westminster, S.W.
Test of Newbolton	Manchester Cleansing Committee	R. Williamson, Town Hall, Manchester
Machine-Made Rivets	Barking Town U.D.C.	C. F. Dawson, Surveyor, Public Offices, Barking
400 cubic yds. of Granite	Rhonda U.D.C.	J. Kees, Architect, Hillside Cottage, Pentre
Alterations, etc., of Mardy Boys' and Girls' School.	Birmingham Water Committee	E. A. Lees, Secretary, 44, Broad-street, Birmingham
Cast-Iron Pipes, Special Castings, etc.	Rhonda U.D.C.	W. J. Jones, Engineer, Public Offices, Pentre, Rhonda
Stoneware Pipe Sowers at Ferndale	Rathmines U.D.C.	A. Mackenzie, C.E., Architect, Kingslie
Villa at Newtonmore, N.B.	Stow Guardians	S. H. Bolton, Surveyor, 19, Upper Merion-street, Dublin
Carnegie Free Library, Wynnedell-road, Rathmines	Edinburgh District Lunacy Board	R. E. Wilkes, Clerk, Guardians' Office, Stowmarket
Roberts' Hercules Wind Engine, Sewage Pump, Wkhs.	Woking U.D.C.	Jackson & Fox, Architects, 7, Rawson-street, Halifax
Additions Campbell Gas Engine Co.'s Works, Halifax	Brighton Corporation	A. Fernier, Clerk to Lunacy Board, Castle-terrace, Edinburgh
Furnish, Administrative, etc., Blocks, Bangour Village	Brighton Corporation	J. Woodridge, Surveyor, Boat-chambers, Woking
Road Material	Oxendon R.D.C.	W. H. Maxwell, Eng. and Surveyor, Town Hall, Farnbridge
Private Street Works, Manor-road, etc.	do.	Borough Engineer, Town Hall, Brighton
1,000 tons of Granite Spalls	do.	W. J. Smith, Surveyor, Rothwell House, Market Harborough
Sludge Pump and Suction Pipe	Edinburgh District Lunacy Board	H. J. Blanc, Architect, 25, Rutland-square, Edinburgh
Hospital, Farm Workers' Cottages, etc., Bangour	Aston Guardians	F. Holland, Eng. & Arch., 11, Parkinson-street, Huddersfield
Heating by Atmospheric Steam, Bradford Infirmary	Lewisham Guardians	J. North, Clerk, Union Offices, Vauxhall-road, Birmingham
25 Chapel Seats for Workhouse Chapel, Gravelly Hill	do.	Lewisham Guardians
Painting, etc., at Infirmary, Lewisham High-street	East Suffolk Education Committee	T. R. Phillips, Architect, Old Bank-chambers, Farnley
Rebuilding Business Premises, Taff-st., Portyrrid	Marylebone Borough Council	A. Pells, F.S.I., Beccles
Enlargement of Ilkeshall-st. Lawrence Schs., Bungay	Aberdeen Harbour Commissioners	J. P. Waddington, Borough Surveyor, Town Hall, Marylebone
Underground Conduits, Foley-street	Burton-on-Trent Corporation	R. G. Nicol, Engineer, Harbour Engineer's Office, Aberdeen
1,000 Tons of Portland Cement	do.	G. T. Lyman, Borough Engineer, Town Hall, Burton-on-Trent
Steam Motor Tip Wagon	Rotherham Corporation	do.
Wrought-iron Clinker Storage Hopper	do.	W. J. Board, Town Clerk, Town Hall, Rotherham
Hardware Goods	Leyton U.D.C.	W. Dawson, Engineer, Town Hall, Leyton
Improvements to Eastern Pier Head, Falmouth	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford
Stoneware Pipe Sewer in Cann Hall-road	Bromley Borough Council	do.
Roadworks, part of Brockley-grove, Ladywell	Wirral Guardians	J. H. Davies & Sons, Architects, Chester
*SUPPLY OF MATERIALS, ETC.	Hornsea U.D.C.	W. E. Warburton, Surveyor, Public Rooms, Hornsea
*BREC. INFIRM. ETC. CLATTERBUDE, WEHSE	North-Eastern Railway	Company's Architect, Central Station, Newcastle-on-Tyne
*WAREHOUSE, NEW BRIDGE-ST., NEWCASTLE	West Riding Education Committee	J. Vickers Edwards, County Architect, County Hall, Wakefield
Rectory House at Eborac	Prestwich U.D.C.	L. A. Orford, Clerk, Council Offices, Prestwich
Infants' School, Goole	North-Eastern Railway Co.	T. Houston, Architect, Kingscourt, Wellington-place, Belfast
Laying-out Bowling-green, Heaton Park	Stoke-upon-Trent Guardians	W. Bell, Architect, Central Station, Newcastle-on-Tyne
Detached Villa near Larnie	do.	C. Daniel, Clerk, Union Office, Stoke-upon-Trent
Office Block, Messrm., etc., New Bridge-st., Newcastle	Royal National Lifeboat Institute	B. S. Macdonald, Hon. Sec., Thurso, N.B.
Rewiring Part of Workhouse and Cottage Homes	Metropolitan Asylums Board	Clerk to the Guardians, Guards' Office, Sidney-st., Hammersmith, N.E.
Replating Battery	Hackney Guardians	do.
Lifeboat Station, Scarbrough, Carlisle	Richmond Guardians	P. Umney, Clerk, Union-chambers, Richmond, Surrey
*REPAIRS, ETC., IRON ROOFS, DARTFORD	Essex County Lun. Asy. Visit. Com.	County Architect, Chelmsford
*GAS MNS., ETC., CHILD. HMS., CHIPPING ONGAR	Hereford Guardians	R. Moore, Clerk, 8, St. John-street, Hereford
*LAUN. ETC., PLANT, CHILD. HMS.	do.	do.
Furn., Pictures, Fittings, etc., Board-rm., at Pelsbet	Essex Education Committee	County Architect, Duku-street, Chelmsford
*FENCING A NEW ASYLUM, ST. COLCHESTER	Radcliffe U.D.C.	H. Lord, Architect, 42, Deansgate, Manchester
Laundry Appliances, etc., at Union Workhouse	Great Northern Railway Co. (Ireland)	T. Morrison, Secretary, Amien-street, Tormont, Dublin
Heating Parts of Union Workhouse	Tipton U.D.C.	A. Long, Architect, 21, New-street, West Bromwich
*NEW SCHOOL at BRIDFELD	do.	do.
Public Library, Stand-lane, Radcliffe	Swell Parish Council	G. Hards, Clerk, Elm-street, Ewell, Surrey
Stores	Edinburgh Parish Council	R. M. Cameron, Architect, 53, Great King-street, Edinburgh
Heating the Burn Tree, Dudley Port, Council Schools	Cheshire Lines Committee	J. G. Robinson, Great Central Railway Works, Gorton
Builder's Work in Connection With Heating Schools	Rochdale Corporation	S. Platt, Borough Surveyor, Town Hall, Rochdale
Scavenging	South Mims R.D.C.	Council's Surveyor, 40, High-street, Barnst
*WIDENING ROADS, ETC.	County Pala. of Lancaster & Chester	W. C. Hall, County Bridgemaster, Preston
Stone & Concrete Bidge, between Flixton & Carrington	do.	do.
Hurst Mill Bridge, Leigh	Commissioners of H.M. Works, etc.	H.M. Office of Works, etc., Storey's Gate, S.W.
*NEW POST OFFICE, SUITON		





**NORTHWICH.**—For making two new streets off Victoria-road, and a back passage, for the Education Committee of the Cheshire County Council. Mr. A. E. Powles, architect, 7, Winnington-street, Northwich. Quantities by Mr. E. I. Muspratt, Chester—  
 J. Mayers & Son ..... £1,068 0 0  
 S. Hutton ..... 861 15 8  
 Hughes & Stirling ..... 850 0 0  
 C.W. Davenport ..... 822 0 0  
 J. W. Harris ..... 799 0 5  
 Bennie & G. Boyton, jun. .... £783 0 11  
 Dale & Appleton, Northwich ..... 746 12 0  
 J. Hamilton & Son ..... 725 0 0  
 † Recommended for acceptance.

**NORWICH.**—For the extensions of Norwich City Asylum. Mr. A. E. Collins, City Engineer—  
 J. S. Smith ..... £8,547 0 0  
 T. H. Blyth ..... 9,280 16 0  
 R. Daves ..... 9,255 15 0  
 Couleoun & Lofts ..... 9,249 0 0  
 T. R. Gill ..... 9,977 16 7  
 A. S. Lincoln ..... 8,899 18 7  
 S. W. Utting ..... 8,797 0 0  
 Gunton & Palmer ..... 8,704 10 0  
 † Informal. ‡ Incomplete. § Withdrawn.  
 Youngs & Son ..... £8,693 0 0  
 Boddy & Son ..... 8,983 4 8  
 H. C. Green-grass ..... 8,667 0 0  
 W. J. Hamant, Norwich ..... 8,211 0 0  
 Southgate Bros. .... 8,026 19 9  
 Downing & Son ..... 7,965 0 0

**OSSETT (Yorks).**—For the conversion of Park House into a secondary school, for the Corporation. Mr. F. W. Ridgway, architect and surveyor, 11, Union-street, Dewsbury—  
 Masons: Peace & Oldroyd, Leeds-road, Ossett\* ..... £410 0  
 Joiners: W. & E. Whitehead, Bank-street, Ossett\* ..... 339 10  
 Plumber: J. H. Allott, Station-road, Ossett\* ..... 390 0  
 Slaters: Sedgwick & Son, Globe-road, Leeds\* ..... 57 0  
 Plasterers: Lawwood Bros., Wakefield\* ..... 44 10  
 Heating Apparatus: T. H. Rayner, 12, Market-street, Huddersfield\* ..... 114 0  
 [Sixty tenders were received for the work. The lowest tender in each case was accepted.]

**OXFORD.**—For the erection of additional students' rooms, library, chemical laboratories, and lecture-rooms, Ship-street, for Jesus College, Oxford. Messrs. B. England & Son, architects and surveyors, Oxford—  
 Synn & Co. .... £15,563  
 Hutchins & Sons ..... 15,200  
 Parnell & Son ..... 14,863  
 Kingeslee & Sons ..... 14,367  
 J. Wooldridge ..... £13,850  
 Benfield & Loxley ..... 13,824  
 Estcourt & Sons, Gloucester\* ..... 13,656

Heating.  
 S. T. Haden & Sons, London\* ..... £410

**PORTSMOUTH.**—For pulling down and rebuilding the "Still" public-house—  
 Croad ..... £1,230  
 Crockerell ..... 1,208  
 Salter ..... 1,187  
 Jones ..... £1,187  
 Corke ..... 1,187  
 [All of Portsmouth.]

**ST. ALBANS.**—For the erection of six cottages, for the Trustees of St. Peter's Charities. Mr. H. F. Mence, architect, Town Hall-chambers, St. Albans. Quantities by Mr. W. H. Smith, 5, Great Winchester-street, E.C. 4—  
 H. J. Skelton ..... £2,690  
 C. Muskin & Sons ..... 2,545  
 J. Jarvis & Sons ..... 2,396  
 Vail & Williamson ..... 2,379  
 Bonf Bros. .... 2,376  
 P. W. Stanley ..... £2,294  
 J. Foot ..... 1,889  
 E. Dunham ..... 1,644  
 Sons, St. Albans\* ..... 1,610

**ST. ALBANS.**—For the erection of a residence in Hall-place-gardens, for Mrs. Langridge. Mr. H. F. Mence, architect, Town Hall-chambers, St. Albans—  
 E. Dunham ..... £1,565  
 C. Muskin & Sons, St. Albans\* ..... 1,558

**SUTTON (Surrey).**—For the erection of porter's office at Belmont Asylum, for the Metropolitan Asylums Board. Messrs. T. Dinwiddie & Sons, architects, 54, Parliament-street, S.W. 1—  
 Wright Bros. .... £270 0  
 H. Freeman ..... 264 0  
 T. Cole ..... 249 0  
 T. D. Long ..... 240 0  
 T. Pearce ..... 233 0  
 R. Jones & Son ..... 216 0  
 Marriott & Salter ..... £211 0  
 W. H. Baldwin & Co. .... 203 10  
 J. B. Potter ..... 200 0  
 Cropley Bros., Ltd., High-street, Epsom\* ..... 147 0

**TUNBRIDGE WELLS.**—For additional classrooms at the St. James's National Schools, Tunbridge Wells. Mr. C. H. Strange, architect—  
 W. B. Jury & Sons ..... £716 0 0  
 J. N. Jeffery ..... 687 16 0  
 Beale & Son ..... £565 0 0  
 Jarvis & Son\* ..... 664 0 0  
 [All of Tunbridge Wells.]

**WARRINGTON.**—For erecting a public elementary school (Beaumont Council School), for the Warrington Education Committee. Mr. J. Silcock, architect, Egypt-street, Warrington. Quantities by architect—  
 C. W. Davenport, Stockton Heath, Warrington\* ..... £13,784 10

**WAVENDON (Bucks).**—For additions to Eagle Lodge, for Sir Henry H. A. Hoare, Bart. Mr. W. B. Stonebridge, architect, Woznam Sands, D.S.O., architect, Egypt-street, Warrington. Quantities by architect—  
 F. & T. Gregory ..... £187 0  
 M. Fleet ..... 175 0  
 B. Wilford ..... 165 0  
 C. Sinfield ..... £149 10  
 J. Bonner ..... 131 10  
 W. Summerford ..... 116 10  
 [Architect's estimate, £125.]

**WESTERHAM (Kent).**—For the provision and fixing of an engine, with lift and force pumps (capable of delivering 500,000 gallons of water in twenty-four hours), at the Hill Park Estate, Westerham, for the Metropolitan Water Board—

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Wood Bros.	3,950 0	Ashton, Frost, & Co.	2,500 0
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Richardson, Westgarth, & Co.	3,595 0	Pratchett Bros.	2,480 0
Mathews & Co.	3,379 0	Glenfield & Kennedy	2,367 10
Galloways, Ltd.	3,170 0	Robinson, Cooks, & Co.	2,320 0
Heate Pump Co., Ltd.	3,090 0	J. Simpson & Co.	2,240 0
Thames Iron Works	2,910 0	Fullerton, Hodgkiss, & Barclay, Ltd.	2,180 0
Woodhouse	2,780 0	F. Pearn & Co.	2,100 0
Low Moor Co., Ltd.	2,750 0	Lilleshall Co.	2,085 0
Excelsior Works	2,650 0	Watt & Co.	1,848 0
glenfield & Kennedy	2,550 0	E. Thunings & Son, Runcorn*	1,466 1

**WORTHING.**—For erecting infants' school, Little High-street, for the Education Committee. Messrs. Singer, Hyde, & Son, Worthing. Quantities by Mr. R. R. Wentworth Hyde—

J. Martin	£6,426 14 3	Peerless, Dennis, & Co.	£4,961 0 0
W. A. Field & Co.	5,283 0 0	J. H. East	4,960 15 0
W. J. East	5,225 0 0	J. Linfield & Sons	4,917 0 0
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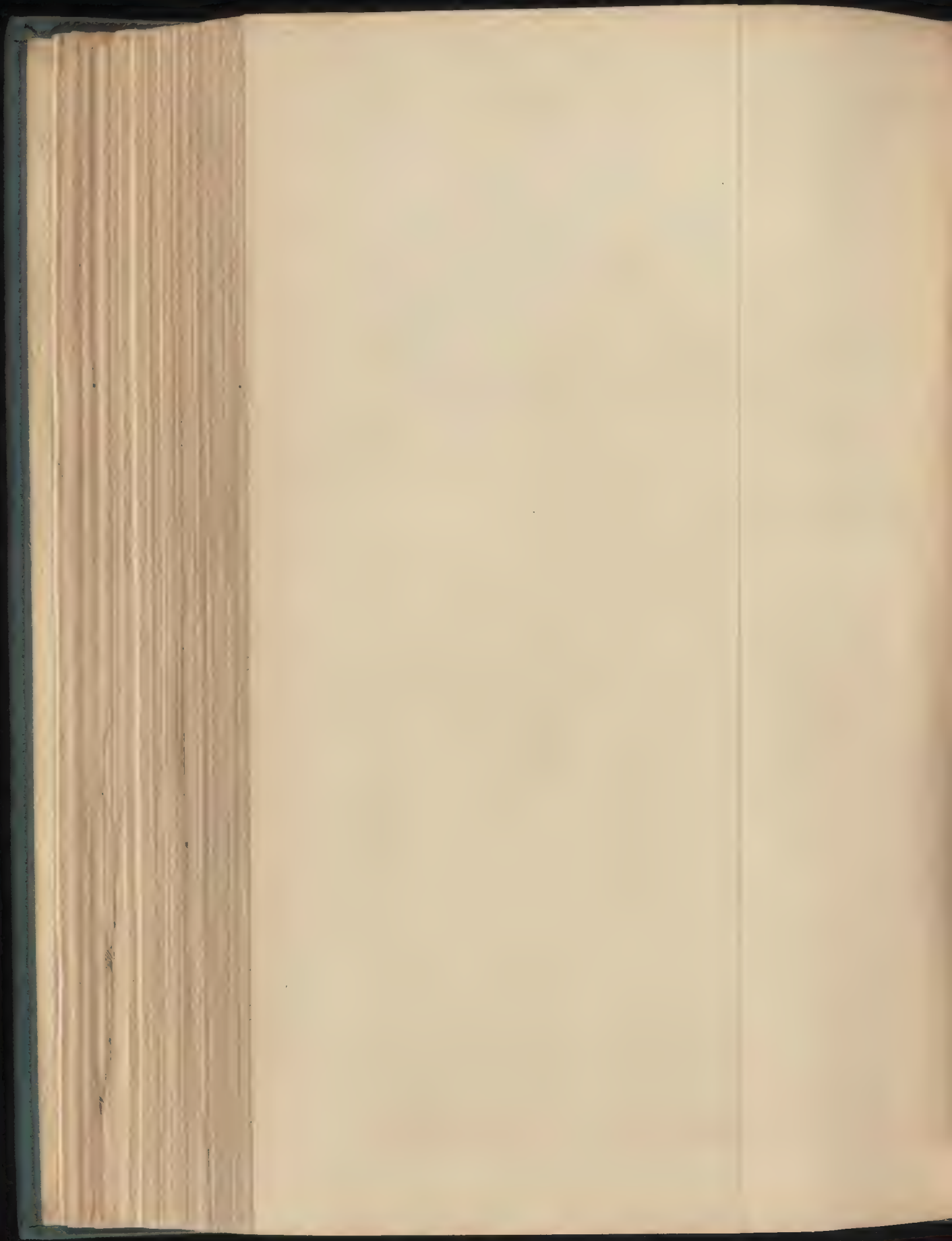


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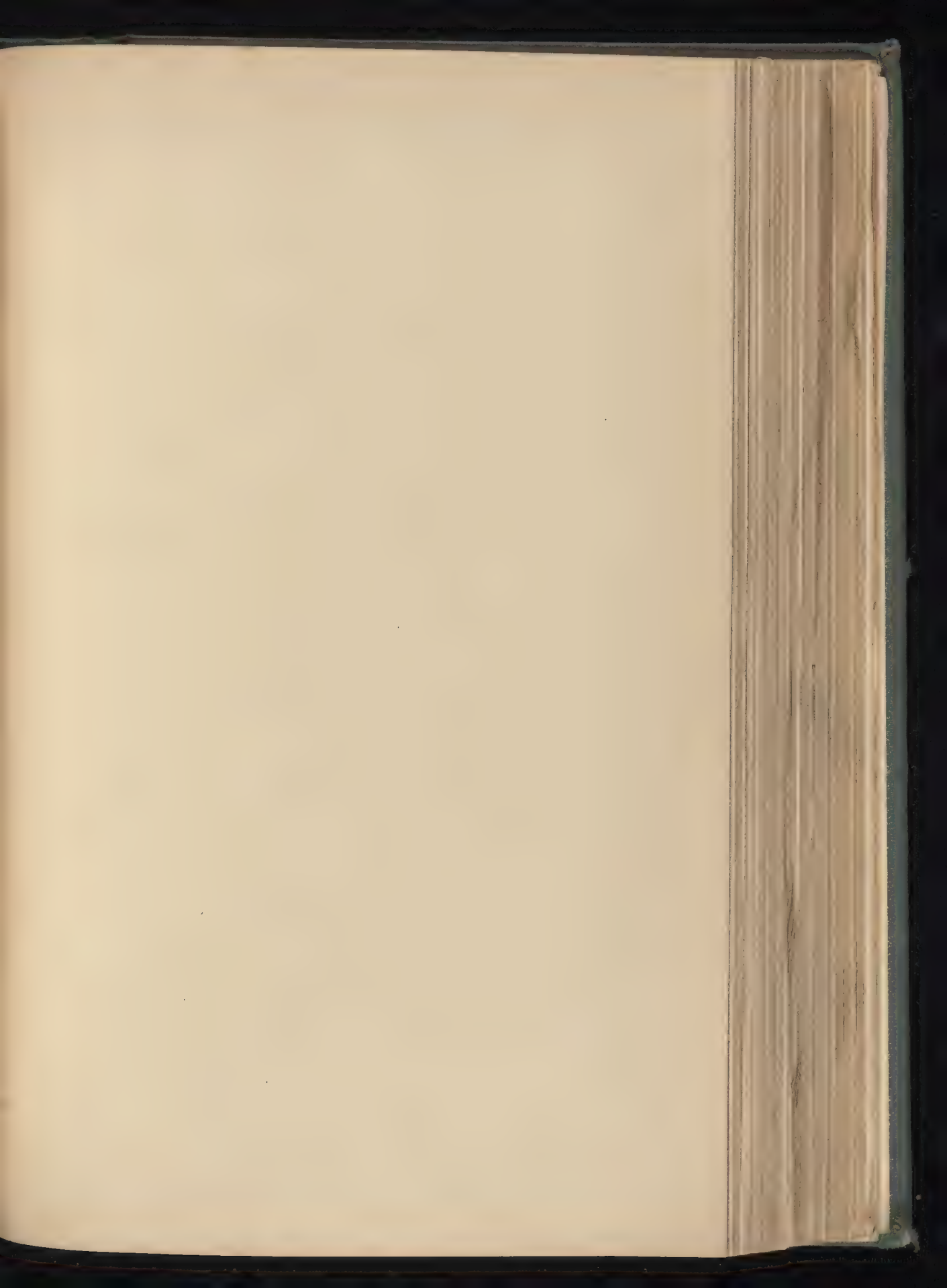




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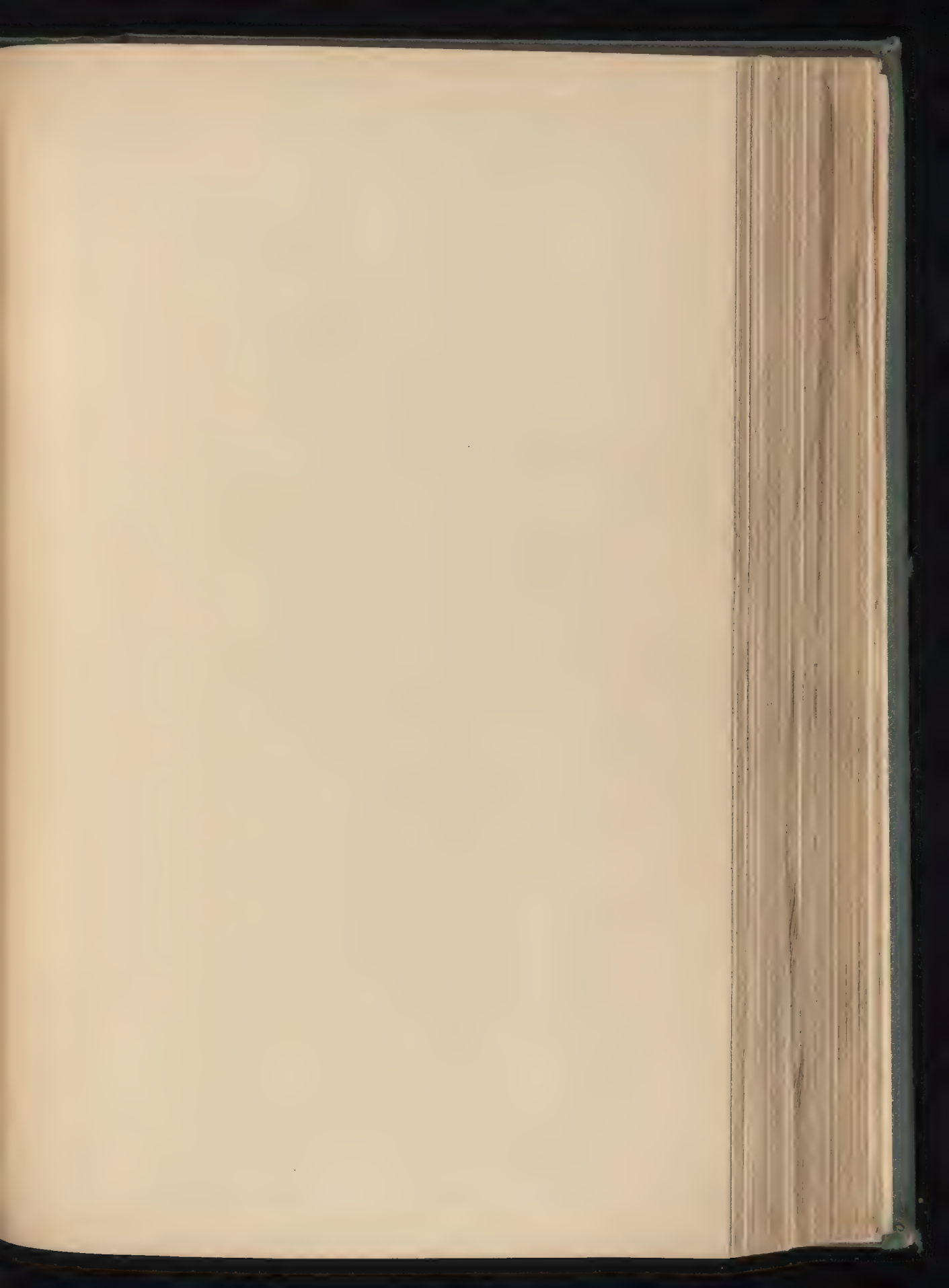








PROPOSED SHOPS IN A  
PROVINCIAL TOWN.





THE BUILDER, OCTOBER 21, 1905





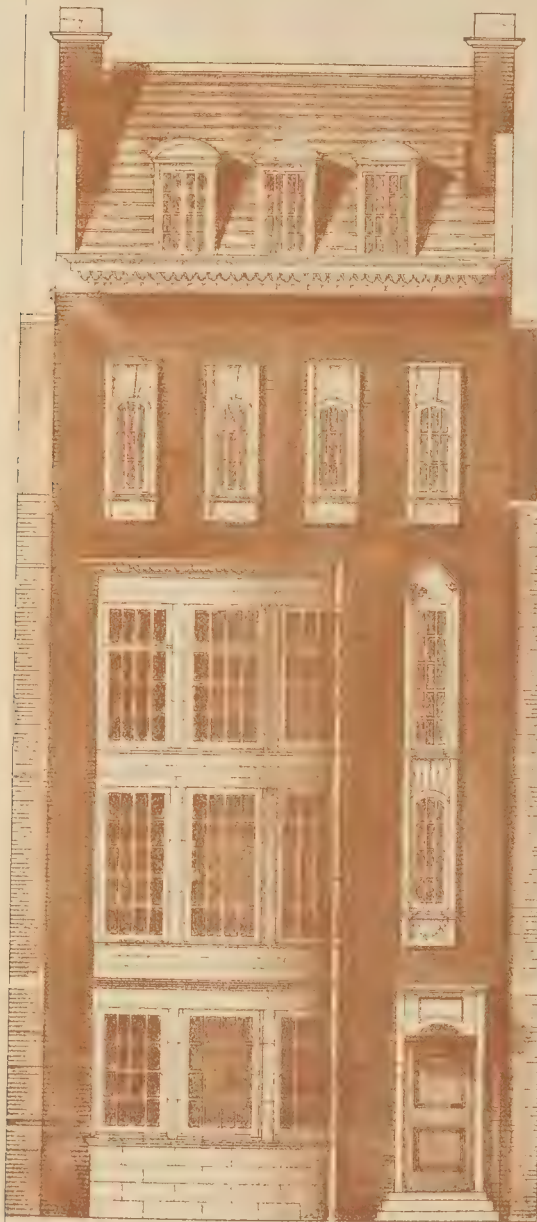
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1905





# The Builder.

VOL. LXXXIX.—No. 3273.

OCTOBER 28, 1905.

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 2. General View of Exterior.  
 3. Interior of Council-Room.  
 Old London Churches: Illustrations to Paper by Mr. Andrew Oliver, A.R.I.B.A.

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## The Mechanical Handling of Materials.

**I**N subjects are of more importance to those engaged in the execution of constructional works and in the management of industrial establishments than machinery and appliances for moving materials from place to place in an expeditious manner and at the lowest possible cost. Considering the history of any product from the source, and particularly through manufacturing processes, to the place where it is to be used, numerous transportations by land, river, and sea are found to be necessary, varying from hundreds, or perhaps thousands, of miles down to a few feet. Among the various products assembled on the site of a large building or engineering work, and finally incorporated in the structure, are timber, stone, brick, cement, tiles, slate, steel, and other materials representing miles upon miles of transport, as well as countless acts of lifting, lowering, pushing, and pulling, which account for a large proportion of the cost price. Even when the materials have been collected in readiness for the builder, they have again to be carried to their respective places and adjusted in position, thereby involving different means of transportation and handling which add to the cost of construction, and, not economically performed, seriously reduce the profits of the contractor;

In the works where iron ore is smelted, where pig-iron is converted into steel, and where steel is rolled into beams, bars, and plates, the transport and handling of materials during the process of manufacture represent huge sums of money. The same applies to cement and brick works, and all other manufactories where raw materials are converted into finished products. Even the means of transport themselves, such as steamships, railway engines, and engines used in providing motive power for mechanical apparatus employed in handling goods, all require supplies of fuel, the provision of which often involves hand labour or the use of labour-saving machinery upon an extensive scale.

In the foregoing remarks we have suggested only a few of the chief materials of construction, but these are sufficient to show how great a proportion of the cost of natural and manufactured products is due to operations of the kind indicated. When we consider the enormous proportions of the mineral products of the United Kingdom, and the immense quantities of products imported into the country, it is evident that the question of handling possesses truly national importance. The mineral production of the kingdom is not far short of 300,000,000 tons, and of miscellaneous imported products, cereals and seeds alone represent nearly 20,000,000 tons. To handle these gigantic quantities in the course of every year in an economical manner, to say nothing of timber, stone, cement, iron, and miscellaneous merchandise, not only at the place of production or the port of

arrival, but also during the process of distribution, obviously necessitates the use of machinery and apparatus on a most extensive scale. Thus the general subject is one of vital interest to every inhabitant of this country, and at the same time, of course, to the individual members of all civilised nations.

The expression which forms the title of this article is usually applied to transport over comparatively short distances and within the range of lifting and conveying machinery, that is stationary at defined points, or is capable of movement to a more or less limited extent. A fixed crane may be taken as an example of the former class, and a travelling crane as an example of the latter. The direction through which materials are moved may be entirely vertical or entirely horizontal, being performed in one case by a fixed hoist or lift, and in the other by a conveyor of some kind. But by the application of hoisting machinery to rails, ropeways, or equivalent devices, vertical and horizontal movements may be performed simultaneously or alternately, and the range of action can be increased from a few feet to several miles. In such an event the railway or ropeway, together with its supports and the actual lifting and conveying machinery, may be regarded as constituting a fixed apparatus of extensive scope, instead of considering the mechanical part separately as a travelling appliance. Owing to the ready response made by mechanical engineers to the demands of the mercantile and industrial interests, an extraordinary variety of appliances



is now available for moving materials from point to point, sometimes for a few inches or feet at a time as required in engineering and other workshops, and at other times for distances so considerable that the operation of handling is essentially similar to the transportation effected by a railway. Between these extremes there are countless types of apparatus, and as most of them combine the primary functions of vertical and horizontal conveyance, the establishment of an entirely satisfactory system of classification is by no means easy.

Until quite recently there has been no such thing in the English language as a treatise upon apparatus for the mechanical handling of materials. This deficiency has been removed by Mr. G. F. Zimmer, an engineer who has devoted much attention to the subject, having been engaged for several years in the design of elevators used in connexion with grain and flour, and later of installations applied to the handling of products such as ore, coal, and timber. Some of the information gathered in this way was presented in the form of a paper read by the same author before the Institution of Civil Engineers in February, 1903, and in the volume to which we now refer\* will be found the substance of this paper, together with numerous descriptions and drawings of hoisting and conveying plant, the whole forming a book of more than 500 quarto pages and containing 550 illustrations. To describe and illustrate machinery of the kind single-handed is an exceedingly onerous undertaking, and to perform the task in a manner that would not be open to adverse criticism is almost impossible in view of the wide field covered, the difficulty and labour involved in the collection of particulars, and the paucity of available data. For these reasons the public should be ready to overlook a few deficiencies, and to accept with appreciation the immense amount of useful information that has been presented by the author. To be really satisfactory a treatise on machinery for handling materials ought to be written and compiled by two or three experts in different departments of this important and comparatively modern branch of engineering. Mr. Zimmer has done as well as could be expected from one man, who has only been able to complete his task in intervals snatched from the exercise of a somewhat exacting profession, and who is identified with but one or two main divisions into which the huge domain of the general subject is divided. Judging from internal evidence, the material embodied in the author's paper read before the Institution of Civil Engineers seems to have been the starting-point of the whole book, the remainder having been tacked on rather than incorporated.

The difficulty of classification, which we admit to be great, is increased by the attempt of the author to establish a distinction between appliances for the continuous and the intermittent handling of materials. A grain elevator, with a regular succession of buckets attached to an endless chain or rope, clearly comes into the former class, and a hoist, having

a single bucket or equivalent device, as certainly comes within the latter. As the two classes of apparatus merge one into the other, it is hopeless to draw a really satisfactory dividing-line. A greater measure of success is attainable, however, by establishing separate divisions for lifting and conveying plant, and a third division for appliances representing combinations of the two first-mentioned classes. Thus three groups may be made, each with subdivisions, in which can be placed forms of mechanism intended for distinct branches of industry and commerce. Mr. Zimmer starts with a classification something like this, but after a few chapters his system breaks down, and the bulk of his manual is based upon an entirely different method of arrangement from that announced in the first chapter. The key to this confusion is suggested by a remark in the Preface, wherein the author says: "I found, perhaps before I was fully conscious of the fact, that a treatise on a somewhat neglected though vast section of engineering had grown up into my hands. At first, with the diffidence natural to one who has never cultivated literature, I hesitated to put my notes in the form of a book, but these doubts vanished that no book existed in the English language on this important branch of engineering." This quotation justifies the belief that the author has trusted a little too much to the process of natural growth, and has paid insufficient attention to the training, pruning, and grafting operations which are so essential in the garden of technical literature. In the following general review of the subject we shall have occasion to refer to some parts of the volume mentioned, but, for the reasons stated above, not always in the order adopted by the author.

Appliances for elevating, or hoisting, in a strictly vertical direction are few in number, and it is convenient to include with them the consideration of elevators only slightly inclined from the vertical. Machinery of this kind is largely used for the continuous hoisting of coal, coke, ores, cement clinker, grain, flour, and other materials in bulk; also of sacks, casks, and packages containing various kinds of substances. A continuous elevator is well represented by the apparatus generally adopted for hoisting grain at most large seaports, granaries, and flour mills. It consists essentially of an endless belt, to which buckets are attached at short intervals, the whole apparatus being enclosed in a casing and provided with a well, to which the material is continuously supplied, and from which it is continuously drawn, and a head from which it is discharged in a constant stream. The elevators adopted in gas-works, power stations, and other establishments are of similar character, although the details of design vary according to the character of the materials to be dealt with. Elevators for raising sacks, casks and bulky objects generally have platforms instead of buckets, and somewhat resemble the passenger lifts occasionally fitted in office buildings. Owing to the enormous quantities of material that can be transferred from one level to another by an elevator of the continuous type, this class of appliance

is more useful for unloading and loading purposes than for the requirements of ordinary industrial works, and unless combined with conveying apparatus of suitable character its scope is somewhat limited.

Intermittent elevators are far more general. They are practically lifts or hoists, with one or two buckets or platforms, as the case may be. Mr. Zimmer gives an interesting account of some blast furnace hoists employed in England, Germany, and the United States. This occurs under the head of *blast furnace elevators*, which can scarcely be looked upon as a suitable place. The reader who is anxious to obtain details of hoists, hydraulic, electric, and other power lifts of the kind that are so essential in industrial establishments and on constructional works, will look to him for guidance. Although he will find incidental references to elevating machinery in the series of chapters dealing with "Unloading and Loading Appliances" and elsewhere. Considering the value attaching to lifts for raising materials from one floor to another in factories, workshops, and warehouses, for hoisting materials from ground level to the upper parts of a structure in course of erection, and in a book professing to be a complete treatise on the mechanical handling of materials some mention of such machinery is certainly a thing to be desired.

If elevators alone were used in large mercantile and industrial establishments, a good deal of hand labour would be required for feeding at the bottom and distribution at the top. Consequently auxiliary devices are very generally applied in connexion with elevating machinery. This brings us to apparatus intended for transporting material in a horizontal direction. It is really very difficult to know where to stop when considering this branch of the subject. Perhaps it would be going too far to include a public railway system among horizontal conveyors of material. Nevertheless, industrial and contractors' railways obviously come within reasonable bounds as much as aerial cableways and kindred plant discussed in this treatise. When minerals have been hoisted out from the depths of the earth, or timber has been cut in far distant forests, the problem of economical transport is a serious one for the ultimate user, as well as for the owner of the mine or forest, who naturally has to face competition. Private railways and various systems of transport are adopted to convey the product to the nearest railway, river, or seaport. In America and elsewhere some very ingenious methods have been adopted for conveying timber and other materials by gravity inclines and water-chutes. In Norway, logs that have been floated down rivers are taken from the water and transported to the mill, often at a considerable distance, by means of a trough, in which runs an endless chain with spikes serving to engage the timber. Some account of these and other useful aids ought certainly to be given in addition to the methods of rope haulage and conveyance by cableways which Mr. Zimmer has described so admirably. We should also like to find something about railway lines in engineering works

\* *The Mechanical Handling of Materials.* By G. F. Zimmer, A.M.Inst.C.E. London: Crosby Lockwood and Son. 1905.



and upon the site of large contracts. The ingenious mode of dealing with materials by what is termed electric telpherage is one that should be found extremely serviceable on temporary works, and the analogous system of conveyance by runways is particularly valuable in manufacturing establishments. Live rolls installed at ground level in steel works are really invaluable for the automatic transfer of heavy girders and bars from point to point, and kindred devices are equally useful in feeding machinery of all descriptions, as well as in removing the finished or partly finished articles. We must point out, in justice to the author, that he has given a really valuable account of self-emptying railway trucks, which are gradually being adopted in this country. Mr. Zimmer is quite right in emphasising the advantages of these, by the aid of which many thousands of pounds per annum are already being saved. Their more extensive application would be of incalculable value to the railway companies, with ultimate benefit to the national industries owing to the consequent reduction of rates.

In treating of conveyors, such as are frequently applied in combination with elevating plant, the author is evidently quite at home. The modern worm conveyor is practically the same thing as the Archimedean screw used by the ancients. In its earlier form the worm conveyor consisted of a spiral attached to a central shaft made to revolve in a trough, and so to push the material forward in a continuous manner. In the present day this type of conveyor is better made, but the principle is unchanged. The worm conveyor is very largely adopted for transferring grain from place to place in warehouses and granaries, and when the spiral is fitted inside a tube the apparatus is excellently adapted for moving materials that require to be well-mixed, such, for instance, as sand and cement in the dry state for mortar mixing, and slurry in the process of cement manufacture. Scraper or push-plate conveyors, in which the trough is fitted with a moving endless chain, or rope, fitted with plates at short intervals or with bottomless receptacles, also find extensive use. Band conveyors, having a trough of flexible material, in the form of an endless band, are still more popular, but the most modern type of the appliance is the vibratory trough conveyor. This is of German origin, and consists of a long trough receiving the material at one end and transmitting it to the other by a succession of reciprocating movements. The trough is supported on spring legs fixed in an oblique position, and each forward stroke is made in a direction inclined about 30° from the horizontal. Thus the material is thrown forward and slightly upward, and, as the return stroke is quickly made, the material comes to rest at a point a little in advance of its original position. By repetition of the process the material progresses by a series of jumps, at the rate of from 40 ft. to 70 ft. per minute, towards the far end of the trough. Conveyors of this type have been extensively employed for draining, picking, classifying, and sifting coal, for handling materials that require cooling or drying during transit, for handling moist sugar in refineries, and

for all the purposes to which conveyors are ordinarily applied.

We now pass on to the third group of appliances combining the operations of vertical and horizontal transportation. The most familiar types of this large family are cranes, which the mercantile and industrial classes of the entire world justly believe to be extremely useful for the economical handling of materials. We have no doubt that Mr. Zimmer shares this opinion, although there is little evidence of it in his treatise. Careful study of the book reveals the fact that incidental mention of cranes is actually made in sundry chapters, but the index merely suggests one section in which crane construction is particularly considered, and the general type there described is the high-level or cantilever crane, of which the Temperley transporter is a well-known example. When the time comes for a second edition we hope the author will make good the deficiency here indicated. Among the varied combinations that are described we find pneumatic elevators and conveyors for loading and unloading ships, but regret to notice that pneumatic dredgers receive no attention. This can scarcely be an oversight, for during the discussion of the author's paper at the Institution of Civil Engineers attention was particularly called to this valuable type of apparatus. As a matter of fact, with the exception of grabs, no reference is made to dredgers of any kind, nor to steam navvies, nor to trench excavating machinery. It is a genuine satisfaction to come to the excellent chapters wherein loading and unloading devices, self-emptying barges, coal-tips, coal handling plant, automatic weighing machinery, and other important branches of the subject are fully discussed and adequately illustrated.

Perhaps it is not quite correct to describe as deficiencies some of the omissions to which we have referred, for it is probable that the author has purposely confined himself chiefly to the discussion of means for handling materials in the huge quantities with which shippers and mine owners are accustomed to deal, and, as this volume proves in a very conclusive manner, the task has been sufficiently onerous. Still, there are many other forms of machinery and apparatus equally deserving of description. We may refer particularly to varieties of cranes, hoists, lifts, and conveyors, used in transporting raw materials and partly finished products through the different departments of brick and cement works, sawmills, and engineering shops. Systems of removing chips and sawdust in wood-working establishments and of dealing with wool and other substances in textile factories are also worthy of notice, and the elaborate plant employed in large building and engineering contracts for handling the constituent parts of mortar and concrete as well as for hoisting, conveying, and depositing these and other structural materials in place, represent another most important phase of the subject. Let anyone make a series of visits to works of the kind and he will realise how wide a field exists for labour-saving appliances other than those described by Mr. Zimmer, and how great is the

need still remaining for a treatise dealing with mechanical aids for the handling of materials employed in these branches of industry.

#### NOTES.

A RATHER surprising letter from the Executive Committee of the Navy League appeared in last Saturday's *Times*, in regard to the artistic improvement of Trafalgar Square—surprising in this respect, that the Navy League should assume that because the monument to Nelson is in Trafalgar-square the square is in some kind of way their peculiar care. Trafalgar-square is a public place in the usual sense of the word, and the question of its decoration is no more a special concern of the Navy League than they are the body proper to advise in such a matter. We have been anxious for a long time to see a finer treatment of Trafalgar-square than the present; but we do not expect that any proposal to make it in a special sense a naval square, and to remove the existing monuments that are not naval, would receive public or official approval. Some of the suggestions made in Captain Crutchley's letter, though not new, are true enough; that the fountains, in point of design, are a disgrace to the site, has been said over and over again. But the letter entirely misses two important points which must be considered in any effort at the artistic improvement of Trafalgar-square. The first is the necessity of remodelling the front, and especially the cupolas, of the National Gallery so as to render the facade worthy of its position\*; the second is the want of grass, flowers, and verdure generally in the square, which ought to be made a stately fountained garden. We observe that not only is this last point omitted in the Navy League letter, but that the Office of Works, in their reply, have gratuitously tabooed the idea before it was suggested; the conclusion being that in their judgment nothing is to be done to prevent the square being made a place of popular mass-meetings. As long as that idea is maintained, any attempt to make the square what it ought to be is of course thrown away. That what is popularly called "the finest site in Europe" should be left a bare yard in order to afford a meeting-place for mob orators to address the unwashed, who could find a dozen other open spaces to meet in, is only too characteristic of England, where politics are always put before Art.

**THE Blue book recently published relating to the output of mines and quarries contains some interesting figures as to the coal industry. The output of coal for the year 1904 is a record, reaching a total of 232,428,272 tons—an excess of over two million tons on that of 1903. The value of the output of 1904 is, however, less than that of 1903 by 4,375,763*l.*, the average price of coal having fallen from 7*s.* 7-93*d.* in 1903 to 7*s.* 2-58*d.* last year. In 1900 the average value per**

\* Since the above note was written, we are glad to see that in a letter to the *Times* by Mr. H. J. Mackinder, this necessity for remodelling the National Gallery front, if anything good is to be done with the Square, is strongly insisted on.—ED.



ton" was 10s. 9½d., and from the figures we quoted last year it appeared that, whilst the value of coal in this country was falling, in the United States it was rising, the value there in 1900 having been 5s. 3½d., but 6s. 6½d. in 1903. The United States, however, is a very large importer of coal, the import into that country being nearly half its export, so that, whilst a fall in the price of coal is serious for the industry in this country, it may be of indirect advantage to our transatlantic friends. The export of coal from this country in 1904, exclusive of bunker coals, etc., used in foreign-going ships, was 46,255,547 tons, and inclusive 65,822,035 tons, and here again a large increase is shown on the preceding year, and the coal tax has not apparently tended to lessen the export. The coal remaining for home consumption is placed at 166,606,237 tons, or 3·894 tons per head of the population:

At a time when projects for improving the Port of London have simmered down

to the meagre residual scheme of the Thames Conservancy, and when the hands of those who would revive inland navigation are tied by the bonds of conservatism and vested interests, Belgium is busy with numerous works for the improvement of her seaboard and inland ports, and of her splendid system of inland waterways. Quite apart from the projected extensions at Antwerp, considerable activity is being displayed at Ostend, Ghent, and Brussels. The extensive harbour works at Ostend are now almost completed and will be opened during the present year. Good progress is being made in the enlargement of the Ghent-Terneuzen ship canal, and when the works have been completely finished ships of large size will be able to gain access to the port of Ghent. Brussels is already open to vessels of about 200 tons, a maximum that will be greatly increased by the widening of the Willebroeck canal between the city and the River Rupel. This operation and an important extension of the dock system are in active progress at the present time. Bruges has already been furnished with means of direct access to the sea and the newly-finished docks are fully occupied. As for canals, the Government are busily engaged in widening channels to provide for the passage of larger vessels not only on the main trade routes to France and Germany, but also on various local waterways. The new Canal du Centre, to connect the eastern and western divisions of the canal system, will complete the network of waterways along the coal-fields and place the industrial regions in direct communication with the seaports and towns of West Flanders. These and other works too numerous for individual mention will be of immense advantage to the country. It is worthy of note that they are the result of a definite and well-considered policy inaugurated by the Public Works Ministry, a department much needed in England.

AMONGST many interesting statistics contained in the Report of the Advisory Board of Engineers to the Royal Commission on London Traffic, none are

more instructive than those which deal with the figures showing the relative expenditure of the railway and tramway companies on improvements as compared with the municipalities. Thus it is estimated that the former companies during the past twenty years have expended some 100,000,000*l.*, whilst during the past fifteen years the municipalities have but expended a little over 9,000,000*l.* in a like direction. The result has been that, whilst the railway companies have constantly had their assessments raised, and the rates have also themselves continually increased, the municipalities have certainly not expended the sums so received in providing increased facilities for the larger traffic the railway and tramway companies have brought to their doors. It is also observable that, whilst the Advisory Board in its Report states that the number of authorities create a serious difficulty in the way of carrying out any comprehensive proposals for improving the traffic in London, the Association of Municipal Corporations, meeting a day after this Report was published, passed a resolution that it was inexpedient that wide legislative powers should be conferred upon Government departments, and it was desirable that in legislation affecting the powers and duties of municipalities adequate freedom of action in administration should be secured to town councils. The public may, however, well begin to ask itself whether too great a discretion has not already been allowed to the local authorities whose tendency has been to take upon themselves duties, and to expend the rates on objects, wholly outside their legitimate sphere, whilst neglecting improvements they might well have given their attention to with direct benefit to the community.

#### Railway Rates and Charges.

A CASE brought by the London & North-Western Railway Company against a City manufacturer last week affords an illustration of the fact that railway companies have to be on their guard against others besides the passenger who travels without a ticket, and the man who nails a package of goods to the bottom of a "returned empty." If two ways can be found of accurately describing the same article, and in one case a lower rate will apply than in the other, the trader may fairly adopt the former description. But a deliberately false and misleading description is another matter, and in such cases the railway companies are properly entitled to protection. The exercise of such misguided ingenuity is, in the case of an iron girder or a truck of bricks, at once impracticable and profitless; but when we come to merchandise in boxes, etc., it becomes both practicable and tempting. Almost every article of commerce is now included in the General Railway Classification, and it may be mentioned that, roughly speaking, the rate applicable to each class is about 20 per cent. above the next lower rate. This shows the extent of the advantage to be gained by declaring a consignment in a lower class than it should be, and the railway companies assert that this is very frequently done. But when we are told that 90 per cent. of their customers are systematically

defrauding them in this manner, as stated in the case in question, one is tempted to regard the statement as an absurd exaggeration. The present case, the magistrate considered, proved that business men in the bulk were honest, and that the defendant was in no way to blame morally. In view of this decision, and of the famous pronouncement that "cats is dogs and rabbits is dogs," it is not surprising that, if anyone finds a more advantageous name for it, he ceases to "call a spade a spade."

#### Motor Vehicles.

At a time when a Royal Commission is considering the question of motor traffic it may be interesting to note the number of such vehicles registered in London up to September 30 of this year. The return just issued by the Control Committee of the London County Council gives the following figures:—Motor-cars, 8,059; motor-cycles, 4,808. These numbers bear a very small proportion to the number of horse-drawn vehicles, and it will be in the recollection of our readers that, from a return given for the year ending May 31, 1904, in the Metropolitan Police District, the number of accidents attributed to motor vehicles was 1,817. At that time the number of motor vehicles was considerably less; during the last three months alone 371 motor vehicles have been registered, and on these figures it would appear that the accidents occasioned by motors is at least 15 per cent. a very high average, but not one to occasion surprise when the figures relating to the average speed in the central area of horse and motor vehicles as contained in the report of the Advisory Board of Engineers to the Royal Commission of London Street Traffic are also considered. These figures show that in the hours when traffic is slack in that area the average speed of horse omnibuses is 5½ to 8 miles, motor omnibuses travelling at 8½ to 11½ miles, the speed of horse cabs being 6 to 8½ miles as compared with 12 miles in the case of motor cabs, the speed at crowded times being less, but in about the same proportion.

#### Recent Dock Construction.

CONSIDERABLE activity is evident in various parts of the country with the object of providing more fully for the requirements of modern shipping. The important branch docks and other works on the Mersey will be ready for use in the course of next month. As the undertaking, which represents an expenditure of nearly 540,000*l.*, was only commenced in April last year, the works and engineers' departments of the Mersey Docks and Harbour Board have distinguished themselves by the rapidity with which the works have been pushed forward. Another remarkable enterprise is the new Trafalgar dock at Southampton, recently completed at a cost of over 300,000*l.*, and formally opened last Saturday. This is the largest graving dock in the world, being 875 ft. long by 125 ft. wide, with the depth of 33 ft. It is equipped with the largest electrical crane yet built, capable of lifting a load of fifty tons at a radius of 87 ft. The dock is approached directly from the estuary of the river Test, which has been deepened by



dredging to 30 ft. below low water level, so as to provide access at all states of the tide for the largest Atlantic liners that are likely to be built within the next few years. Although the Trafalgar dock is a sufficiently noteworthy undertaking, it constitutes only one item of the programme inaugurated by the London and South Western Railway for developing the port of Southampton. The extensive dock schemes which are in progress at Grimsby and elsewhere, and the new project in connexion with Dover harbour, also indicate that the necessity for progress is duly appreciated by those interested in the shipping industry. London seems to be the only place where stagnation reigns supreme.

Concrete  
Buildings  
Blocks.

HOLLOW concrete blocks have become so common in American building construction

that public authorities are beginning to consider the advisability of recognising them in building codes. As a matter of fact, the Building Department of Newark, N. J., have already drawn up a special section of their regulations referring to the new form of structural material. This promptitude deserves every commendation and shows how much more readily innovations are taken up in the United States than in our own country. Steel is not exactly a novelty, but it has not yet received adequate recognition as a material of construction in British building regulations. The same applies to concrete-steel which, although of more recent introduction, has been made the subject of legislation in almost every civilised country outside the United Kingdom.

Paint for  
Steelwork.

A VALUABLE lesson upon the qualities of linseed oil paint is furnished by the investigations made on the New York Rapid Transit Subway. The steel used in the construction of that work was delivered with a coat of paint composed of pure red lead and pure linseed oil, and was subsequently treated with a heavy, continuous coat of similar paint, consisting of 33 lb. red lead to one gallon of oil. Examinations made after the lapse of two years showed the existence of oxidation under the paint, and from photomicrographs taken on one section of the line it seems probable that the red lead had actually operated to produce rust instead of preventing it. As for the linseed oil, the chemist by whom the investigations were conducted came to the conclusion that moisture had been carried through the film to the surface of the metal. Previous evidence exists to show that a film of linseed oil may combine with water to form a semi-solid substance similar to soap, and it is only reasonable to infer that the mineral bases present in paint pigments assist the process of saponification. The results observed in New York demonstrate the fact that linseed oil paint is practically useless for the preservation of steelwork in situations where abnormal humidity prevails. The problem, however, is to find a form of paint absolutely impervious to moisture and gas.

The Housing  
Problem  
in Liverpool.

LIVERPOOL has always been a conservatively-minded city, and it appears to be about to follow a conservative policy

in regard to housing. From the speech of the Chairman of the Housing Committee of the Corporation at its final meeting for the year last week, it appears that, in his opinion, the time has come for pressing owners to make improvement in existing dwellings rather than for the Corporation to build new workmen's houses. In 1864 22,200 houses were pronounced to be structurally insanitary; now the estimate is 8,500. The worst class of houses has now been dealt with, and the policy of the Committee is to endeavour to improve the remainder through pressure on the owners and not by municipal rebuilding. Without full details it is impossible to say if this policy is feasible or not. But it is not desirable for municipalities to do more wholesale municipal building than is absolutely necessary. It is a great temptation to a Corporation to do work in a wholesale way, to make a clean sweep of a block of buildings, and to erect model dwellings. The ratepayer necessarily has to suffer in his pocket, and if the same end can be attained at less cost and in a less heroic manner the more moderate should be followed.

Harcourt House, HARCOURT HOUSE, on the No. 19, west side of Cavendish-square, nearly all the site of which was recently acquired to provide additional accommodation for the service of the Western District Post Office in Vere-street, was formerly known as Bingley House. It was originally built for Robert Benson, Lord Bingley, in 1722-3; after Lord Bingley's death in 1731 it was bought by Simon, second Viscount and first Earl Harcourt, who sold it to William, second Duke of Portland. In the King's Drawings, British Museum, is a print, engraved by J. Rocque, of the original design "as it was drawn by Mr. [perhaps Thomas] Archer, but built and altered to what it now is by Edward Wilcox, Esquire." It appears as Bingley House in Rocque's survey of 1744-46. The stabling was rebuilt by Samuel Ware in the earlier half of the XIXth century; the house formed the town mansion of the sixth Duke of Portland and afterwards of the late Marquis of Breadalbane. The high screening wall, courtyard, and general air of seclusion give it an unusual appearance, less frequent in London than in the older aristocratic *quartier* of Paris, which is noticed in the "New Critical Review of the Public Buildings in London," 1736. An earlier house, if any, on the site has been gratuitously attributed to Inigo Jones: the laying out of Oxford, now Cavendish, square, was begun in 1717, long after Jones's time, the first buildings there being the two wings—at the corners of Chandos and Harley streets—ascribed to E. Shepherd and to James, of the mansion designed in 1720 by John Price, but not completed, for the Duke of Chandos. The two wings, of red brick and since pulled down, are depicted in T. Malton's aquatint, July 28, 1800.

Monument to  
Sir Thomas  
Browne.

At Norwich, on the 19th inst., a statue was unveiled to the memory of the author of the "Religio Medici," a book so dear to the students of quaint and curious

thought in English literature. Lord Avebury performed the ceremony, and made some remarks on the special character of Browne's mind and writings, and "hoped that the sight of his statue might induce many to read his books"; not a superfluous remark, for though his writings are known to every student of English literature, they are certainly not as widely read as they ought to be, for the wisdom and suggestive thought they contain. Sir Thomas Browne was a native of Norwich, which has thus, though late in the day, commemorated one of its most illustrious citizens. The statue, which is in bronze, is by Mr. H. Pegram, A.R.A., and represents Browne seated, in the costume of his period, looking thoughtfully at the broken portion of an ancient vase which he holds in his right hand; one of those "sad and funereal pitchers" the consideration of which prompted one of the most characteristic passages in his writings. The bronze was cast by Messrs. Hollinshead & Burton, of Thames Ditton. As a memorial statue the work is very original and of a vivid personality.

The  
Fine Art  
Society.

At the Gallery of the Fine Art Society is a collection of water-colour drawings of Rome and Umbria, by Signor Alberto Pisa. Though not works of the first order, these form a collection of water-colour sketches of somewhat more than topographical interest; the best of them being some views in the gardens of the Roman villas, Borgese and d'Este. Considering that a considerable portion of the drawings deal more or less prominently with architecture, it is not as carefully treated as it might be; the columns in the "Temple of Saturn" (1) are too thin in proportion; in "View of St. Peter's from the Pincio" (9) St. Peter's is crooked; and in one or two drawings of the Colosseum the real size of the structure is not realised. Some of the drawings of the early basilicas, and others buildings where classical detail does not come in, are interesting and more satisfying from an architectural point of view. Mr. W. Foster's exhibition of water-colours of various kinds, under the title "Here and There," shows a capacity to treat effectively a great variety of subjects. Some of these are studies of birds, living and dead, painted with great care and brilliancy; in others, as in "Harvest, Sussex" (8) and "Skye, from Balmacara" (10), we have landscapes of no ordinary beauty of style and execution; buildings are well treated in various drawings of old English cottages and of street scenes at Hyères and elsewhere; and coast or beach scenery is treated with a marked perception of colour effect, in "Beachy Head" (43), "At Eastbourne" (47), "Low Tide" (55), and "Oyster Catchers, Warkworth" (65). Mr. Foster seems to be a water-colour painter of very all-round capabilities.

The  
Carfax  
Gallery.

AMONG "Some Oil Paintings by Deceased Masters" on view at the Carfax Gallery are a fine Turner of the early period (date not given), "The Lake and Castle of Inverary," and an example—"The Bridge at Rimini"—of Richard Wilson



at his best; the other Wilson, "Tivoli," is not equal to it. James Ward's "The Cornfield," with its old-fashioned figures painted in an old-fashioned style, is almost amusing from the present-day point of view; Reinagle's "A Farm and Pool," also in a *passé* style, is interesting in respect of the treatment of the buildings. The stiff religious pictures described as "School of Antwerp," "School of the Netherlands," etc., do not interest us much; and if the "Amorini in a Tree" is really by Stothard, it is unlike any Stothard we ever saw; nor can we feel much faith in the "St. Anthony" near it being by Gerard Dow. "Bathers among the Ruins," by Poelenburg and Steenwyck, is a very interesting example of its class; and there is a really fine life-size portrait by Goya. At the top of the room is also Whistler's capering portrait of Connie Gilchrist, an object of admiration to Whistler-worshippers, but to our mind equally questionable both in taste and drawing.

#### BRITISH SCHOOL AT ATHENS.

The annual meeting of the subscribers to the British School at Athens was held at the Rooms of the Society of Antiquaries, Burlington House, on Tuesday, the Bishop of Bristol presiding.

The Report, which was taken as read, gave the following statement with regard to the work of the year:—The fourth campaign at Palaikastro lasted from March 28 to June 18. The Congress and the Lakonian excavations detained the Director in Greece, and the work in Crete was directed by Mr. R. McG. Dawkins, Fellow of Emmanuel College, Cambridge, who had spent two previous seasons on the site. The prevailing disorders in the island caused some inconvenience. The centre of this year's work was the temple area which in 1904 yielded the Hymn to the infant Zeus and other remains of a Hellenic sanctuary, on the eastern margin of the prehistoric town. In this region there proved to be unexpected depth of soil and very complete stratification, all periods from the Classical Greek back to the "Early Minoan" being represented. Of the temple itself, which was probably of wood, little remains, but its terra-cotta decoration had been recovered, including a frieze of chariots and metopes adorned with the head of Medusa. The enclosing wall of the temenos had been traced, and near it had been found quantities of offerings, vases and lamps, bronze shields, and also a bronze lion, which, like the terra-cotta lions of the Altar-hill at Praesos, may point to the survival of the old cult of Rhea beside that of her son, Zeus. The Bronze Age buildings underlying the temple proved to be especially rich in objects of the fine "Palace style," which was known to have flourished in Crete during the Egyptian Eighteenth Dynasty. These included painted jars with marine and floral designs, a hoard of thirty-six elaborately carved stone vases, and four ivory plaques engraved with lilies and other figures. Neither here nor in the poorer strata intervening between this and the Hellenic level was there any definite evidence of religious use. But in a slightly older stratum Mr. Dawkins came upon a quantity of bones of oxen which seemed to mark the position of an early place of sacrifice. Thus the lonely Hellenic temple, which stood a thousand years later on the ruins of the prehistoric town, occupied, whether by chance or by some direct religious survival, a site of immemorial sanctity. There were terra-cotta models of bulls' heads and a great mass of painted pottery of the beautiful transitional style which Mr. Evans called "Late Minoan I."—a most valuable find, for hitherto this period was not well represented at Palaikastro. So, too, with the lower strata; until this year they had plenty of "Middle Minoan" forms and designs, but very little "Early Minoan" material; this want, too, had now been supplied. Deep deposits under the temple area had furnished a quantity both of an older plain ware with

dappled black and red surface and of the black ware with geometrical patterns in white which during the Third Millennium B.C. gradually developed into the polychrome Kamares style. With these "Early Minoan" remains the stratification ended; no regular Neolithic deposit had been found at Palaikastro, though stone axes are not uncommon in the district. But Mr. Dawkins had made a brilliant little discovery which goes far to fill this gap. He traced some of these axes, brought to him by a peasant, back to their finding-place, a cornfield in a depression of the high bare limestone plateau which rises behind the plain of Palaikastro. Excavation disclosed not only primitive pottery, bone needles, broken celts, and chips of obsidian lying thickest under a rock-shelter at one end of the plot, but the walls of an L-shaped two-roomed house, unmistakably of the same age, since within it were found twenty stone axes, more than half of them in brand-new condition. This discovery gave us, for the first time in the Aegean, a definite idea of a Neolithic homestead. In other directions Mr. Dawkins and his helpers, Messrs. Charles Hawes, Kirkwood, and Dickens, had made important progress. The main street of the prehistoric town has now been cleared for a total distance of more than 350 yds., and some of the side streets were further explored. Outside the town several small cemeteries were discovered, and Mr. Hawes, the anthropologist of the expedition, measured a number of skulls from "Late Minoan" earthenware coffins, obtaining data for comparison with the "Middle Minoan" skulls measured here in 1903 by Mr. Duckworth. The results of this season supplemented and complete those of previous years in a most satisfactory way. For the present further excavation would add little to our knowledge, and it was better that there, as at Troy and Phylakopi, part of the ground should be spared until researches elsewhere increased our comprehension of the evidence. The first site examined in Lakonia was that of Thalamai on the west coast, famous in antiquity for its oracular shrine of the Goddess Ino—the sacred spring mentioned by Pausanias is almost certainly identical with one outside the village of Koutiphari, the water of which welled up within a vaulted chamber of recent date and then flowed out across a sunken court which was still in part enclosed by a wall of fine Hellenic masonry. Their trial trenches showed many traces of ancient occupation round the spring, which was still reckoned the best in all the narrow strip of Northern Maina which extends between the Taygetus range and the sea up to Kalamata. But the whole neighbourhood must have been ransacked for stone again and again in the Middle Ages, when there was a considerable population here. The country side was studded with little Byzantine churches, often built of ancient blocks; Mr. Dickens discovered and photographed some very interesting sculptured marble capitals and screens, some of them exhibiting Western characteristics, due perhaps to the Frankish occupation. A few inscriptions were gleaned—one, an archaic dedication to Asclepius, gave a new form of his name—but no new light was thrown on the cult of the local goddess. At Geronthrae, the modern Geraki, a thriving place on the eastern margin of the Eurotas basin, Mr. Hasluck, Fellow of King's, and Mr. Wace, Fellow of Pembroke College, Cambridge, did some experimental work on the ancient Acropolis. There, as at Thalamai, the Hellenic remains had been used as a quarry by Frankish and later builders, and there was nothing to justify a large excavation. An interesting settlement of the early Bronze Age was located, a grave containing geometric pottery of a quite new type was opened, and some inscriptions found. Moreover, arrangements were made for the publication of a remarkable series of archaic marble sculptures, work of a local school in the VIIth and VIth centuries B.C., which have been collected by the enlightened mayor of Geraki. A little digging was done at Angelona, near Monemvasia, as a result of a discovery made by Mr. Hasluck on an exploring journey. A farmer in clearing ground for cultivation had turned up a marble relief and other objects which suggested that there had been some sort of

shrine on the spot. The clue was promptly followed up, with the result that the whole equipment of a local hero had been brought to light. There was a fragment of the cultus-image of the hero, the relief already mentioned, which is a masterpiece of VIIth-century art; a hero or perhaps a warrior standing on an altar; there was a terra-cotta pyxis, which he was enthroned, holding a drinking cup and attended by a snake; there was the snake itself in bronze, and a terra-cotta plaques and figurines, and a number of miniature drinking-cups of the kind that were so often represented in the hero on the Spartan reliefs. The whole find, by the wise decision of Dr. Carnaud, was to be exhibited together in the Museum of Sparta, where it would furnish a most suggestive illustration of the large class of local sculptured alabs representing the deceased ancestor enthroned and attended by a snake. To complete the record of this year's work in Lakonia, mention must be made of a series of plans and drawings begun by an Austrian surveyor, Mr. v. Hasluck, under Mr. Hasluck's supervision. These of Zarax and Epidauros Limeria had now been completed.

The Bishop of Bristol, in moving the adoption of the Report, said there was no nation more entitled to take part in ancient Greek things and Greek investigations than the English nation, considering that the whole of their earliest literature was written in Greek letters. He did not know that any of the other nations who were helping in this work could say the same thing. They were Greek letters slightly altered and not on wood, and they found that there was no such thing as a horizontal line because the wood splintered. There was another fact which he hoped someone would take in hand seriously. It was a certain fact that things found in the investigations at Mycenae were almost identical with tombstones in the East of Scotland, and if a Scottish antiquary had asked where these things came from he would reply without hesitation that they were Scottish. If that was so—and it was—then he thought they should study a little more than they had the connexion of this land of ours in the matter of decoration and the beautiful decoration to which he had referred. With regard to the excavations carried on by the School, no one could imagine, except persons as old as himself, what vividness past excavations had given to their study of Greek literature. Besides that, the whole tendency of the age was to dig and excavate into fresh stages of history, both to discover what was there and to find their existing writings by what they found and to show their influence on modern times. If they did nothing more than to vivify Greek literature by their discoveries and set right a great deal of Greek history, then he would say, "Go on as you are." The Chairman proceeded to deal with the growth of the spirit of investigation at Cambridge, which was fostered by various scholarships founded to send students for a certain number of years to foreign lands; and he concluded with an appeal to the public to help forward the work of the School at Athens. They were told that the School intended to retire from the work at Palaikastro, although it was stated that there was no place where so many beautiful things could be found at so little expense. At first it struck him whether it would not have been wise to have gone on and exhausted the site, but perhaps it was well that they should leave this site until they had learned something from some other fields were to the site, and to leave it to future generations when they had further knowledge. The reason the work had been done so cheaply was that the students had paid their own expenses. That ought to open their hearts, for a work which brought forth such self-denial ought to allow of further investigations than the present funds permitted. The past year had been rich in discovery, but he hoped there would be no withholding of support when the year were not so interesting, for it was not they had a comparatively colourless report that the School needed the greatest help. Sir J. Evans seconded the adoption of the report, and it was carried.



Mr. R. C. Bosanquet, the Director, said that the past year had been a particularly busy one for the staff of the School and a particularly productive one for the students. They had completed the Penrose Memorial Library, and no sooner was that completed than they had the Archaeological Congress, which marked an important epoch in the development of the School. For the students it was a productive year, not on account of any action of the staff, but because they were fortunate in having half a dozen exceedingly able students, a good proportion of whom had spent several years in the country. A particularly happy event was the visit of the Queen. It was her third visit to the School, and she graciously presented her portrait. He did not propose to speak so much of particular discoveries that evening, but to give some idea of the range and variety, and he might say independence, of the work which had been done by the students of the School. Owing to the Congress it was impossible for him to proceed to Crete, and the work at Rous-soukios was entirely under the control of Mr. Dawkins, who carried it out with the highest degree of success. The work was now practically completed so far as they intended to continue it at present. The main street of the town had been traced further until it led them into an outlying block of buildings at the extreme end of the site which had been excavated last year. The whole length of street excavated was 350 yds., and several cross-streets had been traced a considerable distance. The principal work of the year was a complete excavation of what they called the temple area. There were five different strata, beginning with an early Minoan building lying 15 ft. below the surface. [Mr. Bosanquet illustrated the discoveries made by Mr. Dawkins by a number of lantern slides, several of which showed the drainage of a late Minoan house.] Another of the workers at Palaikastro was Mr. Hawes, a new member of the School. Mr. Hawes was an anthropologist who had been trained to this work, and he was fortunate in finding some old Minoan interments and a number of skulls. From Palaikastro Mr. Hawes went out to obtain data with regard to the living inhabitants of the island, and he had very remarkable success, and obtained in all measurements of 1,440 natives. He traversed the whole island, including the White Mountains, which was the centre of a revolution, but, thanks to a mixture of audacity and tact, he succeeded perfectly. The results would not be published for some time, but Mr. Hawes told him that his measurements confirmed the view that in Crete there existed in the mountains a race considerably taller and finer than the population of the plains, and his measurements showed that they were more long-headed. To show that Mr. Hawes had not neglected the wider aspect of archaeological work, the speaker showed a number of photographs which Mr. Hawes had taken of places he had visited. The work in Crete had been many-sided, but it did not touch the Classical Period; the work in the Peloponnese had. They had attacked sites at Geronthae and at Angelona, and Messrs Tod, Hasluck, and Wace had explored almost every village in Southern and Eastern Lakonia. At Geratsi they excavated near the springs, and found many remains of the great blocks which had been used in buildings of Byzantine and mediæval date. They did some work at Thalamai, and they found the churches in the district were very numerous, and consisted largely of ancient blocks. It was evident that some of these churches were on the sites of some of the great blocks, for the great blocks could not have been carried there. Mr. Dickinson, who spent some time in the district, devoted himself to churches, and in the end he was rewarded by finding some interesting marble capitals and screens. Several inscriptions were gleaned, including an archaic dedication to Asclepius. He also obtained a very interesting series of photographs of mediæval, principally Frankish, sculptures. Mr. Bosanquet exhibited a photograph of one capital, showing on one side the representation of a dancing bear, and on the other side two foxes yoked to a plough, being driven by a bird. He could offer no explanation of the meaning of this, but it was an interesting piece of sculpture to which, he believed, attention had never

been drawn before. Mr. Hasluck and Mr. Seyk spent some little time at Zarax, and a complete plan of the fortresses there was obtained. While exploring in this district Mr. Hasluck made a very interesting discovery of a relief in a peasant's house, which was excellent 17th-century work. He found out where it came from, and a small excavation was carried out, and a number of other objects were found, with the result that practically the whole equipment of a local heroön had been brought to light. This was the first instance of a whole series being found together. Mr. Tillyard came out to fill Mr. Tod's place in the library, and his work had been a study of the whole subject of Greek boundaries and frontiers. The frontier tower which was now exhibited had never before been photographed. Another journey by Mr. Hasluck into Broussa, in Bithynia, had resulted in the discovery of a very interesting Byzantine church. Mr. Wace also made a journey in the neighbourhood of Volo, and he visited the little-known islands of Skiathos and Skopelos. In conclusion, Mr. Bosanquet showed a number of photographs of the new library at the headquarters, including the memorial slab to the late Mr. Penrose, who, he said, was a man whose friendship, like his fame, had no national horizon. The Congress which had been held was a splendid illustration of the work which the School had long tried to do in fostering international co-operation in research.

At the conclusion of the director's address the election of officers was proceeded with. Dr. Walter Leaf was re-elected treasurer, Mr. Penoyre secretary, and Messrs. E. Blomfield, R. J. G. Mayor, J. L. Myers, and Professor Reid were re-elected to the Committee. Mr. W. Loring was elected to fill a vacancy on the Committee in place of Dr. Monro.

Mr. E. Waterhouse was re-elected auditor on the motion of Dr. Sandys, seconded by Mr. Tod.

Professor P. Gardner, in proposing a vote of thanks to the Chairman, said the Congress at Athens was the first of the kind which had taken place. It was an extremely interesting meeting, but the most important part of it was the formation of a permanent committee at Athens, consisting of the heads of the different foreign schools, in conjunction with the Greek Minister of Foreign Instruction, to produce co-operation between the museums, and to arrange for an exchange of duplicates, and, to some extent, control their publications. Therefore the Congress was no mere momentary thing, but it had resulted in an alliance amongst museums, and the federation of archaeologists throughout Europe.

Mr. Macmillan seconded the motion, and it was carried, and the proceedings terminated.

#### THE ARCHITECTURAL ASSOCIATION.

The first ordinary meeting of the Architectural Association for session 1905-1906 was held on Friday last week at Tufston-street, S.W., Mr. Louis Ambler, Vice-President, in the chair.

The minutes having been read and confirmed and some nominations having been read, the Chairman read the following list of seventy-three candidates, who were elected members, i.e.:-

R. G. Schute, Wilmslow.	A. MacConnell, Barnstaple, N.B.
D. M. A. Lander, Laversham, Salisbury.	P. Ogilby, London.
E. S. Hall, West Dulwich, S.E.	T. F. W. Rolfe, Maidstone, Kent.
H. T. Barnard, Stroud Green, N.	R. W. Fry, Maidstone, Kent.
D. L. Solomon, London, N.W.	H. Doné.
D. S. Hake, London, S.W.	R. S. Frideaux.
W. H. Crawford, Woodberry Down, N.	E. J. W. Whitehead.
F. J. McC. Maxwell, Bedford Park, W.	A. T. With.
F. C. W. Dakers, Brondesbury, N.W.	A. E. Vey.
W. H. Wilson, Buckenham.	W. J. Kel.
H. V. Love, London, W.C.	C. E. Fellowes Prynne.
L. G. H. McCredie, London, E.C.	W. E. Trent.
A. E. Harris, Lee, S.E.	E. A. Ross.
A. W. Hall, Ealing.	H. W. Britton.
R. H. Cock, London, S.W.	J. Haslehurst.
W. E. R. Randall, jun.	F. D. Danvers.
C. J. Bathurst, Maidstone, Kent.	R. Pierce.
Vale, W.	W. J. Gale.
	J. Newton.
	C. W. Denton.
	W. H. Huckvale.
	S. P. Schooding.
	T. M. Ellis.
	R. W. Cable.
	L. Keir-Hell.
	R. O. Bridger.
	D. G. Shrubbsall.

R. Knowles.	T. M. Swales.
P. J. Waldram.	A. R. G. Eaton.
J. G. de Parada.	F. S. Jasper.
W. B. Jones.	G. T. Power.
E. Newman.	G. Sanderson.
A. G. Blackford.	F. H. Knight.
W. Cook, jun.	W. J. Jones.
H. M. Robertson.	G. C. Wilson.
R. F. Matthews.	F. G. Troop.
T. H. Barrow.	C. D. Carus Wilson.
L. S. Wood.	H. Batiscombe.
E. E. Morgan.	P. A. Tilden.
O. H. Davis.	A. Levy.
W. H. Low.	V. Reinacker.

#### Building Fund.

The Chairman also announced that Mr. Howard Chatfield Clarke had been reinstated, and that the following further donations had been made to the Building Fund, i.e.:-Messrs. H. Chatfield Clarke, 10s.; H. Wigglesworth, 5s. 5s.; T. Bisset, 1l. 1s.; G. P. Bowie, 1l. 1s.; R. I. Buck, 1l. 1s.; G. Hubbard, 1l. 1s.; C. Wontner Smith, 1l. 1s.; J. Borrowman, 10s. 6d.; S. Box, 10s. 6d.; S. Chatfield Clarke, 10s. 6d.; A. H. Fagg, 10s. 6d.; I. T. Sifton, 10s. 6d.; E. Howley Sim, 10s. 6d.; A. H. Ryan-Tenison, 10s. 6d. On the motion of the Chairman, a hearty vote of thanks was accorded to the donors.

#### Council's Report and Balance-sheet.

Mr. Francis Hooper, Hon. Treasurer, said that, according to the by-laws, it was necessary that he should, at the first ordinary meeting of the session, propose the adoption of the balance-sheet of the accounts for the past year which had been printed in the Brown-book. Those accounts spoke for themselves, and particular comment on any point seemed unnecessary. He had but to express his appreciation to their Secretary, Mr. Driver, and his assistants for the excellent manner in which the accounts had been kept during the past year, which had been testified to by the auditors, Messrs. Saffery. He could not omit, also, an expression of indebtedness on his own account and on behalf of the Council and the members generally to the Royal Institute of British Architects for their continued support of the evening schools and their fourteenth annual grant of 100l. towards the expenses. In regard to the Building Fund, he took occasion in September to publish the balance-sheet showing how they stood when the accounts were audited and what the liabilities amounted to. The amount of the debt then was just over 1,000l., and it was his hope, and the hope of the Council, that this sum would be wiped off during the current session. Since the Association last met the donations had been very liberal, and they thanked all those who had helped them, and especially Mrs. Arthur Cates, who was the donor of the 1,000l. promised in such a handsome manner twelve months ago. He would not suggest that there were no anxieties in regard to the outlay which they had made, but they felt confident that before very long they would have wiped out the deficit in regard to the premises, and they would be able to look forward to extending the equipment of the building in the way they were all ambitious it should be equipped.

Mr. S. J. Tatchell seconded the motion, which was agreed to.

The Chairman then proposed, and it was agreed, that a vote of thanks be accorded to the Carpenters Company for donation of carpentry models to the day and evening schools. He said he understood that the collection was a magnificent one, and their best thanks were due to the company for their kindness.

On the motion of the Chairman, a vote of thanks was also accorded to Mr. Banister F. Fletcher for a gift of forty-one diagrams.

Mr. Tanner, Hon. Secretary, announced that the conversazione would be held on Thursday, November 2, in the premises of the Association.

#### Ecclesiastical Architecture of the City of London.

Mr. Andrew Oliver then read the following paper, which was illustrated by a large number of lantern slides:-

"In dealing with the ecclesiastical buildings of the City of London it must not be forgotten that the edifices at present in existence form but a small portion of those that were originally constructed. Various causes have left their mark to account for the destruction which has taken place at various



periods amongst these monuments erected by former generations in the vain hope that they would exist for all time. But although the original edifices have so completely disappeared, yet we are able to reconstruct them, and so are enabled to lay before us the glories of monastic London as it was in the palmy days of its ecclesiastical grandeur, the splendour of whose ruins can only be compared with those of Newark, Fontaine, and Glastonbury. The first great wave of destruction, not only in London, but over the whole of England, took place in the reign of Henry VIII. and his successor, Edward VI., and it was at this period that the whole of the monastic edifices of the City were swept away. The second period of destruction took place at the Great Fire of 1666, when not only did the few remnants of the monastic establishments utterly vanish, but nearly the whole of the churches of the City were overwhelmed in the general ruins. It will thus be seen that there can exist, owing to these two great influences, but few examples of ecclesiastical architecture belonging to the earlier periods, as the majority of those at present in existence date from the period which elapsed after the Great Fire of 1666.

We will now take the subject under the following heads:—(1) Monasteries, (2) Churches before 1666, (3) Wren's Churches.

#### (1) Monasteries.

The religious orders to which they belonged were the Benedictines, who had three nunneries—St. Helen's, Bishopsgate; Holywell, Shoreditch; and the Black Nuns, Clerkenwell. To the Carthusians belonged the Charter House, the Cistercians, the Abbey of Westminster. To the Grey Friars or Franciscans belonged the Monastery of the Grey Friars, Newgate; Christ's Hospital, where the Bluecoat School used to be; the Blackfriars, or Dominicans; and, just outside the City, the White Friars, or Carmelites. The Austin Canons possessed the greatest number of establishments—St. Bartholomew, Smithfield; St. Martin's-le-Grand, St. Mary of Bethlehem, and St. Katherine of the Tower; the Priory of the Holy Trinity, Aldgate; and St. Mary Spital, Shoreditch; the Nuns of St. Clair, or the Minoreesses, a minor order of the Franciscans, where the Minories now is. The Austin Friars had a house which was near Broad-street. The Preceptory of the Knights Templars in Holborn, and later at the Temple; the Knights of St. John, or the Hospitalers, at Clerkenwell. All that now remains of the foregoing is the chancel of St. Bartholomew, Smithfield, and part of the cloister of the church of St. Helen's, Bishopsgate; the nave of the church of the Austin Friars, part of the Charter House, the gateway, crypt, and the nave of the Priory of St. John, Clerkenwell, and the Temple Church.

**St. Martin's-le-Grand, 1056-1548.**—This was the greatest of all the monastic edifices in the City, as well as being the most important. It was founded in 1056 for a dean and secular canons, and dedicated to St. Martin, with the additional title of Le Grand, or extraordinary privileges of sanctuary. It was one of the churches from which the "curfew" was rung. Edward I., in his orders to the City for keeping the peace, commanded that "henceforth none should be so hardy as be found wandering in the streets after Curfew bell at St. Martin's-le-Grand." The college was surrendered in 1548, the church being pulled down in the same year. The General Post Office now stands upon its site.

**Holy Trinity Priory, 1108.**—The priory was founded in 1108 by Maud, wife of Henry I., in which she makes it "free of all subjection to St. Paul's," and gives to it "the gate of Aldgate." A charter of Henry I. grants that "the canons may close the way which runs between their church and the City wall," and a charter by a son of Stephen mentions that Maud and Baldwin, children of Stephen, were buried here. The "Liber Trinitatis," of which a translation is at the Guildhall, was written by Thomas Azebridge early in the XVth century. It states that the Priory was founded in 1108 by Queen Maud, in the place where Syred had of old a church, in honour of the Holy Cross and St. Mary Magdalene. Norman was the first prior, and "he built the gate of Aldgate from the foundations."

Queen Maud wished to be buried there, but she was buried at Westminster in 1118. In 1132 the church was burnt, with nearly all its offices. Prior Norman died in 1147, and was buried before the high altar, and King Stephen's son and daughter were buried on the north and south sides of the altar. The plan shown is taken from the *Home Counties Magazine*, and it is a copy of the original now at Hatfield House. It bears the signature of John Symons, and it is dated 1592. The dimensions would appear to be—length, about 245 ft.; width, 69 ft.; and across the transepts, 120 ft. The chancel is eight bays in length, including the Lady Chapel, and two apsidal chapels are on the north and south sides; the nave seven bays up to the western pier of the central tower. The chapter-house is entered on the north side from the cloister, is square in form, and around the cloister are the usual offices attached to the priory. The plan shows the way in which the old buildings were turned into a dwelling-house. Coming down to later days, we can trace where the old buildings stood. The chapter-house site, and probably the walls, became St. James's Church, Duke's-place; Mitre-square occupies the site of the cloister, whilst Mitre-street passes right through the church, over the site of the high altar and the graves of the children of King Stephen.

**Holywell Priory, Shoreditch, 1127-1539.**—It was founded in 1127 by Robert Fitzjohn, prebendary of Halwich, and was dedicated to Christ, the Blessed Virgin Mary, and St. John the Baptist. The holy well from which it took its name was dedicated to St. Agnes. The entrance was through a gateway, which was standing in 1786. In the court-yard stood the priory church, probably of late Norman date, with windows Early English and decorated; a chapel of early XVth century work upon the south side, next Bishopsgate, erected by Sir Thomas Lovell. In the glazing of the window were these lines:—

"All the nuns of Holywell  
Pray for the soul of Sir Thomas Lovell."  
Or, according to another authority:—  
"All ye nuns of Holywell,  
Pray ye, both day and night,  
For the soul of Sir Thomas Lovell,  
Whom Henry the Seventh made Knight."

It was suppressed in 1539 and taken possession of by Henry VIII. by grant on August 5 and September 23, 1544. The whole site is now occupied by the Great Eastern Railway.

**Blackfriars, 1176-1538.**—This consisted of precincts, church, sanctuary, with four gates. It was founded in 1176, being removed from Lincoln's-inn-fields. New Inn now occupies the site of the first monastery. Edward I. gave them a charter and granted them permission to take land between Castle Baynard and the Tower of Montpicket, and also to pull down the City wall and take in all the land as far as the Fleet River, and also denied the City to rebuild the wall at the City's cost. The church, it would appear, was a very fine structure, about 66 ft. in width by 230 ft. in length, or rather larger than St. Saviour's, Southwark. There were two aisles, chancel, a cloister 110 ft. square, with chapter-house to the west 44 ft. by 22 ft. The cemetery, on the north side, was 90 ft. by 200 ft. It was surrendered in 1538.

**The Greyfriars, or Franciscans, 1225-1538.** occupied the site of the Bluecoat School, or Christ's Hospital. The monastery was founded in 1225, the choir built in 1289. The nave and the other monastic buildings were erected later. The whole church was rebuilt and enlarged between 1306 and 1327. It will be noted from the plan that it shows some peculiarities. There were no projecting chapels, but the aisles were very wide to allow of them being placed there. The nave was seven bays in length, with transepts and a central tower. The choir was also seven bays long, being screened off from the nave, and space provided for four altars. Along the centre of the choir there was a row of tombs. On the inside of the church was the great cloister, chapter-house, dormitory, and library, and the way to the frater, infirmary, and other offices was through the cloister. In 1538 it was suppressed, and the Bluecoat School established there a few years later. The present church of Christ

Church occupies part of the site of the ancient choir.

**Priory and Hospital at St. Mary of Bethlehem, 1246-1541.**—The Lunatic Hospital was removed here at the suppression of St. Giles-in-the-Fields, 1547, and afterwards to London-wall, and in 1814 to St. George-in-the-Fields.

**The Westminster Abbey, 1349.**—Of this once magnificent building records are known as to what remained were.

**The Minories, 1293-1539.**—The north wall of the Church of the Holy Trinity, Minories, is the outer wall of the ancient minnery.

**White Friars.**—The White Friars at Carmelites had their house in Fleet-street. In 1350 the church was rebuilt, and the Bishop of Hereford built a steeple in 1420. At the dissolution the chapter-house became a private house, and the church was demolished. The convent refectory became the Whitefriars Theatre. The right of sanctuary lasted until the reign of James I., and the neighbourhood was known as Alsatia. An account will be found in the "Fortunes of Nigel" by Sir Walter Scott.

#### Churches Erected before 1666.

In the second of these divisions we find a complete sequence of architectural style from the Early Norman period to the close of the XVIIth century.

The buildings may be classified under the periods as follows:—

**The Norman Period.**—St. John's Chapel in the Tower; St. Bartholomew, Smithfield; the crypt of Bow Church; the west end of All Hallows, Barking; the Round Church of the Temple; and the crypt of St. John's Clerkenwell.

**The Early English Period.**—The choir of the Temple Church.

**The Decorated Period.**—Gt. St. Helen's the Austin Friars Church, Bishopsgate.

**The Perpendicular Period.**—St. Andrew Undershaft; St. Olave, Hart-street; St. Giles, Cripplegate; and Chapel of St. Peter, in the Tower.

**Transitional, Perpendicular, and Decorated.**—St. Catherine Cree.

The earliest example of ecclesiastical architecture that there is in the City is the Chapel of St. John in the Tower.

The exact date is somewhat uncertain. Gundolph, Bishop of Rochester, built the white tower about 1178, so that it is probably the date of the chapel, or maybe a little later. The chapel is divided into a nave and aisles with ambulatory, and as the arcade is supported by twelve piers and two responds, of which six form the apse; the aisles, vaulted with a plain ground vault. The arches are plain and rest on massive caps. Above this arcade is a triforium gallery. The whole is covered with a barrel-vault.

**St. Bartholomew, Smithfield.**—It was founded in 1123, and the founder, Rahere, became the first prior of the monastery. The Norman work on the chancel (what is now the nave) was executed by Rahere and his successor between 1123 and 1174. The transepts, with the Early English work, were added during the ensuing fifty years, and possibly the nave, the site of which is at present occupied by the churchyard, and also the gateway. To the Perpendicular Period belongs the range of cloister windows, and what is known as Prin. Bolton's Pew and the Tomb of the Founder. The so-called pew is, in all probability, a watching loft, like we find at St. Albans and other places. The cloister windows in the apse are modern, and were the work of Sir Aston Webb. The Lady Chapel is of Early English date, and is entered from the ambulatory of the choir at the east end. The plan shows gives the position of the monastic buildings which formerly belonged to it.

**The Temple, 1185-1312.**—The Knights Templars existed for about two hundred years, 1118-1312, and their first settlement was in Holborn, near Southampton-buildings. In 1180 they came to Fleet-street. The church was consecrated (1185) by the Hieraculus, patriarch of Jerusalem. The original church consisted of a round nave, the choir being added in 1240. The church consists of porch, a round nave, and choir. The west doorway is Transitional Norman.



The piers consist of Purbeck marble columns, with capitals, which support pointed arches, over which is an arcade of intersecting semi-circular arches. The clearstory windows above are round-headed; the choir, five bays in length, with nave and aisles. The vault is carried on marble shafts with richly-moulded capitals.

**St. John's, Clerkenwell, 1100.**—The Knights of the Order of St. John are said to have settled at Clerkenwell about 1100. The earliest portion of the present chapel, now the crypt, was erected at the end of the 13th century. The west of this there was situated a round church similar to the Temple Church, which was consecrated the same year, i.e., 1185. The original chapel then became a crypt under the new church. The plan of the crypt consists of a nave of five bays, with chapels at the eastern and in the north side of one bay only, and on the south of three bays. There are other chambers on the northern side. The original chapel was of three bays, and perhaps terminated in an apse. Upon the building of the church above the crypt was lengthened to the extent of two bays. The eastern end of the present crypt marks the extent of the Priory Church. The crypt and present church represent the length of the choir. The gateway was erected by Prin. Docra in 1540.

**Justin Friars.**—Founded in 1259 by Humfrey de Bohun, Earl of Hereford and Essex. The church, originally cruciform, containing nave, chancel, transept, and central tower, was entirely destroyed, excepting the nave, by Sir W. Paulet. The chancel extended as far as Broad-street, and the site is marked on the ordnance map adjoining the Church of St. Peter-le-Poer. The church was given to the Dutch congregation in the year 1551. The spire of the tower, which is shown in Peter Verscher's map, was destroyed in the year 1600.

**The Charterhouse.**—It was founded in 1301 by Michael de Northbury, Bishop of London. By Royal permission it was named "The House of the Salvation of the Mother of God." Another benefactor was Sir Richard Manny, who gave 13 acres of land to the monastery. There is not much now left of the old buildings, which were suppressed in 1537, and the Charterhouse School was founded in 1572 by Thomas Sutton.

**Great St. Helen's, Bishopsgate.**—This was the church attached to the Benedictine Monastery. It consists of a north aisle, or that is termed the nuns' aisle. This was added on the north side from the cloisters, the doorway of which is still to be seen, together with a curious squint. This aisle was separated by a screen from the parochial nave, which has a transept and two eastern chapels. The establishment, with refectory, chapter-house, and other buildings, was practically complete until the end of the 18th century, when it was bought by the Leathersellers, and their present hall and St. Helen's place were erected on the site.

In the year 1475, or soon after, great alterations were made, as Sir John Crosby writes, with a sum of 500 marks. This consisted in the removal of the screen between the nuns' aisle and the nave and the insertion of larger windows. He directs his body to be buried in the Chapel of the Holy Ghost within the parish church of St. Helen within Bishopsgate. He also bequeathed various sums to the prioress and nuns and also to the parish priest, thereby making a distinction between the two foundations. The site of Crosby Hall was leased to him for ninety-nine years at an annual ground rent of 111. 6s. 8d., by Alice Ashfield, the then prioress. In 1539 the property was surrendered to King Henry VIII., and by him given to Thomas Cromwell, who, as we are told by a deed in the MSS. Department at the British Museum, sold it for the sum of £100.

**St. Ethelburga.**—Before the suppression of the monasteries this church was attached to that of St. Helen's. It consists of a nave, chancel, and south aisle, with clearstory. The porch shows remains of 15th century date. The view given is of the date 1737, and it shows the changes that have taken place since that date.

**All Hallows, Barking.** was formerly attached to Barking Abbey. It consists of

nave, chancel, aisles, and clearstory. The piers at the west end are of Norman date, and the east end belongs to the Perpendicular Period. Richard I. added a chapel on the north side. A brotherhood was established here in the reign of Edward IV., and Richard III. established a college of priests, all of which were abolished in 1543.

**St. Andrew Undershaft.**—The church dates from the early part of the 15th century. The northern portion and part of the south aisle were built at the expense of Sir Stephen Jennings, Lord Mayor, 1508, and it was completed in 1523 by William Fitzwilliam. It consists of a nave and aisles and clearstory and a lofty tower. The most interesting monument is that of John Stow, the earliest writer upon London, and to whom all authors upon the subject owe a debt of gratitude. The name Undershaft is given as it stood originally under the Maypole, or shaft. The church of St. Mary Axe was taken down in 1561, and its parish united to it. It is a well-known district for second-hand clothes dealers, as the old lines inform us:—

"Jews from St. Mary Axe, for jobs so wary,  
That for old clothes they'd even axe St. Mary."

**St. Giles, Cripplegate.**—A brotherhood was founded there by Queen Matilda to St. Mary and St. Giles. The church, partially rebuilt after a fire in 1545, consists of nave, chancel, and aisles. In the churchyard is a part of one of the old bastions of the Roman wall. The houses, which formerly hid the north side, have been taken down, and a statue of Milton has been erected on the site. John Milton, the author of "Paradise Lost," Foxe, the author of the "Book of Martyrs," and Sir Martin Froisher, the old Elizabethan sailor and explorer, were buried here, as the register records.

**St. Peter, in the Tower of London.**—The whole building was rebuilt in the reign of Edward I., Edward III. and Edward IV. tried various schemes to make the church collegiate, and similar to the chapels in the Royal Palaces of Westminster and Windsor. The last named instituted a dean and three canons, but his death occurred before the idea could be completed. In the year 1532 a general repair was ordered, and it is to this date that the present building belongs. It consists of a nave of three bays, and a chancel containing one bay, and north aisle.

**St. Olave, Hart-street.**—It is one of three dedicated to St. Olaf of Norway. It dates from the middle of the 15th century, and consists of nave, aisles, chancel, and a low tower at the east end of the south aisle. The pulpit was originally in the Church of St. Benet, Gracechurch-street. The Plague of 1665 commemorated by the gateway with its row of skulls under the pediment. Readers of "Pope's Diary" will remember how proud the little man used to be of his appearance in church, and how vastly prim his wife looked.

**St. Catherine Cree.**—The church was built for St. Catherine's parish in the churchyard of the Priory of the Holy Trinity. At the dissolution the church was given to Lord Audley. In 1628 the church, all but the tower, was pulled down, and the present church erected. The building is a strange mixture of Gothic and classic architecture.

#### Churches Erected after 1666.

The series of buildings which followed the Great Fire, and which were the work of Sir Christopher Wren, were different in every respect from those which had been erected at a previous period. Up to that date the church architecture of the City resembled in the style, the detail, and general arrangement, that which was usually to be found in the architecture of the country, but, with the advent of Wren, a new style was created, and which belonged solely to the City of London. There is no city which shows such a great variety in its towers and spires, or in its church architecture, and all of this may be said to be due to the genius of one man. As may be supposed, there is a great more generalness in the design of some of the examples; but this may not be the fault of the architect, but through circumstances over which he may have had no control. But even if we allow this to be the case, one cannot but be struck with the beauty of many of the designs, and of their adaptability to the surroundings. They show not only

great power in design, but, if we examine them, a marvellous grasp of constructive detail. The whole range of construction seems to have been drawn upon, hardly any of them being constructed in a similar manner.

**St. Paul's.**—The present cathedral of St. Paul, the grandest of Sir Christopher Wren's works, is the third building which has been erected. The first cathedral is said to have been founded in 597, and destroyed in 1087 by fire. In this latter year a new cathedral was built in the Norman style.

In the year 1240 the choir was rebuilt and enlarged by being extended over the site of the Church of St. Faith, when the parishioners were given the use of the crypt, and was called St. Faith under or in St. Paul's in 1256. The tower and steeple were completed in 1221, and the latter was burnt in 1561, and never rebuilt. It is said that part of the stone intended for the rebuilding of St. Paul's steeple was given by Charles I. to the Duke of Buckingham to use in the building of Buckingham House. Some of the present watergate is built out of this stone originally intended for St. Paul's. The cathedral was partly repaired by Inigo Jones, who added the classic porch or narthex at the west end. Sir Christopher Wren was called in, and he proposed to take down the Gothic arches and substitute round ones of a neat classic style, and erect a dome in place of the tower. These works were all stopped by the Great Fire, and various attempts made to patch the edifice, but, these being futile, there came Wren's opportunity for the present building.

**The Rebuilt Churches.**—In the Harley MSS., 4941 (British Museum), there are three schemes for the rebuilding of the destroyed churches; the number first proposed being thirty-nine, but this was altered in the final arrangement to fifty churches, St. Paul's not being included, as it was considered at the time that the matter was brought forward that the cathedral could be made suitable for public worship. In addition to these there were rebuilt in the XVIIIth century, about a dozen in all, by Nicholas Hawksmoor, who rebuilt St. Mary Wolnoth; George Dance, All Hallows-on-the-Wall; and others by James Gold, Staines, Gibson, and Cockerell. None of these, with the exception of St. Mary Wolnoth, are of much interest architecturally or otherwise, so it will not be necessary to refer to them more fully.

In describing the churches which were erected by Wren it will be impossible to give a detailed account of the buildings. All that can be done will be to enumerate a few of the leading examples.

**Types of Churches.**—In the churches which Sir Christopher Wren erected we find the following types:—

The basilica—i.e., a parallelogram divided by arches, at St. Michael, Cornhill.

A nave, and north and south aisles, St. Mary-le-Bow.

At All Hallows the Great (now destroyed) a nave with only a north aisle.

St. Nicholas, Cole Abbey, shows a nave only, and at St. Stephen, Walbrook, we find the dome, the leading feature of the interior.

In the planning of the churches which were rebuilt in many examples they follow upon the old lines, and even occupy the original sites of the old foundations. In some instances the old walls have been re-used, or refaced, and many of the towers still retain the work of an earlier period.

Although Sir Christopher Wren was, to a great extent, tied by the old boundaries, yet he departed in many instances from the original ground plan and arrangement, and erected practically a new building.

Before this period most churches had followed one particular plan—i.e., a nave and aisles, separated by piers and columns.

A structural chancel was a rare feature in the London churches, most of which had been rebuilt in the 15th century without a chancel, and the aisles being continued to the east end, a screen being used to cut off the portion which was used as a chancel.

The towers and spires of Sir Christopher Wren may be placed in four divisions:—(1) Towers; (2) Towers with Spires; (3) Towers with Lanterns; (4) Towers Surmounted by a Dome.

**Towers.**—This division contains one-half of the number, numbering twenty-five in all, out



of fifty examples which were erected originally. In many instances it is possible that the original walls of the structure were left or repaired, and all that was done would be to add to the original structure. The additions chiefly consisted of a parapet wall, and sometimes we find stone vases, obelisks, or other architectural features at the angles, and, in some cases, round windows or openings inserted, and the walls refaced with stonework.

The second division, "towers and spires," is of two kinds, "stone spires," and "wooden structures covered with lead." In the first we place the destroyed spire of St. Antholin, which may be said to have been a true spire, and constructed in the Gothic style; St. Bride, Fleet-street; St. Mary-le-Bow; St. Dunstan-in-the-East. In the second, St. Martin's, Ludgate; St. Edmund, Lombard-street; St. Nicholas, Cole Abbey. Towers with lanterns, as St. Stephen, Walbrook; St. James, Garlickhithe; St. Michael, Paternoster. Towers with cupolas in lead—St. Magnus, London Bridge; St. Peter, Cornhill; and St. Peter, Benet-fink, destroyed. A stone cupola was at St. Mary Magdalene, Old Fish-street, now destroyed.

#### Dedication of Churches.

The saints, to whom the churches were dedicated, show that many were repeated, the largest number to one person being St. Mary, or the Blessed Virgin. All Hallows—eight, St. Michael seven, and St. Martin five; four to St. Benedict or St. Benet, St. Botolph, St. Peter, and St. Margaret; three to St. Bartholomew, St. Nicholas, St. John, St. Stephen; two to St. Anne; one with St. Agnes attached, St. Clement, St. Dunstan, St. Christopher, St. James, St. Laurence, St. Leonard, St. Mary Magdalene, the Holy Trinity, and St. Mildred; one to St. Alban, St. Alphage, St. Antholin, St. Augustine, St. Bride, St. Denis or Dionis, St. Edmund, St. Ethelburga, St. Faith, St. Gregory, St. Gabriel, St. George, St. Giles, St. Helen, St. Magnus, St. Pancras, St. Swithin, St. Thomas, St. Vedast, the Holy Sepulchre or St. Sepulchre, and St. Paul in the Cathedral. The dedication names present some peculiarities in names, as St. Margaret Pattens, St. Benet, Sherehog, St. Margaret Moses, St. Michael, Le Querne, and St. Andrew Hubbard.

The number of parishes is also a curious feature, and by far the greater number of parish churches are to be found near the river in the south-east.

St. Mary Aldermary and a large number of parishes all take the name of Mary, as St. Mary-le-Bow, Abchurch, Woolchurch, Winoth, Bothaw, at Hill, and others.

All Hallows, it will be noted, has the next greatest number of dedications, All Hallows, Barking, being the oldest, that of All Hallows, Thames-street, being divided into the Great, and Less.

Sometimes parishes were united, as when the Priory of the Holy Trinity, Aldgate, was founded; it included the parishes of St. Mary Magdalene, St. Michael. St. Catherine and the Blessed Trinity were made into one parish, as Stow says, of the Holy Trinity, but St. Catherine was given later to the parishioners of St. Catherine Cree. The sites of the destroyed monasteries were also made parishes, as Great St. Helen's, Bishopsgate.

The dedication is sometimes shown externally, as at St. Laurence, Old Jewry. The weather-vane is in the form of a griffin, or the gilded key of St. Peter, Cornhill.

In the names of the dedications we often find another name attached to that of the original saint, in order to distinguish one parish church from another. They may be grouped under the following heads:—Localities, as St. James "Garlickhithe or Hill"; Founders, as St. Peter "Benetfink"; Scriptural saints, St. Bartholomew; Danish or Anglo-Saxon, St. Olave; St. Botolph, to whom there was dedicated a church outside Aldgate, Aldersgate, Bishopsgate, and Billingsgate; Saints of the early church, St. Pancras; English saints, St. Dunstan; Founder of religious orders, St. Augustin; Guild saints or company saints, St. Martin of the Vintners, and St. Mildred of the Bakers."

Mr. J. D. Crace, in proposing a vote of thanks to the lecturer, said that in con-

sequence of the changes which took place so rapidly about us in London it was valuable to have such information brought into compendious form for use and reference. People could hardly realise how great an interest there was in the subject of old London until they began to look into the matter in walking about modern London. He had, for instance, to remind himself very often that a street he was constantly passing through in the West-end, which showed a depression of the ground, represented the course of the old stream which supplied the City of London with water from the year 1255 and onwards. The estate in which the street was situated was still known by the name of the Conduit Mead Estate, and still belonged to the City of London. As to the Church of St. Bartholomew the Great, which had been so admirably restored, he recollected, when some partial restoration was going on about the year 1855 or 1860, that he went into the church one morning and he thought he saw traces of colouring in the Norman arches. He had a small ivory paper-cut with him, and with that he scaled off some of the whitewash and found underneath a complete system of Norman colouring on the nave walls and on the Norman arches. blocked out very much as was the old colouring at Ely, he believed. At the time he referred to there was a factory at the eastern end, and he remembered being taken over that part of the factory by the owner, who told him that a great many remains of the departed monks had been dug up in the yard immediately outside his building. Round churches had been mentioned by the lecturer, and, of course, the Temple Church was a very interesting one; there was another interesting one at Northampton and one at Cambridge, but the one at Northampton was particularly interesting. It might be mentioned that the spire of old St. Paul's, which was burned in 1561, as they had heard, was then the highest in Europe; but it was a wooden spire, and a very remarkable one it must have been, and a magnificently conspicuous object in the views of London, for then the houses were all lower, and the mass of the cathedral, as one saw in the old views, stood out as a most telling object. Another point in connection with these old churches was that many of the dedications were to old Saxon saints. Amongst others were four to St. Botolph, who was buried at St. Edmunds or near there, and the four gates which commanded the four possible roads to the saints' place of burial had churches dedicated to him. It was not a common dedication elsewhere, though he came across one a few weeks ago in Norfolk at Grimston. (The church had been beautifully restored by Mr. Bodley at his own cost as a memorial to his brother.) As to the Church of St. Magnus, the tower of which many of them had admired, when old London Bridge was in existence the tower was pierced by the footway of the bridge, which passed under the tower. As to Bow Church, the lecturer had not mentioned that the present name of the church was derived from the arched vaults beneath it. It was the Court of Arches; and the title of Dean of Arches and the Court of Arches still remained, having their origin in this old church. When Bow Church was rebuilt a vault and crypt were again built. They were greatly indebted to Mr. Oliver for bringing together such a quantity of valuable information about old London.

Mr. Hugh Stannus said, in seconding the vote of thanks, that in looking at the views and engravings of London he had been reminded of a remark made by Street about the beauty of London, with all its beautiful churches and steeples which still remained. When returning from Continental journeys, Street said that in crossing Cannon-street Bridge he looked upon London with pride—or words to that effect. He (the speaker) felt much the same, and he had mentioned to people who were returning from a Continental tour that in that view they had something as beautiful as anything they had seen abroad. The Church of St. Etheldreda, in Ely-place, which had returned to its old allegiance, was a magnificent example of English Gothic work. He never passed a church when the doors were open, especially on Saturdays when cleaners were about, without wanting to go in. They would all

look forward to seeing Mr. Oliver's paper in print, for they would like to use it in some sense as a guide-book to these churches, and especially if some of the plans and views they had seen could be reproduced at the same time.

Mr. J. Johnson said he had prepared a few notes from the very interesting and valuable drawings of the churches of London, by Christopher Wren made by Mr. J. C. G. in 1848. Of St. Paul's they could not but be impressed by its exterior design as a magnificent masterpiece, especially excellent when viewed from some little distance, though, unfortunately, only portions of the building were thus visible owing to height of surrounding buildings. The transepts were very pleasing, also the western towers were not too much foreshortened, when the upper portion seemed to be too small for the lower part. As to the other churches, he would deal with those on a domical plan first. St. Stephen's, Walbrook, had one of the most charming interiors he knew of, and the width of its dome was 43 ft., St. Swithin's Church, Cannon-street, had an octagonal dome, 45 ft. diameter; St. Mary, Abchurch, had a large dome for a comparatively small church. Its diameter was 64 ft., on five quinate arches from the square, and the effect was fine; St. Antholin's, Watling-street, destroyed, had an elliptical dome, 45 ft. by 33 ft., carried on columns, and it was made that shape on account of the street, which sloped of a little. Wren was always anxious to utilise the site to the best advantage, he never wasted space in his plans; St. Mildred's, Broad-street, had a 36-ft. dome, on pendentives from cross vaulting. As to these churches with domical roofing, he should advise students to study them whenever they had a chance of doing so. The next most interesting type of church were the galilee churches, and first of all must be mentioned the spacious St. James's, Piccadilly, which had no chancel, which was the case with St. Andrew's, Holborn. These, with St. Bride's, Fleet-street, and St. Anne, the Priory, were all of one type, i.e., nave and two aisles. St. Clement Dane's was like an apsidal end; the old tower was raised and a spire added by a pupil of Wren. The next type of church were those of similar action but without galleries, such as St. Peter's, Cornhill; St. Mary-le-Bow, Cheapside; and Christ Church, Newgate-street, which had a clearstory. The remaining churches had one or two aisles or large spans with flat ceilings, with or without coxes, but in several matters they varied owing to the peculiarities of site. There were hardly any of Wren's churches but what would repay examination, and even in the plainest of them externally there was most charming woodwork built. St. Lawrence, Guildhall Yard, has splendid examples by Grinling Gibbons. As to the towers and spires, he had compared them so as to try and find data for their arrangement. The towers were in height four to five times the width; the lanterns half the height of tower; and the spires were nearly the same height as the towers. St. Mary-le-Bow, the finest classical tower and spire in London, had a 32-ft. square tower; it was 111 ft. 7 in. up to the cornice, and from cornice to top of spire 104 ft. 6 in.; St. Bride's had a 30-ft. square tower, a height of 123 ft. up to cornice, and 104 ft. above; Christ Church, Newgate-street, had a 23-ft. square tower, 98 ft. to top of cornice, and 58 ft. to top of spire; St. Magnus, London Bridge: tower, 27 ft. square, 100 ft. to parapet, and 20 ft. above; St. Vedast, Foster-lane: tower, 20 ft. square, 80 ft. high to cornice, and 70 ft. above—the lower part of tower, therefore, being very little higher than the upper part. As to towers with stone lanterns, there were three of them which were particularly interesting; they were smaller than the others, but well designed. They were—St. James's, Garlick Hill, St. Michael's, College Hill, and St. Stephen's, Walbrook, all of which had 20-ft. square towers. The height of St. James's was 87 ft. to cornice, and 38 ft. above; St. Michael's, College Hill, 94 ft. to cornice, and 38 ft. above; and St. Stephen's, 83 ft. to cornice, and 44 ft. above from which it would be seen that the dimensions of each part were about half the total height, whereas in the towers with spires the upper part was nearly equal to the lower.



Of stone spires, St. Antholin's (now destroyed) was the only example of a Wren church with a stone spire that he could recollect. It had a 20-ft. square tower, was 74 ft. to parapet, and 70 ft. to top. St. Margaret's Pattens, Eastcheap, had a 21-ft. 6-in. tower, 106 ft. to parapet, and 84 ft. above; and St. Swinburn's Church, which was very plain, had 15 ft. 4-in. square tower, 89 ft. to parapet, and 67 ft. above. The lead spires, though picturesquely treated, were inferior to the stone ones. St. Martin's, Ludgate Hill, was extremely pleasing, it had a 22-ft. tower, was 88 ft. to cornice, and 72 ft. to top of spire; while St. Mary Abchurch had a 20-ft. square tower, was 81 ft. high—giving four squares—and with a 60-ft. spire. St. Dunstan's was a very graceful structure, founded upon the beautiful example at Newcastle-on-Tyne. It had a 20-ft. square tower, was 93 ft. high to parapet, and 77 ft. to top. St. Michael's, Cornhill, had one of the most impressive, sturdy towers in London. As to towers of simple character, St. Andrew's, Holborn, had a 33-ft. square tower, and was 122 ft. to parapet; All Hallows, Lombard-street, had a 21-ft. 6-in. tower, and 105 ft. 3 in. high; St. Clement's, Clement's-lane, had 16-ft. tower, and was 86 ft. high; St. Mary Somerset, Thames-street, was a peculiar church (now destroyed), because it had a range of obelisks at angles, treated effectively. There were several examples of towers, leaded spires, etc., which were not particularly happy in design, but all the towers and spires when viewed from one of the bridges afforded a varied and magnificent spectacle not to be equalled by any city in the world.

Mr. C. Lynam, of Stoke-on-Trent, said he was a stranger among them, but he was not a stranger to the works of the Association, whose Sketch Book reached him whenever it was due, and from which he found great gratification in the work which he saw there. Mr. Oliver had attempted a great deal in his paper, but he had accomplished his task very successfully. That task must have been a laborious one—one of much observation and one of great personal enthusiasm. As the studies of old St. Paul's passed before him he was wicked enough to wish that the building stood there now. He would emphasise that opinion in this way: Suppose that Westminster Abbey were swept away from London and a classical building put up in its stead, how many would feel, as he did, with those who had lived through the Gothic revival, which was now almost moribund? There would be some who would, and so there were those who enjoyed and gloried in the views of old St. Paul's. As to the Church of St. John's in the Tower, he ventured to say that there was no building in London of the same size that was more impressive in character. The lesson of Mr. Oliver's paper seemed to be to those who would profit by it to go and see again the churches they had already seen and to visit those that one had not seen.

Mr. Banister F. Fletcher, in supporting the rule of thanks, said that the Merchant Taylors was the school which now occupied part of Charterhouse and not the Grocers'. As to round churches, there were four in England, and the one not mentioned was that at Little Maplestead. The chief thing that they as architectural students should gather from the paper was that there are a number of buildings in London from which we can study. That was the main thing brought before the student. Books are all very well, but we know that we must go direct to buildings and study them—their mouldings and planning and so on—if we were to get value out of them. The Lady Chapel at Canterbury, he might mention, was still used by the French Protestants, to whom it was handed over. The charming piece of late stellar vaulting at St. Sepulchre, Holborn, was one of the most satisfactory pieces of such work in England. As to what had been said about many churches in England having been erected by Catholics, in London we were fortunate that the great majority of churches were erected by Protestants for Protestant worship, and that was the great interest of Wren's buildings. Wren had some most unpromising sites to deal with, and the planning, which was well worthy of most careful study, showed some most extraordinary effects—notably St. Stephen's, Walbrook: square on plan, but

most interesting inside. The lecturer finished somewhere about the time of Wren, but it might be possible for him to bring the subject of London buildings nearer to our own time. The buildings of Barry in London would make an excellent subject for another lecture. Look at the houses alone that Barry built in London! Such a building as Bridgewater House was a masterpiece of design, and that might be the subject of a paper in itself. It was the habit of some people who travelled—often not very far—to compare Paris, say, with London, to the detriment of the latter; but, in his opinion, Paris did not compare with our City. If one lived in Paris for three months, one got tired of it and of the monotony of it. There were wide streets, but they were uninteresting in character, and there was a want of individuality in the streets which one did not feel in London; one never got tired of London, for there were buildings of all periods and all styles, giving special interest and character to many districts.

The Chairman, in putting the vote of thanks to the meeting, said the paper must have taken a great deal of time to prepare, for there must have been a considerable amount of research necessary. Mr. Oliver had incidentally referred to Birch's book on city churches, and, as they knew, that book was full of beautiful photographs and pictures of churches, and it contains an interesting account of them as well. He thought it would be a very good thing if members of the Association would combine to measure up and draw all those churches which had not been drawn and measured, and if they would do that and would publish the drawings in the Sketch Book or in some other architectural publication, they would be doing a great service to present and future students.

The vote of thanks was then very heartily agreed to.

Mr. Oliver, in reply, said he had not given any details about St. Sepulchre, Holborn, because it was outside the City practically; it had late vaulting. It had not been possible to refer to all points. As to Mr. Fletcher's remarks about Barry's work, that would have been outside the scope of the lecture. With all these fine buildings in the City he hoped that another year there would be a better show of work for the Architectural Association prize.

The Chairman, announced that the next meeting will be held on November 17, when Mr. J. A. Gotch will read a paper on "Old Manor Houses."

The meeting then terminated.

#### ROYAL COLLEGE OF ART EXHIBITION OF STUDENTS' HOLIDAY WORK.

The South Kensington Sketching Club, formed by students of the Royal College of Art, are holding their exhibition of holiday work in the temporary iron building at the back of the Natural History Museum. The exhibition will remain open until November 4. No student's work is quite so interesting, perhaps, as that done by the students in their holidays. Holiday work is a good test of a student's ability and perseverance. Unfettered by the restraint of supervision, and without expert advice, he is thrown on his own devices, and expresses the individuality that is in him. Good holiday work is, besides, a gauge of the healthiness and activity of a school. The students at South Kensington are fortunate in that the professors and masters take an interest in their outside work, and offer prizes under various headings. Nothing is so important to an art student, whether it is in architecture, sculpture, or painting, as how he spends his time. As R. L. Stevenson has pointed out, the calling of an artist differs from all other callings in that he finds a pleasure in his work to a degree denied to all other callings whatsoever; holidays ought for him to mean change, not rest, from work, and a student who produces nothing during his holidays had better adopt some other means of livelihood where holidays, pure and simple, are not only legitimate, but a necessity.

Some of the architectural students have spent their time in making measured drawings of ancient buildings in a thorough and workmanlike manner. The drawings by Mr. H. Castle of Much Wenlock Priory of the

XIIth century win Professor Pite's and Mr. de Gruchy's prize; other students have worked out full-size sections through Gothic door-jambs and arch moulds, and there are a few architectural sketches on the walls. Undoubtedly, the way to learn architecture in mass and detail is to measure and plot on the spot; sketching has its place, chiefly for its real assistance in practice, and partly for the pleasure to be found in a field of so much scope. The studies for wall decorations are very attractive, those of Mr. L. Crane and Mr. O. Senior winning the prizes. Mr. O. Senior's oil sketches from nature are some of the best things in the exhibition; the sketches of Messrs. Clark, Woolway, and Baker are delightful, those of Mr. Clark being specially able. Miss Eyre wins Mr. Walter Crane's prize for a design for printed linen, and Miss Brennand the prize for studies of ancient stained-glass given by Mr. Bunney.

#### THE INSTITUTE FELLOWSHIP.

THE following letter from Mr. C. H. Brodie appears in the current issue of the *Journal* of the Institute of Architects. Without expressing any opinion on the point dealt with, we publish it so as to give it circulation among architects outside the membership of the Institute, who at all events ought to have the subject brought before them:—

To the Editor, *Journal R.I.B.A.*

"SIR,—After December 31, 1905, no architect can be elected a Fellow of the Institute but from the class of Associates unless, by special proposal of the Council, for unusual merit and the number of such cases must of necessity be limited."

The above fact is not, I venture to think, sufficiently widely known or appreciated, and I would ask our Council, the Allied Societies, and the professional Press to call the attention of architects in some special way to it.

In the course of my duties to an important concern, having some 250 branches scattered all over England and Wales, I travel to very many towns thereon, and see a vast quantity of good architectural work being carried out. On inquiry, I find that the architects do not, as a rule, belong to our Institute, and this is a grave reflection on them, and also, in my opinion, on the Institute and its Allied Societies.

One cause I fancy may be—and I say it with some trepidation—the professional jealousy which seems to exist in the provinces, and a somewhat sad exhibition of which has more than once recently been shown when men found duly qualified by our Council have been violently opposed, and sometimes rejected, at elections. I venture to ask if such a policy can possibly be otherwise than harmful to the Institute. For I believe that dozens of good men and true are thus prevented from presenting themselves. There are hundreds of men in busy practice, of fair age, who cannot possibly work up for the Examinations, and to keep such out of the corporate body is little short of a crime. These men, if they are eligible under the Charter, have an absolute right to election, and I do seriously ask that they come forward, and, further, that when they do, and are duly presented by the Council we elect for the purpose, no capitious opposition be offered. The Secretary's letter, published on page 519 of the *Journal* for June 10, 1905, is so clear and convincing that no words of mine are needed to show what is desired. The Institute in General Meeting has clearly laid that down: Every reputable practising architect doing good work is invited to come up for the Fellowship if he is eligible under the Charter. Better far, Sir, is it that we should admit one or two men who ought—some may argue—to become Associates than that, by an ill-judged opposition, we should scare away dozens, and perhaps hundreds, to whom no reasonable opposition could possibly be offered.

May I also suggest a further difficulty? Many men to whom I have talked on the matter point out that they do not know three Fellows who can personally vouch for them and their buildings. Here our Allied Societies could do a really good work. They could make the necessary inquiries, and then provide the requisite nomination. I would even dare to suggest the appointment of a special committee of our Council to deal with such cases if necessary. It might easily be that when in a district the work of an aspirant could be visited by a Fellow whose word we could all rely on, and who might at the same time learn something of the candidate's reputation, which is no less important.

My zeal for the welfare of the Institute—and I hope that cannot be doubted—must be my excuse for this letter. As I have said, I enjoy some what unusual opportunities of knowing the men and seeing the good work that is done over a large part of the country. And I feel our Fellowship numbers might and could be nearly doubled if the requisite steps were taken. Such a strengthening would do much for the public, the Institute, and the art we all—no matter how humbly—follow and love.—Yours faithfully, C. H. BRODIE.

THE ARCHITECTURAL ASSOCIATION.—The members of the Architectural Association who are not already aware of the fact will be interested to know that their courteous secretary, Mr. D. G. Driver, has been elected a Fellow of the Chartered Institute of Secretaries.



## THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A HOME COUNTIES District meeting of the Association of Municipal and County Engineers was held at Tottenham on Saturday, October 21. The business proceedings were held in the Council Chamber of the new Council Buildings, which have not yet been formally opened to the public. Mr. A. E. Collins (Norwich), President, occupied the chair, and among an unusually large gathering of members present were:—Messrs. J. Patten Barber (Islington), W. Nisbet Blair (St. Pancras), T. W. A. Hayward (Battersea), O. E. Winter (Hampstead), J. Lemon (Southampton), J. T. Eayrs (Birmingham), R. J. Thomas (Aylesbury), Hon. District Secretary, T. Cole (Westminster), Secretary, A. H. Campbell (East Ham), C. Chambers Smith (Sutton), P. Dodd (Wandsworth), C. Jenkins (Finchley), W. T. Loveday (Stoke Newington), E. B. Newton (Paddington), J. Pollard (Westminster), N. Scorgie (Hackney), F. Sumner (City of London), T. G. Taylor (Ramsgate), and others.

Mr. W. E. Warran, as Chairman of the Tottenham Council, heartily welcomed the Association, and informed the members that under Mr. Prescott's able guidance they had recently carried out most important undertakings with excellent results.

Mr. C. C. Knight, Vice-Chairman, who also welcomed the Association, said they were pleased to do so, as the Council owed such a debt of gratitude to Mr. Prescott.

The President briefly acknowledged the welcome accorded to the Association. He remarked, notwithstanding that Tottenham had made enormous strides and carried out great public improvements, the rates had actually fallen. That redounded greatly to the credit of their officers and the Council.

On the proposition of Mr. Chambers Smith (Sutton), seconded by Mr. Dawson (Leyton), Mr. R. J. Thomas, County Surveyor of Buckinghamshire, was re-elected Honorary Secretary for the Home Counties District.

## Local Administration of Tottenham.

Mr. W. H. Prescott, A.M.Inst.C.E., M.I.M.E., Engineer and Surveyor, read a paper on the "Local Administration of Tottenham and its Development."

He said the area of the district was 3,033 acres. The rateable value was 483,360l. The General District rate for the half-year ending with the September quarter was 2s. 2d. in the pound, and the Poor rate for the same period was 2s. 2d. in the pound.

At March 31, 1905, the total amount of the Council's loans outstanding was 404,910l. Of this sum 41,705l. was allocated to the Council's Water Department (which had been transferred to, and was now controlled by, the Metropolitan Water Board), and would shortly be paid off, and 23,288l. to the Urban District Council of Wood Green, which district, prior to the Separation Act of 1887, formed part of Tottenham. The number of houses was 21,254. From the report of the Medical Officer of Health for the year terminating December, 1904, the mortality rate was 11·5 per 1,000, including 0·764 per 1,000 for the seven principal zymotic diseases (probably the lowest zymotic death-rate in the kingdom).

At the end of March, 1905, the total length of roads and streets within the district was 60½ miles, of which nearly 4½ miles were main roads and 4½ miles contributory roads. The whole of the main roads were paved with wood on a 6-in. foundation of Portland cement concrete, Jarrah blocks being used for the portion between the tramway metals, and creosoted deal for the breasts of the road. This work was performed concurrently with the laying of the tramway track, when it was being remodelled to suit the requirements of electric traction two years ago. The total cost per square yard worked out at 13s. 9d.

The cost of maintenance of the main roads was borne by the county authority, who also contributed a moiety towards the upkeep of the subsidised roads, one of which was partially paved with "red gum blocks" nearly five years ago at a cost of 4,125l. The cost per square yard in this case worked out at the rate of 15s. 8d., and the road was now in a most satisfactory condition considering

the time the wood had been laid. The loan for this work was granted for a period of ten years.

The average cost of scavenging and maintenance of ordinary highways and main roads for the year ended March, 1905, worked out at about 243l. per mile.

The public streets at the present time were lighted solely by incandescent gas, supplied by the Tottenham and Edmonton Gas Light and Coke Company at 2s. 10d. per 1,000 cubic ft. The company's charge for supplying and erecting new lamp columns, fitted with single incandescent "C" burner, was 3l. 7s. 6d. each.

The statutory powers for the making up of private roads within the district were contained in the Tottenham Local Board Act, 1890, the provisions of which were, with a few exceptions, very similar to those contained in the Private Street Works Act, 1892.

The general construction was as follows:—9-in. hard core, 2-in. gravel, 4-in. Leicester granite, rolled in with granite chippings; footways were paved with artificial stone flags on 4-in. hard core; granite kerb, 12 in. by 8 in., laid flat; channelling formed of three rows of granite setts; crossings formed of granite setts; kerb, channels, and crossings were laid on 6 in. of 6 to 1 cement concrete. The cost per foot run of frontage worked out at about 15s.; and the amount spent in private street improvements was about 25,000l. per annum.

A new outfall sewer, 5 ft. by 3 ft. 4 in., had lately been constructed at a cost of 30,000l., which was necessitated principally through the development of the London County Council Housing Estate, which alone was estimated to contribute over one million gallons of sewage per day of twenty-four hours.

The sewage was forced from the pumping station through 21-in. and 30-in. cast-iron rising mains into the London County Council system situated in the Metropolitan Borough of Hackney, whence it eventually arrived at the northern outfall works at Barking.

It might interest some members to learn that one of the powers enjoyed by the Tottenham Council under its special Act of Parliament was the authority to charge building fees to pay the salaries of the building inspectors.

Five building inspectors were employed in this department (under the control of the engineer and surveyor), each of whom received a salary of 200l. per annum.

The fees received from builders more than covered the salaries of the five inspectors.

Some members of the Association had recently suggested the sweeping away of existing by-laws and substituting a universal Building Act. It surely must have been forgotten that such an Act would probably repeal the private Acts that most large local authorities had expended a considerable amount of money and labour to obtain, and very many valuable clauses would then be lost altogether; the power to charge building fees, for instance, which some few authorities possessed, but which the blue pencil of the Local Government Board invariably strikes out of new Acts of Parliament, would probably be one of them. Whilst such an Act would give the advantage of uniformity, the author submitted it would be at the expense of the loss of elasticity; moreover, the task of getting such an Act through Parliament was not to be lightly thought of, while the still greater difficulty of getting obnoxious clauses amended after would be almost insuperable. In the author's judgment the experience of the London County Council with their two still-born Building Acts showed how futile any attempt to pass a universal Building Act would be.

The refuse destructor works were officially opened on June 23, 1904, and had been in constant operation ever since.

One complaint as to smoke was received when the destructor was started, but this was more fanciful than real. The weight of refuse destroyed during the twelve months ending June 30, 1905, was 21,757 tons, of which some 655 tons was fish offal; the greatest quantity of refuse destroyed in one day was 102 tons, and the maker's guarantee was 37 lb. per square ft. of fire-grate per hour, which gives 160 tons per day of twenty-four hours as the capacity of the plant. They also guaranteed an evaporation of ½ lb.

of water per lb. of refuse. The cost of burning worked out at 1s. 7½d. exclusive of interest and repayment of capital. Up to the present there had been a ready sale for the clinker, old iron, &c.

When the provision of a destructor first came up for discussion it was considered jointly with a municipal scheme for lighting the district with electricity, generated from a station proposed to be erected on the destructor site, using the waste heat from the destructor plant for supplying a portion of the electricity machinery. The chimney shaft and destructor were erected with this object in view. A change of Council had, however, resulted in the municipal electricity scheme being definitely abandoned.

The cost under the "contract system" amounted to 6,400l. per annum; the cost under the new system was 7,600l., included in which was an amount of 2,350l. 15s. per annum for the interest and repayment of loan. If, in addition, allowance was made for the value of the steam generated, there was a considerable saving under the new method.

The Council obtained a Provisional Order in July, 1902, and various schemes were prepared, but none were adopted by the Council. After a chequered history, the Council had now decided, subject to the approval of the Board of Trade, to conclude an agreement with the North Metropolitan Electric Power Supply Company, who were covenanting to supply the district with electrical energy before October 1, 1906.

The district was visited with an epidemic of small-pox in 1901-2, which cost the ratepayers of Tottenham over 12,000l., and a temporary hospital was erected within the space of three weeks by the Council on land adjoining the destructor site to cope with the outbreak. The sum of 6,000l. was expended on buildings and tents, and over 600 cases of small-pox were treated at this hospital, a large proportion thereof being of a very malignant type.

The actual cost per head for treating the patients at the Council's hospitals was less than 7l., as compared with over 11l. per head which had to be paid by the Council for eighty-eight patients sent to South Mimms from the district.

The present Medical Officer of Health (Dr. J. F. Butler-Hogan) took office when they were in the throes of this epidemic, and never probably in the history of Tottenham was there a time when those to whom was entrusted the care of the public health and administration of sanitary legislation occupied a position of greater difficulty and responsibility.

The buildings were constructed of galvanised iron and timber on brick foundations, and were destroyed by fire on the cessation of the epidemic.

Competitive designs were invited for Council offices, baths, central fire-station, etc., in September, 1902, and a scheme was ultimately accepted by the Council. The works were commenced on May 16, 1904, and completed in October, 1905; the whole of the fittings for the offices were made in the Council's workshops, and the furniture of the Council chamber, committee-rooms, etc., was supplied and fixed by a London firm. The total cost of the scheme, including the acquisition of the site, was expected to reach 70,000l.

In 1900 the Council acquired an estate of 14 acres for 3,600l., and the author was directed to prepare a scheme for the erection of workmen's dwellings. The scheme was duly approved, and application was made to the Local Government Board for sanction to a further loan of 102,000l. to carry out the work. An inquiry was held on May 12, 1902, at which there was tremendous opposition by builders and others. Since this inquiry took place the London County Council had deposited plans for the development of a huge estate in Tottenham for housing an estimated population of 42,500 at an estimated cost of one and a half millions; the work was now in hand.

In view of this the Council decided in July of this year not to proceed further with the scheme prepared by the author, and the application for permission to borrow 102,000l. for the purpose had accordingly been withdrawn.

The Legal Committee had now been instructed to consider and report as to the

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advisability of leasing the land for building purposes to suitable tenants, the Council reserving to itself the right to stipulate as to the building of houses and their construction.

Parks and open spaces had always been a subject of deep interest to the Tottenham Council. The open spaces in the district had an area of over 240 acres, which could never be covered by buildings, and was open to the enjoyment of the public for ever.

Bruce Castle Park had an area of 20 acres, and was purchased in 1892 at a cost of 15,000*l.* The park was beautifully wooded, possessing smooth lawns in deep shade, tennis courts, bowling greens, and an old and picturesque mansion, with a quaint central tower, known as Bruce Castle.

In 1827 the estate was put up to auction and bought by a family of schoolmasters of the name of Hill, who had views on education very far in advance of their times, and who made Bruce Castle School a great success. One of these masters became known throughout the world as Sir Rowland Hill, the introducer of the penny post, the birthplace of which was Bruce Castle.

Chestnuts Park and Recreation Ground was purchased in May, 1898, and had an area of 13 acres; it was laid out by the authority principally as a recreation ground, with cricket and football pitches, bowling greens, etc., against a background of ornamental shrub and flower beds. The old mansion on the estate had been converted into a library and public reading-rooms.

The Council were the owners of 117½ acres of land lying in the far east of Tottenham, locally known as the "Lammas Lands." An Act of Parliament was obtained in 1900 to require power over and extinguish the Lammas rights over these lands, which were now the absolute property of the public; football and cricket pitches were allotted by the Council to applicants, this being greatly appreciated.

When the London Water Bill of 1902 was introduced by the Government the Council was at once confronted with a most serious and important matter—a very thorny problem which required their careful thought and serious consideration; the question before them was whether they should ask the Government to include Tottenham in the area of supply proposed to be established under the Water Board or continue to keep the water undertaking under municipal control and management. It was sought by the Government in their Bill to transfer to the District Council so much of the plant and business of those companies as were in Tottenham, and the Council would have been required to refund to the Water Board the ascertained value of such plant and business. It was ultimately agreed by a unanimous vote that the passing of the proposed Bill would be highly detrimental to the district, and strong reasons were adduced for bringing Tottenham within the limits of the Act without in any way depreciating the value of the Council's undertaking. The valuation of the undertaking was prepared by the author, and in the end the sum of 77,700*l.* was paid to the Council by the Metropolitan Water Board for the plant and works, which they took over in June of last year.

This left a balance of over 30,000*l.* after paying off all outstanding loans, and the final agreement was considered by the Council to be eminently satisfactory.

The author would like to take this opportunity of saying how much the public of Tottenham were indebted to their representative on the Metropolitan Water Board (Mr. Councillor P. B. Malone, J.P.), who worked so indefatigably and successfully during the conduct of the negotiations.

There were ½ miles (double track) of tramways in the district and ½ miles (double track) of light railways.

The electric tramways belonged to, and were run by the Metropolitan Electric Tramways Company, to whom also were leased the lines of light railways in Bruce Grove and Whip-lane, constructed and owned by the Midland Counties Council under their Light Railways Order of 1903; the service was good and frequent, and rendered the adjoining county, together with the City and West-end of London, very easy of access.

An open-air swimming bath had been constructed on Tottenham Marshes. The work

was put in hand at the beginning of last winter, mainly with a view to relieve the distress of the unemployed of the district, and the whole of the labour was derived from this source. The total cost was 4,000*l.*, of which 2,033*l.* was spent in wages. The author considered the employment of casual unskilled labour on this class of work most unsatisfactory, and estimated that the wages bill was increased in consequence to the extent of about 70 per cent.

The President promised that the Buildings By-laws Committee of the Association would not overlook the position of local authorities having special Acts.

Mr. J. Lemon (Southampton) proposed a vote of thanks to Mr. Prescott for his paper. He congratulated the Tottenham Council upon their ability to reduce the rates. His experience was that rates were going up everywhere, so if Tottenham were able to reduce their rates they were doing very well. He was glad Tottenham had got a good local Act, but they must not be selfish in the matter, and must not prevent other districts getting equally good powers. He did not think the Legislature would allow any more local Acts to be passed, because they wanted uniformity throughout the country. Mr. Prescott seemed to have arrived at the conclusion that if a General Building Act was passed the local Acts would be repealed, but that was not so. Further, the good points in these local Acts might be incorporated in the General Act and all the bad points omitted.

Mr. Gamble (Southwark), who seconded, said the feature of the paper seemed to be the unsatisfactory way in which the so-called unemployed had done the work at the open-air swimming bath. He had constructed a bath somewhat similar in size, 100 ft. in length by about 30 ft. in width, and the cost for wages was 380*l.* That fully bore out Mr. Prescott's statement as to the unsatisfactory way in which the men employed on that work carried out their duties.

Mr. Norman Scorgie (Hackney) supported the vote of thanks as a neighbour of Tottenham. In the last few years the improvements in Tottenham had been rapid and for the benefit of the inhabitants. At the same time the rates were rather high. Mr. Prescott had been more fortunate than most of them in his experience of red gum blocks. Three years ago he put down a test piece of 1,500 yds., and he wished to goodness he had never seen the stuff, and a good many others of the Metropolitan engineers were in the same unfortunate position.

Mr. Price (Latham) was much interested in Mr. Prescott's remarks as to building inspectors. It had been his lot to work as a building inspector for five years in a fairly large town, and he held the first-class honours certificate in building construction of South Kensington and the diploma of the Municipal and County Engineers. He had had many years' teaching of building construction, and many boys who had been under his tuition were now Associate members of the Royal Institute of British Architects, and while they were strong artistically and aesthetically they were often very weak in constructional work. One of the greatest difficulties he had was to get them to distinguish between tensile and compressive strains, and he could not drive graphic-statics into them. Some of them could not tell a cast-iron girder from a rolled steel joist. Still they would be able to go into Tottenham as building inspectors.

Mr. T. W. A. Hayward (Battersea) remarked upon the special powers enjoyed by Tottenham under their local Act. In Battersea they had to pay the district surveyor to see that they had done their work properly, and some of them resented it.

The vote of thanks having been passed, Mr. Prescott briefly replied to the questions asked, and thanked the members for their kind reception of the paper.

The members were then entertained to luncheon by Mr. Prescott, who presided, and the usual toasts were honoured.

Dr. Butler Hogan, Medical Officer, in proposing the health of the President of the Association, remarked that that Association had as much to do with the municipal progress of England as any Association that could be named. The medical officers of health had no greater friends and no abler colleagues in the administration of sanitary work, and particularly in the practical

departments, than the Municipal and County Engineers.

A special call of the motor fire-engine was witnessed, and the afternoon was devoted to a round of visits, including the open-air swimming bath on Tottenham Marshes, the sewage pumping station, and Bruce Castle Park, where tea was served.

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Mr. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Greenwich Borough Council 1,500*l.* for pipe sewers; Hammersmith Guardians 6,500*l.* for poor law purposes; Stepney Borough Council 3,770*l.* for electric lighting; and Woolwich Borough Council 5,111*l.* for electric lighting and street lighting.

**Chairman's Address.**—The Chairman, in the course of his annual review of the work of the Council, said that the enormous increase in the Council's responsibilities might be illustrated by comparing its financial operations in the year 1904-5 with those during the first year of its existence. In 1889 the Council took over a net debt amounting to 17,563,262*l.* At the end of March, 1905, this had increased to 44,620,266*l.*, of which 5,622,221*l.* was in respect of remunerative purposes not involving any charge on the rates. A large portion of this increase took place within the year under review, when the outstanding debt of the late School Board, amounting to 11,546,883*l.*, was added to the Council's net debt. The total expenditure of the Council had increased from 3,303,923*l.* in 1889-90 to 16,170,040*l.* in the year under review. The economic and social forces of the present day tended powerfully towards the concentration of the population in large towns. Especially was this so in the case of London, whose magnetic influence on the workers in the provinces had furnished many a theme. If allowed to operate undisturbed the effects of this concentration, combined with the natural growth of the population, were that the people crowded closer and closer together, to the detriment of health and comfort, and the growth of physical, moral, and social degeneration. The central parts of the City became more and more congested, all available space was occupied by buildings, and houses which were originally constructed for the use of a single family had to serve the purposes of a whole colony. Although, however, in particular instances, the condition of affairs was bad in the extreme, counteracting forces were, happily, at work, by which the municipal authorities of London were wrestling with this serious problem. These methods might be divided into two classes:—(1) Measures for remedying the insanitary conditions resulting from actual overcrowding; (2) means for mitigating actual, or preventing possible overcrowding by dispersal of the population. With reference to the first class, during the past year the Council had been engaged in the execution of five schemes, involving the displacement of 4,218 persons, and the provision of rehousing accommodation for 4,434 persons. Up to the end of the year the Council had, under Parts I. and II. of the Act, demolished insanitary property, covering an area of 29 acres, displaced 12,290 persons, and provided accommodation for 13,932 persons. Up to March 31, 1905, the Council had incurred a net capital expenditure of 964,748*l.* in respect of 765,821*l.* for the erection of working-class dwellings upon the cleared sites. The latter figure, however, was of the nature of remunerative expenditure, the income derived from rents more than meeting the debt charges. As to the second class, the Council, by its tramways, possessed the actual means of providing cheap and speedy transit. Of the 115 miles of tramways within the county, ninety-seven and a half miles were owned by the Council on March 31 last. Of these the Council itself worked forty-seven miles, of which twenty-six and a quarter miles had already been adapted for electric traction. The total number of passengers carried during the year was 164,818,560, or 31,679,475 more than in the previous twelve months. It was safe to say that no feature of the Council's work was so



generally known and appreciated as the preservation and maintenance of parks and open spaces, which was another branch of health administration in London. There were over 7,000 acres of such spaces under public control within the county, while there were 7,550 acres outside the county under the control of London municipal authorities. During the last sixteen years the Council had expended on capital account a total sum of about 1,046,000, in connexion with parks and open spaces, and the annual cost of maintenance amounted to 115,000.

The Chairman was thanked for his address. No. 17, Fleet-street.—Mr. Howell J. Williams asked the chairman of the Building Act Committee whether it was a fact that the new front of No. 17, Fleet-street was not in accordance with the Building Acts of London. If that was so, whether the Building Act Committee was approached with a view to obtaining an exemption.

Captain Hemphill said that, before 1894 there were thirteen Acts of Parliament relating to building, and this building being an ancient building, probably it was erected under these Acts. At all events, it had now been reconstructed presumably to the satisfaction of the District Surveyor.

Sir M. Beachcroft asked where the old front was. The new front was entirely new, probably based on the lines of the old one.

Captain Hemphill said he was unable to answer the question.

Westminster Improvement.—The Improvements Committee recommended that a ninety-nine years' lease be granted to the Victoria-embankment Contract Syndicate, Ltd., of the whole of the surplus land from the Westminster improvement. They reported as follows:—

"We desire to bring before the Council an advantageous offer made by a syndicate, registered as the Victoria-embankment Contract Syndicate, Ltd., for a lease of the whole of the land surplus from the Westminster improvement. As the result of negotiations we report the terms offered by the syndicate, which we have no hesitation in advising the Council to accept. These provide that the Council shall grant the syndicate a lease for ninety-nine years of the whole of the surplus land from the improvement. It has been agreed, subject to the Council's approval, that the syndicate shall pay an ultimate ground rent calculated at the rate of 4 per cent. per annum on the total gross cost of the improvement, including the cost of the purchase of property and compensation, the provision of rehousing accommodation, and the paving, etc. works. The syndicate at first asked that the Council would allow a peppercorn period of three years, but this was afterwards reduced to two years, with provision that the rent for the third year shall be 25,000l., for the fourth year 32,500l., for the fifth year 40,000l., and that the full rent, estimated at 52,760l. a year, shall come into charge for the sixth and succeeding years. Having regard to the size of the area to which the syndicate's offer relates and to the time which must consequently elapse before it can be properly developed, we think the proposed arrangements for the payment of rent are reasonable. The ultimate estimated ground rent of 52,760l. a year, capitalised at thirty years' purchase, represents a sum of 1,522,800l. We believe that if the syndicate's offer be accepted the cost of the Westminster improvement will ultimately involve no charge upon the rates.

The syndicate state that they propose to erect, in brick or stone, buildings of fine architectural character. The expenditure in erecting the buildings on the Council's land, and on the additional land, is estimated at 2,500,000l., so that the Council will have full security for its ground rent. Moreover, as about one-third of this sum will be spent in wages, it is apparent that constant employment during the next few years will be afforded to a considerable number of workmen. The Council will retain full control over the lines of frontage and the widths of the new and widened streets, and also over the architectural treatment of the buildings to be erected, the plans being submitted for approval in the usual way.

No portion of the land has been submitted to auction, but, having regard to the terms of the offer now made, we think it should be accepted by the Council. We consider that the fact that so large an undertaking is to be executed in this improvement under the Council's building conditions will have a beneficial effect on the disposal of the valuable surplus land in Kingsway and Aldwych.

The syndicate desire that powers shall be sought over the property to the west of the area of the Westminster improvement, included in the syndicate's scheme of 1893, but not included in the Council's scheme sanctioned by Parliament in 1900. The cost of acquiring this property is estimated at 550,000l. The Finance Committee, however, whom we consulted, thought it inadvisable that the Council, by applying for the necessary powers, should commit itself to a scheme involving such heavy expenditure on capital account. We then considered whether the Council should apply to Parliament for power to acquire the additional property, with a proviso that the Council should be at liberty, within a period of twelve months from the passing of the Act, to transfer its powers to the syndicate. After a careful review of the facts, and having been advised as to the form which the proposed legislation should take, we are of opinion that the acquisition of the land adjoining the site of the Westminster improvement shall, in

accordance with the view which now commends itself to the syndicate, be dealt with in a Bill to be promoted, not by the Council, but by the syndicate. This will render unnecessary the outlay by the Council of the additional sum, estimated at 550,000l., a course which did not commend itself to the Finance Committee.

If the syndicate obtain powers in respect of the additional property, they propose to widen Horseferry-road in continuation of the widening which is now being executed by the Council, and also to effect desirable improvements in St. John-street and Marsham-street. A considerable portion of this property is insanitary, and as the Bill will, of course, contain the usual provisions for the rehousing, at the cost of the syndicate, of the persons of the labouring class who will be displaced by the demolition of the premises, we consider that the Bill may well receive the Council's support. The Housing Committee, whom we have consulted, also approve the syndicate's proposal.

Mr. Horniman, the chairman of the Committee, said that the syndicate had permitted him to state that the gentlemen composing it were Lord Avebury, Hon. J. Scott Montagu, M.P., Hon. W. E. D. Smith, M.P., Mr. T. C. Warner, M.P., Mr. R. J. Price, M.P., Mr. Faithfull Begg, Mr. T. A. Welton, Mr. H. B. Marshall, and others.

Mr. Hubbard moved an amendment to add these words to the recommendation of the Committee:—"That it be referred to the Improvements Committee to bring up a scheme in time for the session of 1907 for the Council to acquire such additional property as to complete the improvement on the lines indicated by the syndicate." He drew attention to the fact that in 1898, not only the Council, but Parliament, rejected a similar scheme by a similar syndicate, and he failed to see that the circumstances had changed in such a manner as to warrant such a complete reversal of policy.

Dr. Cooper seconded the amendment. Lord Welby said the circumstances had completely changed since the resolution of 1898. At that time the Council had no scheme for the electrification of the railways, nor were they committed to the expenditure on the county hall, and a vast number of other schemes which would press heavily on the ratepayers within the next few years. In round figures, the Council had committed itself to capital charges amounting to between 12,000,000l. and 15,000,000l. since then, and as the ratepayers were suffering to an undue extent, the opportunity should not be missed, from quixotic motives, of saving a recoupment loss of 170,000l. The loss would disappear if the syndicate scheme was adopted.

Sir Melvil Beachcroft was anxious to know if the extensions of the Embankment and the Thames gardens were to be carried out by the syndicate or the Council.

Mr. Horniman said that by the Act of Parliament the spaces for the gardens and the extension of the Embankment were secured.

After further discussion, the amendment was rejected, only fourteen members voting for it.

Mr. Jeffery moved a further amendment that the whole question be referred back for further consideration, and report.

This was also rejected.

Mr. Johnson then moved a further amendment, which was identical with that proposed by Mr. Hubbard, except that the session of 1906 was substituted for 1907.

On a division, this was rejected by fifty-four votes to twenty-eight.

As the time had now arrived when only unopposed business could be taken, the whole matter stood over until the next meeting.

The Council shortly afterwards adjourned.

VICTORIA MEMORIAL, BLACKBURN.—The memorial to the late Queen which has been erected at Blackburn was unveiled by Princess Louise a short time ago. The work was executed by Mr. Bertram Mackennal, sculptor.

THE FRASCATI RESTAURANT.—Various alterations have just been carried out at this restaurant in Oxford-street, and at the same time a new masonic temple has been erected. The restaurant has been redecorated in blue, white, and gold, and an enlargement has been made to the winter garden, a new wing having been added. The builders were Messrs. G. Godson & Sons, of Kilburn, who carried out the work under the direction of Mr. C. H. Worley, architect. The constructional ironwork was by Messrs. Homan & Rodgers, and the painted decorations were carried out by Messrs. Campbell, Smith, & Co., Ltd., of Newman-street. The cedarwood paneling of the masonic temple was executed by the Fire Prevention Building Co., Ltd., of Fulham.

## Fifty Years Ago.

FROM THE *Builder* OF OCTOBER 27, 1855.

### LABOURERS' COTTAGES.

SIR CHARLES ANDERSON, in his paper on "Cottage Architecture," read at the meeting of the Lincoln Diocesan Architectural Society, said:—"In these days the poor have been driven into the towns from the country, and much obloquy has been thrown on landowners as if they had been the sole cause of this. No doubt they shared in the blame; but many causes have been at work to bring about this evil: the former poor law—the natural tendency of men to shift the burden upon others. But there was one other cause—the cost of building cottages. This was the problem he wished to see solved—in how a cottage having three good bedrooms, with suitable conveniences, could be built so as to be substantial, warm, convenient, not so unsightly as to destroy self-respect, and yet pay a fair interest on the money spent. Many proprietors had most laudably spent their money in building cottages near their own residences, which were models of beauty and excellence. He named the villages of Belton, Blankney, and Hainton, as affording examples of this admirable munificence; but such models could not be followed in ordinary cases. We must have something less costly before we could expect proprietors to lay out their money. In different localities different materials would be found—stone, brick, tile, slate, and the relative cost of each would make estimates differ, as well as the cost of labour. A simple mode of drainage, the quality of mortars, the pitch of roofs, the height of rooms, the situation of doorways—all these require careful consideration; and it would be one of the most beneficial tasks of the society to endeavour to obtain plans which had been tested, with vouchers for the cost of all the items, and the experience of the inmates as to their comfort, in order to arrive at what was wanted.

## Illustrations.

### MUNICIPAL BUILDINGS, WALSHALL.

IN the *Builder* for October 13, 1900, we gave the plans, elevation, and perspective view of the design for Walshall Town Hall by Mr. J. G. S. Gibson, which had just then been accepted as the result of a competition. A description of the design will be found in the same issue.

We now give three illustrations of the completed building, from photographs kindly sent by the architect.

The general contractors for the building were Messrs. Armitage & Hodgson, of Leeds; the decorative carving has been executed by Mr. H. C. Fehr; the furniture in the Council Chamber is by Messrs. G. Pratt, of Bradford. Mr. W. C. Lee acted as clerk of works.

A perspective of the interior of the large hall, as then intended, was given in our issue of October 6, 1900; and a view of the main staircase, from a drawing, appeared in our issue of May 13 of the present year.

### SOME OLD LONDON CHURCHES.

THREE of the churches shown in the illustration are now destroyed, viz.—St. Mildred, Poultry; St. Dionis Backchurch, and St. Mary Staining. The tower of this latter is, however, still standing. The Church of St. Mildred, on its destruction, was taken to Thorpe Nab, Louth, with a view to its re-erection; at present the remains are to be seen where they were first put down. The Church of St. Peter is now used by a Welsh congregation.

THE BRITISH FIRE PREVENTION COMMITTEE.—The tests announced by the Committee for the next year are:—1. A test with a hose supported by broad flange girders (previously supported by Messrs. H. J. Skelton & Co.), in which the cross girders are not fixed by clamps, bolts, or rivets. This test is in continuation of a similar test which was undertaken this session, but a different concrete aggregate is to be employed. 2. A test with a concrete floor with girder reinforcements (constructed by the New Expanded Metal Co.), in which the fire resistive qualities of the zonal encasements are to be determined.



## THE INSTITUTE OF BUILDERS.

The annual dinner of the Institute of Builders, Incorporated, was held on Wednesday last week in the Whitehall Rooms, Hotel Metropole, W.C., the President, Mr. Benjamin I. Greenwood, in the chair. There were also present, amongst others—Sir Aston Webb, R.A., Mr. F. Higgs, President, London Master Builders' Association, and Messrs C. Barry, A. Boden, H. H. Bartlett, J. Bell, S. Bolton, J. F. Bull, A. Burnett-Burnett, F. S. Chesterton, W. Clarkson, F. L. Dove, A. Dixon, J. F. Dallow, C. Fitz-Roy Doll, W. H. Driffield, Basil Ellis, J. B. Gass, T. Gregory, Leslie W. Green, H. S. Greenwood, J. F. Greenwood, F. J. Gill, T. Holloway, Edwin T. Hall, J. S. Holliday, W. Higgs, G. S. Hill, H. H. Holliday, W. Hammond, G. C. Hudson, H. D. P. Kitcat, W. Lawrence, C. W. Laker, W. J. Locke, L. J. Maton, F. G. Minter, W. O. Milne, W. Nicholson, J. Randall, E. S. Rider, G. Sherrin, G. Gordon Stanham, C. J. Smith, E. J. Stubbs, H. W. Trollope, W. W. Thomas, A. M. Torrance, S. Towse, A. W. Turnbull, C. Wall, B. C. Wotton, J. A. Wallis, F. E. Wallis, W. J. Wells, and W. W. Wells.

The loyal and patriotic toasts having been honoured (Mr. H. H. Bartlett proposing "The Imperial Forces" and Mr. Basil P. Ellis responding).

Mr. Edwin T. Hall, architect, proposed the toast of the evening, "The Institute of Builders and its President." He said that when we speak of building we refer to an industry which goes back to the beginning of civilisation. When nomadic tribes gave up their tents and settled in communities they erected permanent buildings, and then the craft of building was initiated. From the dawn of civilisation to the present day this great craft of building had existed, and not only were great buildings erected in England and Europe, but further afield great works were built every thousands of years ago very much as they are to-day. If we looked at that marvellous palace of King Minos in Crete, erected, say, 4,000 years ago or more, we should see that in its construction the methods employed were almost identical with those employed to-day; staircases there had been constructed as we construct them; there were large and spacious apartments, indicating a marvellously complex system of administration; for no place of to-day was more elaborate than that of King Minos of Crete. Then there were the great works erected in Egypt and further east in Ceylon, where we see that 50 years B.C. stupendous works were erected during a civilisation which has passed away. The great shrine of Buddha's 2500— a huge domical structure in brick, in height 60 ft. more than St. Paul's Cathedral, and 360 ft. in diameter, on a base 600 ft. square—was built in an island, where to-day it was difficult to realise that builders of such a work could have existed. Then there were the wonderful works of Rome, where in the great Augustan Age, magnificent palaces and temples were erected such as the world had not seen since. We had nothing to equal the great baths and temples of that city, and all these works were done by those who followed the calling which they represented! Each age had its great building operations. In this country, from the XIth to the XVth centuries, was the great era of church and cathedral building; then we came to the time when some of our noblest houses were erected, and to-day we have municipal buildings, town halls, hospitals, school buildings, and buildings for housing the working classes. There was one point of contrast to mention, and that was that in the past people worked with great deliberation: it was looked upon as a marvellous thing that Salisbury Cathedral should be erected in thirty years. At Durham the Chapel of the Nine Altars took 100 years to build. The keynote of the present day was concentrated constructive energy—the intensifying, so to speak, of application, and that brought with it the spur to inventive genius—the bringing forth of labour-saving appliances so as to enable work to be done more rapidly. Time was, and must always be, given to the architect to mature a building design before it was started, but when once it was commenced everything was done to get it finished in the shortest time possible. All this demanded on the part of master builders an

energy and an administrative executive skill which was equal to that shown by a general of an army in the field. To this business of building their hosts belonged, and it was the noblest of callings. As to the Builders' Institute, the masters had formed it, not for the purpose of offence or fighting labour, but in order to deal with labour and other difficulties. They had in the Board of Conciliation brought themselves into close touch with the men, who had learnt that the masters were not their enemies but their friends, who desired to work in harmony with them. It was very necessary that they should have men of honour and credit at their head, and at the present time they had in their President such a man. As long as the Institute was controlled by such men so long it would prosper.

The President, in response, said that Mr. Hall had referred to the grandeur and magnificent stability of ancient buildings, and he (the speaker) had no doubt that buildings of equal strength and durability could be erected in the present day if the circumstances were equally favourable. On some previous occasion he offered to enter into a contract for the erection of a Pyramid in this country similar to those now standing in the land of Egypt, on two conditions, both of which, he believed, obtained when the ancient Pyramids were erected, namely, unlimited time and unlimited cost. Of course, he should require substantial payments on account, and the maximum retention would have to be limited to a very small sum. He thought he ought also to stipulate that bills of quantities should be supplied, because it would be such a delightfully remunerative job for a quantity surveyor. His offer, which was made some time ago, had never been accepted. As to the work of the Institute of Builders during the current year, they had received a proposal that clause 12A in the official form of Contract should be revised, and that, instead of reading—"Any error that may appear in the bills of quantities shall be rectified, and such rectification shall be a variation of the contract," it should read, "Any error or omission that may appear," etc., the reason for the proposed alteration being that the word "error" did not include the word "omission." This question arose in consequence of the peculiar judgment of Mr. Justice Channell in the case of Patman & Fotheringham v. Pil-ditch; but, as a matter of fact, he believed it was not so much the judgment itself as the comments made subsequent to the delivery of the judgment which produced the impression that, in the opinion of the learned judge, an omission was not an error. He should imagine that the learned judge had been misunderstood, although he knew that many were quite confident that the learned judge expressed the extraordinary opinion that an omission was not an error. In any case, it was a very interesting proposition. There was no doubt whatever that builders' omissions were reckoned as errors, and if, for instance, a builder were to omit a damp course he did not think there would be the slightest hesitation in condemning his omission as an error and compelling him to rectify it. If builders' omissions were errors, then surveyors' omissions were errors; that was to say, the word "error" covered omissions. He had heard some zealots for accuracy criticise the use of the word "appear" in this connexion, and ask the question, "Can an omission appear"? An omission could be obvious; it could be apparent, and it was not a great stretch of imagination to suppose that that which could be obvious and apparent could appear. Perhaps it would be as well to explain that he was the author of the clause in question, and they might then appreciate his zeal in defending it. When he first drafted the clause he used the words "be discovered," instead of "appear"; that was to say, "Any error that may be discovered," etc., but that word seemed to him to suggest that as soon as a builder's contract was signed he immediately began diligently to search for errors in the bills of quantities, for the word "discover" implied search. He could assure them that that would be quite an erroneous inference, and he therefore substituted the word "appear." The Institute of Builders, however, in accordance with the request made to them, submitted a proposal to the Royal Institute of British Architects that the word

"omission" should be included in clause 12A, and they received a reply which, in his judgment, was a very right and proper reply, namely, that there was no necessity whatever to alter the clause, as it was quite sufficient to cover the purpose intended; the clause therefore remained unaltered, and he ventured to think that if ever this clause should need to be interpreted in another law suit there should be no doubt that its meaning would be properly understood by any judge who gave the matter his careful attention, especially if proper evidence of the customs of the trade were brought before him. When bills of quantities were supplied to contractors it was, of course, for the express purpose of saving all the competitors for the contract the heavy expense of taking out the quantities themselves, the one measurement by the quantity surveyor serving for all. The contractors therefore all based their estimates on the bills of quantities supplied (the suggestion that the contractors should verify the bills of quantities was quite foolish, and could only come from one who was ignorant of what such a suggestion would involve). Reliance was placed on a quantity surveyor as a professional expert. If any item was omitted from the bills of quantities it followed, as a matter of course, that it was also omitted from the contractors' estimate, and that estimate was consequently less than it otherwise would be, and if this work omitted from the bills of quantities was subsequently carried out, then, if the bills of quantity were part of the contract, the cost of this item must obviously be added to the contract sum, otherwise the client would obtain that work without paying for it. On the other hand, if the quantity surveyor provided for excessive work which was not required, then the contract sum would, of course, be reduced accordingly, as the contractor should not be paid for work included, by direction, in his estimate and which work had not been done. When parties entered into a contract on these terms, indicated by a special clause (12A) inserted in the contract, any misconception such as that implied by the learned judge's remarks, was inexplicable. When the bills of quantities were deliberately excluded from the contract, that was another matter. In that case the contractors consented to take the risk of inaccuracies in the bills of quantities; he took them "for better for worse, for richer for poorer," but the bills of quantities sometimes failed to realise expectations, whilst there were some rare cases when one got more than one expected. He disclaimed any inference that quantity surveyors were more liable to error than other men. "Humanum est errare." It was human to err, and surveyors were human. In the form of contract, however, it was not only inferred that surveyors might err, but architects also, for he remembered a certain clause which spoke of discrepancies which might occur between drawings and specifications which implied error, and also of stipulations that figured dimensions were to be followed in preference to scale, which also suggested error somewhere. With regard to builders, there was no attempt at a gentle insinuation, but it was evidently a foregone conclusion, without any hesitation or demur, that builders were not only liable to err, but that they probably would do so, and a large part of the contract was taken up in anticipating these errors and providing stern retribution. With regard to quantity surveyors, he should like to express the conviction that they were the marvels of accuracy, considering the enormous obstacles to accuracy that they met in their profession. When a client did not know what he wanted, and the architect did not know what he wanted, and the surveyor would tell what they both wanted, and would put it down in black and white in such a clear and concise form that the builder was able to estimate for it. Of course, there were quantity surveyors and quantity surveyors, all assuming the same title but with very different qualifications; there were some whom he was about to call "amateurs," but he believed an amateur was one who did a thing for the love of it, and he could not conceive any human being taking out quantities for the love of it. He remembered once having what purported to be a bill of quantities placed before him which was a marvellous example of the way not



to do it; there were several items, such as, "Allow for water services," "Allow for such painting as may be necessary," and other clauses of that kind; but one particular item had impressed itself upon his memory; it ran as follows, "1 mahogany top," and he ventured to write to the gentleman from whom this so-called bill of quantities emanated to inquire what kind of mahogany top was intended—a peg top or some other kind of top. But these instances were, fortunately, rare, and he believed the weight and authority of surveyors' bills of quantities were becoming recognised every year to a greater extent, so much so that he believed in a few years' time that form of contract in which the bills of quantities were excluded would become obsolete. Even His Majesty's Office of Works, who for so many years adhered to this old custom, were now adopting the bills of quantities as the basis of their contracts. Parliament had been very busy during the current year, although it had done nothing; there was an art in being busy and doing nothing which found very competent exponents from the British workman up to the British legislature. There had been an abundance of legislation introduced, although, in most cases, it had fortunately led to nothing. There had been an attempt to amend the Workman's Compensation Act, which attempt had proved abortive, and the proposals would, in many cases, have increased the unfair burden that already rested upon the employer of labour. Some people thought that the Workman's Compensation Act was not capable of amendment; on the contrary, he thought it could be amended with very great advantage. It was undoubtedly a very desirable thing that when a workman met with an accident some provision should be made for the support of himself and his family during the time that he was laid aside. This would be, in the first place, a very great benefit to the workman himself; in the second place, it would be a benefit to the State, because it would prevent the wife and children of the injured man having recourse to the State for support. It was also suggested that some benefit would accrue to the employer of labour, although this was somewhat vague and difficult to discover, but let them assume for argument's sake that some benefit would accrue to the employer. Now, we knew that insurance against accident could only be effected by the payment of money, and he submitted that the workman, who received the greatest benefit, ought to pay something towards the cost; that the State, who also received benefit, should also contribute to the cost; and in that case he was quite sure that the employers would gladly contribute their share in order to effect the desirable result; but the Legislature had in its wisdom imposed the whole burden upon the employer, whether he liked it or not, and in this direction the Workman's Compensation Act was capable of considerable amendment by the equitable adjustment of the burden. He considered that workmen should be placed in a position to effect insurance against accident on terms infinitely more favourable than the rest of us, say, at one-third the ordinary cost, or even one-quarter, but to give them this benefit without any payment whatever was, in his judgment, a mistake; and the same objection applied to all those benefits which we desired to confer upon the poorer classes. Let them contribute something, however small, to avoid the detrimental effect of making them the objects of charity. A Bill was also introduced into Parliament, entitled the "Trades' Disputes Bill," but it was very soon apparent that this could lead to no practical result. Mr. William Shepherd gave very valuable evidence before the Parliamentary Committee concerning this Bill, but, as they knew, the Bill died in its infancy. The chief work of the Institute, however, had been to contest the extraordinary Bill introduced by the London County Council entitled "The London Building Acts Amendment Bill," and in the efforts to oppose this autocratic measure they were joined by the London Master Builders' Association, the Institute of Architects, and the Institution of Surveyors, and other public bodies, as well as private individuals, also offered determined opposition to the measure. The Institute opposed the Bill in conjunction with the London Master Builders'

Association, and it had cost about 700*l.*, and there was no doubt that the other bodies opposing the Bill spent as much, if not more, in their opposition. They petitioned against the Bill for reasons which appeared to be overwhelmingly conclusive, and Mr. William Shepherd gave evidence in support of their views before the Parliamentary Committee, and he should like to call attention to the very valuable services that Mr. Shepherd had frequently rendered to the trade in this direction. He was a man who had very clear and decided views as to what might be considered fair and just, and when he expressed these opinions in his deliberate manner they generally carried conviction with them. There was no member of the Institute who rendered more valuable services in this direction than he. The Bill was dropped, with the exception of the "Fire Clauses," containing most arbitrary and onerous restrictions upon owners of property and the building trade. They opposed, not the fire clauses, but the oppressive provisions contained in these fire clauses, both in the House of Commons and in the House of Lords; but the Bill was rushed through at the tail end of the session and became law. They obtained, however, one very valuable amendment, in addition to two or three minor amendments; the important amendment was the insertion of a "right of appeal," or, as the builders would call it, an "Arbitration Clause," for in drafting the Bill the London County Council asked for unlimited powers to enforce their own requirements without restriction and without giving any proper reason for their decisions. If there be one thing more than another that created enmity against the London County Council it was their autocratic and dictatorial attitude towards those who were entitled to their consideration. When democracy once got into power it seemed to act in a much more autocratic and domineering spirit than was ever exercised by the aristocracy. He was quite sure that in securing the right to appeal they had secured that which would prove to be of great ultimate value to the community. It was proposed to present a petition to His Majesty that a Royal Commission be appointed to consider the various London Building Acts for the purpose of revising and combining them in one Act which should at once be comprehensive and comprehensible, for he thought they would agree with him when he said that it would tax the abilities of the proverbial Philadelphian lawyer to grasp the intricacies of the Building Acts as they now exist. There was one matter to which he intended to refer at the outset of his remarks, i.e., to the recent decease of Colonel Stanley Bird, whose name was so well known by all connected with the building trade. The valuable services that he rendered to the trade in years past would not easily be forgotten, and they would be glad to hear that it was proposed to establish some permanent memorial to him. Colonel Bird was greatly interested in the work of St. Mary's Hospital, and it was proposed to endow a cot in that institution in his memory. Colonel Bird was intimately associated with the Institute of Builders, the London Master Builders' Association, the National Federation of Master Builders, and the Builders' Accident Insurance Co., and it was suggested that all these bodies should participate in this memorial. A circular would shortly be issued inviting contributions, which he felt sure would be readily forthcoming. At this gathering, representative of the London building trade, some reference might well be made to the excellent work that had been recently accomplished by the President of the London Master Builders' Association in the readjustment of the hours of labour during the winter. Mr. Frederick Higgs had expended very much time and energy to effect this result, and in the conferences with the various trades unions he had exhibited tact and discretion which had contributed in no small degree to the successful result. He was not yet through with the task he had taken in hand, and perhaps the most difficult problem was yet to be solved, but he (the speaker) was sure they wished him every success in his endeavours to complete the useful work he has undertaken.

Mr. Fredk. Higgs, President of the London Master Builders' Association, then proposed the toast of "The Architects and Surveyors."

Referring to the alteration in the rules, he said they had been fortunate in hitting on the right time for alteration, and that was due to the success of the operations so far. He did not think that in the days of old there were general contractors, and whether these architects he did not know, though he fancied that the architect was the builder, i.e., that the man who carried out the scheme was the man who was carrying it out; but the exigencies of present-day life, and the convenience to the architect of having such a man to deal with, had brought into existence during the last 100 years or so the general contractor, who was termed the "undertaker" in the Workmen's Compensation Acts. Those who were in the trade were not dependent on one other. The architect was the brains of the scheme; the contractor might be called the heart; and below him were the nerves and muscles, who might be called the nerves and muscles. It would be absurd of one to say to the other, "I have no need of you." They were indissolubly bound together in one community of interest. Amongst the architects of to-day were men of great ability, and the opportunities for the exercise of their skill and ingenuity were never greater than they are to-day, though probably, if only a small part of the recommendations of the Traffic Commission were carried out, there would be greater opportunities in the future. Every street improvement meant opportunities for both architects and builders. With the toast he coupled the names of Sir Aston Webb, R.A., and Mr. Walter Lawrance.

Sir Aston Webb, in reply, said that their interests in common were so great that it would be extraordinary if they did not work together in amity, and he thought that they were never on better terms than they were to-day. He desired to associate himself and all architects in what had been said by the President as to the late Colonel Bird. He (the speaker) met him often, and had opportunities of realising how wise and sagacious he was—a man of cool judgment and fairness—and they all regretted that his time to go had come. He (the speaker) had the good fortune to be associated with the President in the erection of a great national building, and he congratulated him on occupying the position he did that night. As to what the President said about the Pyramids, he (the speaker) had no doubt that if Mr. Greenwood had the opportunity of building such a work, he would build an excellent Pyramid, every bit as good as the existing one. Great admirer as he was of old work, he was an equal admirer of the present, and if we were to make progress we must look forward rather than backward. The building trade and building work one had every reason to be proud of, and every reason to believe that they would progress, and that works would be produced equal to what had gone before. Sometimes he thought that it would be well for building generally if architects and builders could confer together a little more in regard to many matters—as to the use of materials, matters of construction, etc. He thought it might result in keeping specifications closely up to date, and would help them to understand what they required and what they intended to do. London seemed to be rebuilding, and yet he heard on all sides that the building trade in London was in rather a depressed state, and there was a cry from the public for increased cheapness in all buildings, and for greater rapidity of construction. He ventured to think that neither cheapness nor rapidity was to the advantage of good building or design. He thought they should try and make the public understand that; because a thing cost less money, it was not necessarily cheap. He was inclined to think that the 150*l.* cottage was dearer than the 200*l.* cottage; but, on the other hand, he thought they should try to economise where they could. He believed that cheap materials were a mistake, but economy they might more closely go into—the economical use of materials, economical construction and labour-saving contrivances. In regard to rapidity of workmanship, there had been most alarming operations in London within the last few months or two years. He looked upon it with the greatest possible alarm, and he was astonished to see the buildings that were put up in six or nine months. He did not think



that such rapidity could be good for building, and he hoped that they, who had so much influence in the matter, would not take to that system of building. It was not good for the building itself, and it was bad for the design. These experiments from across the Atlantic were apt to be taken up, and if people got the idea that certain buildings could be built in, say, six months, they would never give longer time. When people pressed him to get on quicker, he always said: "When your building is finished, if all you have to complain of is the time it took to build, I shall not mind." He did not believe that we ought to hurry such things so much. They were all engaged in one of the noblest of crafts, and no one was more proud to belong to it than he was. If it was a worthy ambition and he supposed it was—that when we leave this world we shall leave some little mark behind us, there was no occupation which lent itself so well to that ambition as the erection of buildings. But that advantage carried with it a great responsibility. He did not think that Shakespeare referred to builders and architects when he said that "the evil that men do lives after them," but he might have done so, and one knew that errors of design and errors of construction which they all sometimes made would in due time come home to roost. The mills of time grind slowly, but they ground exceedingly small, and if we did not see the result our successors did. Let us all try, that our descendants may say of our designs and work, as we said of our ancestors: "They dreamt not of a perishable home who thus could build."

Mr. Walter Lawrance, President of the Quantity Surveyors' Association, who responded for the surveyors, said that the President had mentioned one very important matter, i.e., Clause 13A of the Building Contract. As the surveyor in the case which the President mentioned, he must utterly disagree with him as to his satisfaction with the decision of the Royal Institute of British Architects. He felt most strongly that that clause ought to be altered. The decision of Lord Justice Channell simply amounted to this: That if the surveyor left the total quantity of an item—say, the whole of the floor of a building—out of his bill of quantities, the builder had no claim; but if the surveyor should happen to take twenty squares where he ought to have taken 200, then the builder had a claim. He could not see how the contractor could be satisfied with that. But he quite agreed with the President's remark there were surveyors and surveyors, but he looked to both architects and contractors to uphold the position of surveyors. The amount of advertisement and competition at the present time was bringing in men who, he was sure, contractors would be sorry to have to deal with as quantity surveyors, and would give rise to endless trouble in the future owing to the bad quantities which they would prepare. There were men who prepared quantities at a very reduced rate—at a rate which experienced quantity surveyors knew it was impossible to do the work at properly.

Mr. Chas. Wall then suitably proposed the last toast, "The Visitors," coupled with the name of Mr. G. Lee. In referring to the new clauses of the London County Council Building Act Amendment Bill, he said that those clauses would increase the work of London builders immensely. If the President had to build a Pyramid, he was afraid he would not live to see it completed.

Mr. Lee, of South Africa, in response, said that it had been the aim of the architects and surveyors and builders of the colonies for years past to work on the lines of those at home, and in considering what should be done in the colonies they considered what had been done at home. It was the desire of every architect in South Africa who strove to rise in his profession to become a member of the Royal Institute of British Architects. He had known men who had handed over their work to others so as to return to England to study and pass the examinations of the Royal Institute of British Architects. Quantities in South Africa were formerly drawn up in a very primitive and haphazard way, but quantities to-day in South Africa were prepared in much the same way as they were in England. Trade in South

Africa was very depressed at the present time, but in the Transvaal things were brightening up a little.

The President said he should like to refer to what Mr. Lawrance had said. He did not think there was any difference of opinion between them, and if the judgment referred to was the last word to be said on the subject, he admitted that some alteration should be made in the Contract; but he was loath to believe that any such judgment could stand permanently or form a precedent, and it was because he held that opinion that he thought the alteration was unnecessary. As to Mr. Wall's remark about the Pyramid, it would not matter if he did not live to complete it, so long as the payments on account were made.

The proceedings then terminated.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

##### *Lines of Frontage and Projections.*

*Islington, South.*—A projecting pilaster between Nos. 58 and 59, Upper-street, Islington (Messrs. F. Sage & Co., Ltd., for Messrs. Jones & Sons).—Consent.

*Greenwich.*—Detached houses on the east side of Mycenæ-road, Westcombe-park-road, Greenwich (Messrs. Crickmay & Heath for Mr. W. C. Johnson).—Consent.

*Lambeth, North.*—Projecting clock at the Royal Victoria Hall, Waterloo-road, Lambeth (Messrs. J. Walker, Ltd.).—Consent.

*Paddington, South.*—An iron and glass conservatory at the first floor level in front of "Keith House," Bayswater-road, Paddington (Mr. E. C. Macpherson for Sir Clifton Robinson).—Consent.

*St. George, Hanover-square.*—A projecting balcony at No. 27, Maddox-street, St. George, Hanover-square (Mr. E. K. Purchase).—Consent.

*Wandsworth.*—Porches to ten houses on the west side of Luttrell-street, Putney (Messrs. E. H. Wallis & Co.).—Consent.

*Westminster.*—That the application of Mr. P. N. Ginhams for an extension of the periods within which the erection of an addition, with a projecting portion, to the Westminster Technical Institute, Vinco-square, Westminster, was required to be commenced and completed, be granted.—Consent.

*Clapham.*—Buildings on a site abutting upon the south side of Clapham Park-road and the east side of Park Hill, Clapham (Wandsworth Borough Council).—Consent.

*Islington, West.*—The erection of a one-story office building on the south-west side of Holloway-road, Islington, adjacent to the west side of the Great Northern Railway Station (Mr. V. F. V. de Brauwere for Mr. H. E. Butcher).—Refused.

*Hackney, South.*—Buildings on a site abutting upon the east side of Trillick-road, south side of Leslie-road, and north side of College-avenue, Hackney (Mr. J. G. Tewson for Mr. D. Burnett).—Refused.

*Lewisham.*—One-story shops on part of the forecourts of Nos. 29 and 31, Beacon-road, Hither Green, Lewisham (Mr. H. Kent).—Refused.

##### *Width of Way.*

*Islington, West.*—A building on the site of the tramways depot on the north-eastern side of Writers-road, next Camden-road, Islington, with external walls at less than the prescribed distance from the centre of the roadway of Writers-road (Mr. E. J. Edwards for the Highway Committee of the Council).—Consent.

##### *Width of Way and Lines of Frontage.*

*Fulham.*—Buildings upon a site, abutting upon the southern side of Fulham-road, western side of Fulham Park-road, and eastern side of Landridge-road (Messrs. Withers & Meredith for Messrs. Spencer, Santo, & Co.).—Refused.

##### *Lines of Frontage and Construction.*

*Fulham.*—A cycle and tool shed at No. 38, Donnerside-street, Fulham, to abut upon Wood-lawn-road (Mr. C. Botterill for Mr. G. Williams).—Refused.

##### *Width of Way and Construction.*

*Southwark, West.*—An iron shed on a site abutting upon the north side of Lavington-street and south side of Farnham-place, Southwark, with the forecourt boundary at less than the prescribed distance from the centre of the roadway of Farnham-place (Messrs. F. Wheeler & Son for Messrs. Measures Brothers, Ltd.).—Consent.

##### *Space at Rear.*

*Strand.*—A deviation from the plans approved for the rebuilding of Nos. 85 and 86, Jermyn-street, and Nos. 10 and 11, Ormond-yard, St. James, so far as relates to the erection of small

buildings in the yard at the rear of the Waterloo Hotel (Mr. G. D. Martin).—Consent.

*Bermondsey.*—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of St. Stephen's Vicarage, St. Stephen's-square, Southwark (Mr. J. W. Rhodes for the Rev. W. Dodge).—Refused.

##### *Alterations of Buildings.*

*Camberwell, North.*—The retention of a water-closet building and reconversion into a dwelling house, of a stable building at the rear of the "Duke of Clarence" public house, No. 181, Camberwell-road, Camberwell, abutting upon New Church-road (Messrs. F. J. Eedle & Meyers for Mr. A. E. Gaurard).—Consent.

*Strand.*—Alterations at No. 7, Noel-street, Soho (Mr. G. C. Lambert).—Refused.

##### *Working-class Dwellings and Space at Rear.*

*Stepney.*—Blocks of intended dwelling-houses to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on a site on the southern side of Adeline-grove, Mile End (Mr. W. E. H. Crawley for the Mercers' Co.).—Consent.

*Stepney.*—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of workshops, stables, and two blocks of dwellings on a site on the southern side of Adeline-grove, Mile End, with open spaces at the rear (Mr. W. E. H. Crawley).—Consent.

##### *Means of Escape at Top of High Buildings.*

*Strand.*—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the seventh (top) story of Nos. 1 and 1A, Cockspur-street, Strand, for the persons dwelling or employed therein (Mr. H. Tanner, jun.).—Consent.

The recommendations marked † are contrary to the views of the local authority.

#### ARCHITECTURAL SOCIETIES.

**ARCHITECTURAL ASSOCIATION CAMERA AND CYCLING CLUB.**—On the 17th inst. Mr. Ernest Marriage read a paper on "The Sculptures of Chartres Cathedral," illustrated by a unique collection of lantern slides, which, for their technical excellence, it would be hard to beat, many of the negatives being taken by aid of the telephoto lens. The paper chiefly described the various sculptures and their representation. The south porch, which was finished in 1170, and is considered one of the finest in France, consists of three bays, each with a pediment containing niches, above being a gallery of large statues, the whole representing the "Glorification of Christ." The north porch, which is also a mass of symbolic carving and enrichment, is devoted to the "Glorification of the Virgin," and contains seven hundred statues; round the soffits of the arches are various figures representing the Creation, while under other arches there are figures representing the months of the year and signs of the Zodiac, although some of them are misplaced, probably owing to the many restorations the cathedral has undergone from damage by fire. In nearly all cases it is comparatively easy to make out their meaning, thereby showing the wonderful state of preservation. On some of the sculptures there are still traces of gilding and colour. Mr. Wonnacott, in proposing a vote of thanks, mentioned that he thought the carving to some of the bases was rather Renaissance in feeling, and seemed to be of a later date than the rest of the work.

**BIRMINGHAM ARCHITECTURAL ASSOCIATION.**—The Green Book of the Birmingham Architectural Association gives a very good account of the prospective arrangements for the coming session. Among the papers to be read at the sessional meetings is one by Mr. J. A. Gotch on "The Homes of Queen Elizabeth's Courtiers"; Mr. Percy S. Worthington contributes one on "Homes of the Monks during the Middle Ages"; Mr. Lancaster one on "The Cardiff Municipal Buildings"; Professor Beresford Pite one on "Architectural Effect in Cities." The visit of the Association to France is commemorated by three or four interesting sketches of Mont St. Michel and Coutances. The B.A.A. studentship prize is offered for the best set of sketches and measured drawings made under certain specified conditions, and for the best design for a cottage hospital, the directions for which are very clearly and fully set forth. Mr. Bidlake's lectures on "Architectural History" at the School of Art, from Roman Architecture to the Gothic Style in England, will be of interest and



value to students. It is noted that Mr. Alfred Gilbert, R.A., and Sir Aston Webb, R.A., have become honorary members of the Association. In the course of the Report is the following rather drastic comment in regard to the subject of Fellowship elections at the Institute:—

"The Council have held eight meetings—one of the most important questions receiving their attention being the procedure of the R.I.B.A. Council in its elections to the Fellowship. It has been felt, pretty generally, not only by our own, but by other affiliated Societies, that the R.I.B.A. Council exercises no efficient discrimination as regards the qualifications of applicants for direct admission to the Fellowship, who desire to escape the test of the qualifying examination imposed upon all new Associates. By its own regulations the Institute is required to consult the Local Societies with regard to such applicants within their respective provinces, but these regulations have been practically disregarded, and what is worse, the recommendations of the Local Societies have been ignored when the attention of the R.I.B.A. Council had been drawn to the point at issue. The Council of the Institute, therefore, drew down upon themselves the adverse vote which in some cases nullified their nominations for the Fellowship."

We print this as an expression of opinion, though we think the Council of the Association, in admitting this paragraph, must be rather under a misapprehension both as to facts and as to the feelings and intentions of the Institute Council. The other side of the question is stated in a communication to the *Institute Journal* by Mr. Brodie, which will be found reprinted on page 443 of this issue.

The following is the list of officers for the new session:—President—Mr. Thomas Cooper; Vice-President—Mr. J. L. Ball; Council—Messrs. H. T. Buckland, Arthur Harrison, W. Henman, Alfred Hale, A. E. McKewan, E. F. Reynolds, and E. L. Percival; Hon. Treasurer—Mr. Edward Hale; Hon. Librarians—Messrs. J. A. Swan and E. H. Worsey; Advisory Committee—Messrs. J. L. Ball, W. Hale, Arthur Harrison, W. Henman, Herbert Martin, F. B. Osborne, and Anthony Rowse; Hon. Secretary to Advisory Committee—Mr. J. C. Nicol; Lecturer at the School of Art—Mr. W. H. Bidlake; Teachers at the School of Art—Messrs. H. T. Buckland, E. F. Reynolds, and F. B. Andrews; Hon. Secretaries—Messrs. Gerald McMichael (105, Colmore-row) and A. Dennis Thacker (33, Newhall-street).

**SHEFFIELD SOCIETY OF ARCHITECTS.**—The opening meeting of the session of the Sheffield Society of Architects and Surveyors was held on the 19th inst. in the General Lecture Room of the Sheffield University, when an address was delivered by the President of the Society, Mr. Edward Holmes, A.M.I.C.E. Mr. E. M. Gibbs occupied the chair. Mr. Holmes referred at the outset to the progress of the Society, and compared the position with that at the end of the first year of their existence, in 1888. The Society then had forty-seven Fellows, twenty-six Associates, and five students, whilst the last report showed thirty-seven Fellows, forty-eight Associates, and fourteen students, a net increase of twenty-one. The results of the competitions during the past two years were rather disappointing. During the seasons 1903 and 1904, only two prizes were awarded, the essays in the other not being considered of sufficient worth to merit recognition, whilst during the seasons 1904 and 1905, out of four competitions, the prize was only awarded in one case. The lectures had been of an excellent character, but there was room for improvement, both in regard to the attendance and the discussions which ensued. The President went on to refer to the housing question, and dwelt upon the much-talked-of "Garden City" schemes. In his opinion many of the schemes which had been formulated were chimerical and impracticable, but that should not prevent them thinking deeply on the subject. Their ideals could not be too high. He impressed upon all the members the desirability of making themselves acquainted with the powers already possessed by municipalities upon the subject, so as to enable them to consider in what way they could be amended or enlarged. The question was intimately connected with the proposed new building by-laws, and the Council of the Society would closely bear this in mind when they were approached by the City Council on the subject, as they would be in due course. Whatever their individual opinions might be, the subject was bound to come more and more to the front, and he advised the younger members to

seriously take up this question of cheap sanitary cottages, which, he was sure, they would find a profitable one. Another question which was worthy of their closest attention was the acquiring by municipalities of open spaces and land in the neighbourhood of large towns. The departure taken by the City Council at their last meeting, when they approved of the acquisition of land along the Rivelin Valley for the purpose of opening out the valley by the construction of a road, so as to provide profitable employment for the unemployed, was, in his opinion, but the commencement of similar action on a large scale by municipalities. It was also intimately connected with the housing question. Mr. Holmes proceeded to comment on the subject of street dedication. The existing rule-of-thumb system of street dedication was, in his opinion, tending to cripple and narrow the dealings in land, to render very difficult the procuring of mortgages, and thus to raise the price of buildings and the rents of small houses. They felt it their duty to take up a strong position on the matter, and most careful consideration was given to the subject, not only by the Council of the Society, but by a Special Committee of Surveyors who were asked to draw up a report, which was afterwards submitted to the Special Committee appointed by the City Council. Local and Imperial taxation, the law as to rights of light, and the question of education were also touched upon by the President, who, in conclusion, appealed to the members, especially the younger ones, to aim high. As professional men, let it be their aim to attain the highest qualifications for their calling, an aim which, properly persisted in, could only result in happiness and satisfaction to themselves and the appreciation of their fellow-citizens. At the conclusion of the address a hearty vote of thanks was passed to the President, on the motion of the Chairman, seconded by R. W. Fowler, and supported by Messrs. Joseph Smith, T. Winder, G. Osborn, and J. R. Wigfull. The following new members were elected:—Fellow, Mr. F. Cartwright; students, Messrs H. Green and F. N. D. Masters.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—The first meeting of the session was held in the rooms, Pitt-street, on Wednesday last week, when Mr. James Lochhead, A.R.I.B.A., delivered his presidential address. The lecturer's remarks were submitted under the title of "Generalities," and dealt with the problems and difficulties of modern practice, the solution of which was not to be found in text-book or college. The present contemplated scheme of amalgamation between the three architectural bodies in Glasgow would, if carried through successfully, incline not only to the advancement of the profession artistically, but by increased facilities for the interchange of ideas result in the spring of certain grievances which require redress. The practice of architecture has never involved more difficulties than at the present time, and the architect, young and old, has to encounter a multitude of problems in the course of his work which might be solved by the greater unity of such a body. The lecturer, in concluding an interesting address, pointed out some of the avoidable pitfalls that lie in the path of the youthful aspirant to architectural honours. A hearty vote of thanks was accorded Mr. Lochhead for his remarks.

#### BOOKS RECEIVED.

**MOTOR VEHICLES FOR BUSINESS PURPOSES.** By A. J. Wallis-Taylor, M.Inst.C.E. (Crosby Lockwood & Son.)

**THE MECHANICAL WORLD POCKET DIARY FOR 1906.** (Emmott & Co., Manchester, 6d.)

**TRUTH, WIT, AND WISDOM: 525 Letters to the Press, 1887-1903.** By Algernon Ashton. (Chapman & Hall, 6s.)

**THE USE AND CARE OF CHAINS FOR LIFTING AND HAULING.** By Henry Adams, M.Inst.C.E. Second Edition. (Published by the author, 1s.)

**THE LAW ON LIGHT AND AIR.** By Alfred A. Hudson and Arnold Inman. Second Edition. (Sweet & Maxwell, 6s.)

**HYGIENE.** By J. Lane Nottter and R. H. Firth. Sixth Edition. (Longmans, Green, & Co. 4s. 6d.)

**THE LAW AFFECTING SEWERS AND DRAINS.** By Arthur P. Poley. (Eyre & Spottiswoode.)

#### Correspondence.

##### ARCHITECTS' BENEVOLENT SOCIETY.

SIR,—May I ask the *Builder* to publish in its journal to give further publicity to a matter which has already been referred to in your columns? In response to the appeal which was recently made on behalf of the Architects' Benevolent Society, Mr. Walter Glover offered to contribute 50l. if nine other gentlemen would give a like sum. Mr. Walter Glover, already a generous benefactor of the Society, has promised to support Mr. Endem's offer, and I shall be glad to hear from other gentlemen to the same effect.

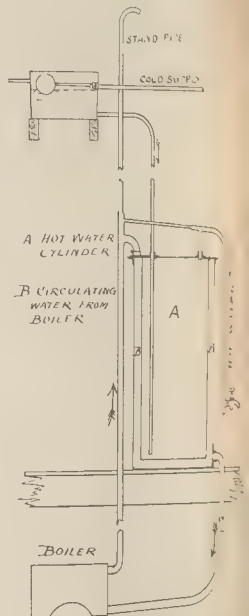
In addition to forming one of the contributors, Mr. William Glover has promised a second donation if a further 400l. is contributed by nine (or any number) of donors before Christmas.

I will not ask you to afford me the space to enumerate the merits of the cause; but, for the sake of a society which performs so beneficent a work among our poorer brethren, or their widows and orphans, throughout the United Kingdom, and which is urgently in need of funds, I trust the above offers will meet the support which they earnestly deserve.

JOHN B. M.  
20, Hanover-square, London, W.  
October 25.

##### SCALE IN BOILERS.

SIR,—The water here is very hard, and consequently we are accustomed to the alarm caused by "thumping" and the expense attending the periodical "scraps," and as the cause of this is a neighbouring conference I have been thinking some experiments in conjunction with an engineer of wide experience and successful dealing with scale in steam-generating boilers, and with a view to the construction of a workable system for my friend's house. The apparatus has been temporarily "rigged up" in a stable loft for testing, and is now ready for putting into its permanent place in the house to replace the "thumper." If your gentleman interested would like to see it I shall be most happy to arrange for him to do so.



The arrangement is a dual system, and consists of a coil I use a double tank—the larger one is one 44 in. by 18 in., the inner one 42 in. by 18 in.—both are bolted to a common top. The larger and outer tank, with the normal space of 2 in., is fitted with the usual supply and return pipes to the boiler, and forms a circulating system, a stand pipe giving room for expansion and vent for any air or steam. The inner tank is fed from the ordinary system and has a service



pipe leading to the taps. The water in the inner tank never goes into the boiler at all, but is heated by the water in the outer tank. A small connection is made between the service pipe and the steel pipe for the purpose of making up any waste caused by evaporation.

The first point we desired to ascertain was whether the dual system delayed the heating of the service water, and we found it did not do so appreciably. We placed thermometers carefully covered with asbestos in contact with the water in the inner tank, and found that the transference of heat began at once, and the difference gradually lessened until it became 2° F. only, at which point it remained.

We then tried heating up and drawing off the water, and starting from a temperature of 186° and 184°, we drew 68 gallons, the final temperature being 117°; this we reckoned to give enough hot water for seven good baths consecutively, as fast as the water would run, the fire in the meantime being down. The firing arrangement was crude, being outside the building, but even with this we could make a bath every half-hour without reducing the temperature in the cylinder; so we concluded that the transference of heat was so rapid as to make no practical difference between this dual arrangement and the ordinary single cylinder. The amount of heat, of course, depends on the fire burnt, the 2° difference in temperature being practically negligible.

As to the main principle of the system, the water in the outer tank is used over and over again, and having once deposited its solids, is freed from deleterious matter, and so prevents scale getting on the boiler or in the circulating pipes.

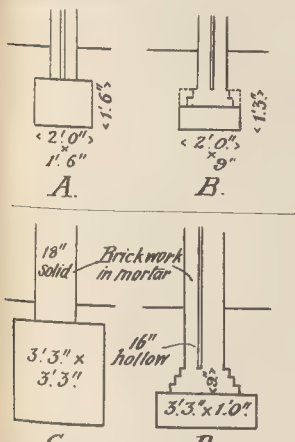
Should salts be deposited in the inner tank they are harmless, and can be removed through the manhole.

The extra expense is that of the double cylinder, but this is small by the side of the usual expense of cleaning the boiler, to say nothing of the risks of worse troubles.

E. GOOLD.

#### RURAL BUILDING BY-LAWS.

Sir.—The enclosed cutting from a Southampton paper throws an interesting light upon the present administration of the South Stoneham Rural District by-laws. The bungalow cottage referred to has footings of 1-6 cement concrete 2 ft. wide and 18 in. deep to enable the long low walls to resist the surface pull of a clay soil, and also to avoid brick spreading courses offering temptations



towards the use of bats. These concrete footings were said to be "no proper foundations," and not in accordance with by-law No. 20, in not having more than the one offset, although that by-law specially says: "The diminution of the footings to be in regular offsets, or in one offset at the top of the footings."

A second cottage on the same plan was to have had similar footings, but these being again objected to, I provided weaker ones, partly of brick, and they are duly approved. Sketches A and B will explain.

Upon my asking if there would be any objection to filling up the corner spaces (enclosed by dotted lines), the committee said, "None whatever," although, as I pointed out, the approved footing with corners filled up (B) would be of the same shape as the disapproved one (A), but 3 in. shallower and with weaker material at the centre.

In another South Stoneham building I provided wall and footings as at C. These were

disapproved, but, being altered, were approved as shown at D.

It is incomprehensible that a council should persist in ignoring their by-law providing for the use of an alternative form of footing most suitable to a district containing both excellent gravel and slippery clay.

R. M. LUCAS.

#### GARDEN CITY—A REPLY TO THE LAMBETH CRITIC.

Sir.—In the report stated by you to be presented by Councillor Bristowe to the Lambeth Borough Council (see page 428 ante), the following criticisms are made against the Garden City scheme at Letchworth:—

- (1) The first prize cottage had large patches of plastering already left the walls.
- (2) Not a house on the estate could be applied to London or its suburbs.
- (3) The boasted 150l. house is a myth.
- (4) The gardens are no larger than are usually found in country places.
- (5) The company gave 40l. an acre for the land, but let on building leases at 17l. 10s. an acre.
- (6) The company will clear 100l. out of each conference.

In reply to these criticisms I beg to state:—  
(1) No plaster has left the walls of the first prize cottage. Certain visitors have prised the plaster off to see its thickness, and it is quite as good as the average plaster used in London houses. The prize for this cottage was awarded by the eminent judges employed by the Exhibition Committee, including two leading architects, and the criticism is utterly misleading.

(2) The object of the Exhibition was to demonstrate the kind of cottage to be built in rural districts. London is not a rural district. There are, however, many houses on the Garden City Estate which are suitable for London. Councillor Bristowe apparently did not see the Garden City proper, and the Cheap Cottages Exhibition which he visited occupied seventeen acres out of 3,818 comprised in the estate.

(3) By the evidence of the judges, which included Sir William Chance, Professor Lethaby, Professor Sims Woodhead, and Miss Octavia Hill, most of the cottages entered for the 150l. prize were built for that sum. The builders of the first prize cottage now offer to repeat it for 175l., including profit and fees.

(4) It is satisfactory to learn that cottages in the central area of Garden City have gardens as large as country cottages usually have.

(5) The land for the Cheap Cottages Exhibition has been let at from 7l. to 15l. an acre—the average being about 10l., which represents a loss to the company.

(6) The first Garden City Company had no connection whatsoever with the conference attended by Councillor Bristowe. The conference was called by the National Housing Reform Council, and the Garden City Company only lent the hall in which it was held, without charging any rent. The charge of 5s. was made by the Housing Council, and did not, I understand, pay expenses. In view of the interpretation placed on this statement by Councillor Bristowe, I have requested him to immediately withdraw it.

If not the results of prejudice, the report represents such a total ignorance of the facts of the case that I should have refrained from taking any notice of it but for the way in which it has been taken up by the Press.

I hope, in justice to a movement to which in the past you have shown the utmost fairness and given the favour of your sympathy, you will publish this reply in full.

THOS. ADAMS,  
Secretary, First Garden City, Ltd.,  
347-351, Birkbank Bank-chambers,  
October 19, 1905.

#### GARDEN CITY PRIZE COTTAGE.

Sir.—While giving Mr. Perry full credit for trying to improve Mr. Houlton's plans, I think I should prefer to live in the house as it was, provided that the ladder were approached from the lobby next stair, and the water-closet from an outside door. A small point, that of placing the purlins vertically, is open to question. If Mr. Perry reversed the bath and shifted his shelf to hang over it when not in use and to fold up at other times a saving of space would be made. A similar folding dresser under the window might prove better than the angular one in the original plan. Sinks are better when directly under a window, and angle fireplaces in either plan would be an improvement to bedrooms now lacking them.

There is far more economy of space in the landing of the prize design. Mr. Perry's suggestion as to the copper seems to have much practical commonsense to recommend it. An important point in the planning of cottages, conspicuous by its absence, is the provision for the reverent removal of the dead from upper rooms.

E. SWINFEN HARRIS.

\* \* Mr. Harris's last remark touches on a point which is important, and to which we do not remember ever to have seen attention called before. We heard of a case where, after a death in the upper floor of a cottage, it was necessary to pull down part of the wall to get the dead body out.—ED.

#### PRIZE COTTAGES.

Sir.—To those visitors to Letchworth who had any practical knowledge of building it was evident that the prices with which most of the cottages were labelled were misleading, in some cases simply absurd and impossible. One result will be disappointment to those amateurs who try to reproduce such places under actual conditions of ordinary building.

It is regrettable that the prize and some other plans likely to be adapted largely have the grievous defect of outside fireplaces. To any, especially a poor country cottager, an inside fireplace, whose warm chimney-stack airs and dries the whole house, is invaluable for comfort, health, and economy.

It has been remarked that ideas for "week-end boxes" are more in evidence than workmen's requirements.

T. R. HOOPER.

#### The Student's Column.

##### STEAM BOILERS AND PIPES.—XVII.

CHIMNEYS (continued).

**B**EFORE passing away from the consideration of chimneys, it is desirable that some attention should be devoted to the questions of stability and practical construction. If treated fully, these subjects would furnish ample material for several articles, but our intention is merely to give a few notes such as are appropriate to the present series, referring readers to other sources of information for more detailed treatment and fuller particulars.

*The Stability of Brick Chimneys.*—An isolated chimney shaft is essentially a tower and may fail by crushing at any section under the weight of the superincumbent brickwork, or by overturning at any section when the moment of the horizontal wind force above that section exceeds the moment of the weight on the same section.

As a general rule the proportions which insure safety against one mode of failure are sufficient to guarantee the security of the structure against the other mode. Nevertheless, it is well to consider separately the effects of the vertical and horizontal forces.

In order that the strain, due to the weight of brickwork, upon any horizontal section may be kept within proper limits, the sectional area of the chimney must be increased from the top downwards. The increase of area evidently causes a further increase of pressure of which due account has to be taken.

When a chimney is proportioned in strict accordance with this procedure, its outline possesses a concave batter like that which has been largely adopted in lighthouse construction. In ordinary practice, however, and especially for chimneys of less than 300 ft. high, a straight batter is almost universal, one important advantage of the outline thereby given being that the accuracy of the work can be readily verified by the eye during the course of execution.

The necessity for more or less intricate calculations for determining the sectional area of chimneys is frequently obviated by the regulations of local authorities.

For instance, the rules of the London County Council demand the observance of the following measurements:—

Width at base of square chimneys, one-tenth of total height.

Diameter at base of round chimneys, one-twelfth of total height.

Batter to be 2½ in. in every 10 ft., or 1 in 48.

Thickness of brickwork to be at least 8½ in. from top to 20 ft. below, and increased by 4½ in. for every additional 20 ft. of height, measured downwards.

These measurements are independent of the fire-brick lining.

No cornice or other projection must stand out more than 8½ in. at the top of the shaft.

Molesworth's "Pocket-book" gives the following general rules for the proportions of brick chimneys:—

"The diameter at the base, one-tenth to one-twelfth of the height.

Batter of chimneys, 0.3 in. to the foot.

Thickness of brickwork, one brick from top to 25 ft. from ditto; one and a half bricks from 25 ft. to 50 ft. from the top, increasing by half brick for each 25 ft. from the top.

If the inside diameter at the top exceeds



4 ft. 6 in., the top length should be one and a half bricks thick."

Péclet comments upon the difficulty of making reliable determination of the varying area of a chimney at different heights, and recommends proportions dictated by practical experience.\* In his treatise, the interior batter is stated at from 15 to 18 millimetres per metre, and the exterior batter at from 24 to 30 millimetres per metre. The thickness of the brickwork at the top is taken at 10 centimetres, the length of an ordinary brick.

Denoting by  $d$  and  $d'$  the interior and exterior diameters at the chimney top, and by  $D$  and  $D'$  the interior and exterior diameters at the bottom, Péclet gives the following equations:—

$$D = d + 2Hm$$

$$D' = (d + 0.20) + 2Hm'$$

where  $m$  represents the interior batter, and  $m'$  the exterior batter. Converting metrical to British measurements, the interior batter becomes 0.216 in. per ft., and the exterior batter 0.36 in. per ft., or about 1 in 55, and 1 in 33 respectively.

To illustrate the use of his rules, Péclet takes as an example a chimney, 20 metres in height, and with a diameter of 60 centimetres at the top.

Then, taking the value of  $m$  at 13 millimetres, the interior diameter at the base will be:—

$$D = d + 2Hm$$

$$= 0.60 + (2 \times 20 \times 0.013) = 1.32 \text{ metres.}$$

The exterior diameter at the top will be

$$(0.60 + 0.20) = 0.80 \text{ metre,}$$

and, taking the value of  $m'$  at 30 millimetres the extreme diameter at the base will be

$$D' = (d + 0.20) + 2Hm'$$

$$= (0.60 + 0.20) + (2 \times 20 \times 0.030)$$

$$= 0.80 + 1.20 = 2 \text{ metres.}$$

Mr. W. W. Christie† recommends that the lengths of each varying thickness of a chimney should be from 20 ft. to 30 ft., with an outside batter of 1 in 30 to 1 in 55, and that in all cases each section should be calculated for stability, which will also aid in determining the thickness of the brickwork.

The following proportions are given in "Spon's Dictionary of Engineering"‡ as fairly representing the average thickness of brickwork for square chimneys about 200 ft. high, with the top width of from 6 ft. to 6 ft. 6 in. Commencing at the top and working downwards:—

The first 25 ft. should be 1 brick thick.

" next 25 ft. "	" 1½ bricks "
" " 30 ft. "	" 2 " "
" " 30 ft. "	" 2½ " "
" " 35 ft. "	" 3 " "
" " 35 ft. "	" 3½ " "
The bottom 20 ft. "	" 4 " "

The safety against crushing of any horizontal section of a chimney, proportioned in accordance with the foregoing rules, can be verified by reference to any reliable data as to the strength of brickwork, after calculating the weight of the superincumbent masonry per square foot of sectional area. For information upon this point the reader is referred to the valuable results obtained by a committee of the Royal Institute of British Architects, and recently published in book form.§ The only previous investigation of a similar character was that undertaken by the American Society of Civil Engineers in 1887-88, and a condensed summary of the results then ascertained will be found in the same publication.

In considering the effects of wind pressure upon a chimney, the force may be taken as being exerted in a horizontal direction, and assumed to be of uniform intensity at all heights above ground level. Although not strictly accurate, these assumptions may be adopted in practice without leading to appreciable error.

The greatest intensity of wind pressure, observed in Great Britain, against a flat surface directly opposed to it is stated by Rankine at 55 lb. per square foot. This is still adopted as the maximum pressure for

consideration, although in 1868 a considerably higher intensity was registered at Liverpool during an extremely violent hurricane.

In the United States, the general practice of engineers is to assume 50 lb. per square foot as the highest wind pressure to be considered. It is worthy of note, however, that in the tornado of 1896 at East St. Louis, Ill., the force of the wind was estimated at about 90 lb. per square foot. On that occasion the brick chimney of the electric-light station was partially destroyed and blown down.

In the case of a cylindrical chimney the total pressure of the wind against the side is about one-half the total pressure against a diametrical plane of the chimney. Hence, even a hurricane representing a force of 90 lb. per square foot against a flat surface exerts a pressure only 45 lb. per square foot upon a cylindrical chimney.

Let  $p$  denote the intensity of wind pressure against a flat surface; and  $A$  the area of a diametrical vertical section of a chimney above any given horizontal section or bed-joint.

Then the total wind pressure ( $P$ ) against the chimney will be

$$P = pA \quad \text{for a square chimney.}$$

$$P = pA \times 0.5 \quad \text{for a round chimney.}$$

$$P = pA \times 0.75 \quad \text{for a hexagonal chimney.}$$

$$P = pA \times 0.7 \quad \text{for an octagonal chimney.}$$

The resultant in each case may be assumed to act in a horizontal direction through the centre of gravity of the vertical diametrical section of the chimney above any given horizontal joint.

Let  $H$  denote the height of the centre of gravity of such a section. Then for the moment of the wind pressure we have

$$HP = HpA \quad \text{for a square chimney.}$$

$$HP = HpA \times 0.5 \quad \text{for a round chimney.}$$

$$HP = HpA \times 0.75 \quad \text{for a hexagonal chimney.}$$

$$HP = HpA \times 0.7 \quad \text{for an octagonal chimney.}$$

It is obvious that, to insure the safety of the structure, the value of the moment of wind pressure must not be greater than the least moment of stability of the portion of the chimney above the horizontal joint under consideration.

When the axis of a chimney is truly vertical, the moment of stability has an equal value in every direction. In practice, however, it is rarely the case that the axis is exactly vertical, and the least moment of stability is that which opposes a lateral pressure acting in the direction towards which the chimney inclines.

Rankine gives the following method of determining the least moment of stability.

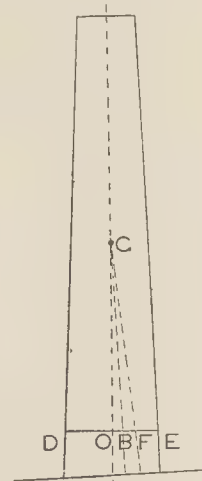


Fig. 58.

The significations of the symbols will become clear by reference to Fig. 58.

Let  $G$  be the centre of gravity of the part of a chimney which is above the joint D E, and  $B$  a point in the joint D E vertically

below the centre of gravity; and let the line D E =  $d$  represent the diameter of that joint which traverses the point B. Let  $g'$  represent the ratio which the deviation of O the middle of the diameter D E bears to the length  $d$  of that diameter. Let  $F$  be the limiting position of the centre of resistance of the joint D E, and let  $q$  denote the angle which the deviation of  $F$  from O the middle of the diameter D E bears to the horizontal of that diameter. Let  $W$  denote the weight of the chimney above the point B E.

Then the least moment of stability is denoted by

$$W.B.F. = (g - g') Wd \dots (1)$$

The value of the coefficient  $g$  is deduced by considering the manner in which the forces are observed to give way to the action of the wind. As a general rule, the forces are observed to give way to the action of the wind by the opening of a crack at the top of the chimney. A crack thus begins which usually extends itself in a zig-zag fashion diagonally downwards along both sides of the chimney, tending to separate it into two parts, an upper leeward part and a lower windward part divided from each other by an oblique fissure.

The final destruction of the chimney occurs either by the horizontal shifting of the upper portion until it loses its support from below, or by the crushing of a part of the brickwork at the leeward side.

In order that the stability of a chimney may be assured, there must be sufficient vertical pressure at every point of each joint to overcome any tendency of the joint to open at the windward edge. Experience shows that this condition may be sufficiently fulfilled by limiting the deviation of the centre of resistance from the centre, or, in other words, by limiting the value of  $g$  so that the intensity of pressure at the leeward edge of the bed-joints shall be not more than double the mean intensity of pressure.

As the thickness of the brickwork in a chimney is small in comparison with the diameter of the structure, the following values of  $g$  are generally adopted in practice:—

For square chimneys  $g = 0.33$

For round chimneys  $g = 0.25$

Substituting these values in the expression for the least moment of stability, the following equations express the condition of stability for square and round chimneys.

$$\text{For square chimneys} \quad HpA = (0.33 - g') Wd \dots (2)$$

$$\text{For round chimneys} \quad HpA \times 0.5 = (0.25 - g') Wd \dots (3)$$

From these equations the following formulæ are deduced. Let  $t$  = the mean thickness of the brickwork above any given horizontal joint;  $w$  = the weight of brickwork per cubic foot. Then we have for the weight ( $W$ ) of the chimney above any given joint:—

$$\text{For square chimneys} \quad W = 4wtA \dots (4)$$

$$\text{For round chimneys} \quad W = 3.14wtA \dots (5)$$

Substituting these values in equations (2) and (3) we have

$$\text{For square chimneys} \quad Hp = (1.33 - 4g') wtd \dots (6)$$

$$\text{For round chimneys} \quad Hp = (1.57 - 6.28g') wtd \dots (7)$$

These formulæ can be applied to find the greatest intensity of wind pressure that a chimney will withstand with safety when its dimensions and form and the thickness of the brickwork are known; and, with suitable adaptation, to find the requisite mean thickness of the brickwork above each horizontal joint, when the greatest intensity of wind pressure, and the dimensions and form of the chimney are known.

It may be pointed out, however, that as the shell of a chimney usually consists of a series of steps, or divisions, the thickness being uniform in each division, but varying from one division to another, it is only necessary to apply calculations to the horizontal joints between these divisions, where the stability is evidently less than at the intermediate joints. The same applies also to the bed-joint at the base of the chimney.

\* "Traité de la Chaleur." Liège, p. 88.

† "Chimney Design and Theory." New York.

‡ "Supplement to Spon's Dictionary of Engineering." p. 352.

§ "Report of Brickwork Tests." 1905.



## COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

**Bishopgate-street.**—The Improvements and Finance Committee were authorized to approach the London County Council on the subject of the improvement of Bishopgate-street between Angel-alley and the City boundary, with instructions to endeavour to arrange a conference thereupon.

**Queen Wharf.**—Mr. Harvey Preen moved that the question of a suggested erection of an ocean wharf for the Port of London be referred for examination to the Special Port of London Committee. He said that the scheme was to erect near Dartford an ocean wharf with a frontage of a mile and a quarter, and to send the goods landed there by rail to London.—Mr. Cooper pointed out that under the provisions of the Thames Conservancy Act a channel would be created in the river 30 ft. deep and 1,000 ft. wide.—The motion was eventually carried.

**Blackfriars Bridge.**—The Bridge House Estates Committee presented a report on a letter of the London County Council relative to the decision to introduce the Terms of Bill of last year, and asking the Corporation to construct a Bill of the purpose of either widening or rebuilding Blackfriars Bridge. The Committee recommended that a Bill be promoted empowering the Corporation to widen Blackfriars or construct a bridge out of the revenues of the Bridge House Estates, the terms of any accommodation to be referred to the Council for their sanction.—Mr. Deputy Alder, in moving the adoption of the report, stated that a conference taken place between a deputation from the London County Council and the Committee, and Mr. Benjamin Baker, who had been consulted, said that there were no engineering difficulties in widening Blackfriars Bridge 20 or 30 ft., but he did not favour the construction of a new bridge. He proposed the omission of all reference to the widening of Blackfriars Bridge. He suggested that the City should build a new bridge near the Temple, which would be available for linking up the tramway system in the subway under Kingsway and Aldwych, and that, on the other side of the river, Stamford-street should be widened. After some discussion the amendment was lost, and the Committee's report adopted.

## WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of this council was held on Thursday last week at the City Hall, King Cross-road, W.C.

**Paving Works.**—The Works Committee reported and received a communication from the Sanitary and the Pavement Co. stating that they had prepared to relay an area of from 1,500 yds. to 2,000 yds. super. of King's-road, Eaton-square, with 3-in. blocks on a mortar bed 1 in. in thickness, the blocks to be made by the Hastings Portland Co., of New York, by a new process. The company suggested that the blocks should be used for six months, when, if satisfactory, they would relay the remainder of the street in a similar manner. The company are under agreement with the Council to maintain the pavement for fifteen years from September, 1901. It was agreed to accept the offer, the trial to be for three months. The Committee reported having called upon the Improved Wood Pavement Co. to supply certain portions of various streets in the City.

**Private Works Affecting Public Way.**—On the recommendation of the same committee it was agreed "that it be a standing order that when the Council consent to the execution of private works affecting the public way their consent shall be conditional on the works being completed within a stated period, to be fixed in each case subject to any variation which may be made by the Council on application in special circumstances." Hitherto the Council has placed no limit on the time during which such works as drains, pavements, lights, etc., shall be completed.

**Utilisation of Destructor Clinker.**—The Corporation further reported having instructed the City Engineer to make inquiries and to report on the setting up of brick and flag making plant for utilising the clinker from the destructor at Shot Tower Wharf.

**Appointment of Quantity Surveyor.**—On the recommendation of the Housing Committee, Mr. R. A. Hardeste was appointed quantity surveyor in connection with the proposed workmen's dwellings in Marshall-street.

**Great Widening.**—The improvements Committee submitted a long report dealing with the proposed widening of Great College-street, Little College-street, and Wood-street, and it was agreed on the recommendation of the Committee, to surrender certain plots of land to the Ecclesiastical Commissioners in exchange for other plots.

**General Institute.**—FENARLEY.—A new Congregational church institute has been erected at Fenarley. The builder was Mr. J. Jones, of Cardiff, the architect being Mr. W. Beddoe Rees.

## OBITUARY.

**MR. WALLER.**—Mr. John Green Waller, F.S.A., died at the age of ninety-two on October 19, at No. 75, Charlton-road, Blackheath. Mr. Waller was an honorary member of the Royal Archaeological Institute and a past-President of the Quekett Society. He was a fellow pupil of G. F. Watts, J. C. Horsley, and Mr. W. P. Frith, R.A. (retired), at Sass's art school. He then entered the Royal Academy Schools, where he won the silver medal for drawing the academy figures, and the life studentship in 1836. Mr. Waller designed the painted window with medallions of Chaucer and Gower, and scenes from Chaucer's life and poems, which in 1888 was inserted above Chaucer's tomb in Westminster Abbey. Having devoted himself during a considerable period to topographical and archaeological studies, he pursued some important investigations into the story of the streams of London, and engraved a series of plates illustrative of monumental brasses in England. In his later years Mr. Waller turned his attention to the theory and practice of microscopical science, and became an eminent member of the Quekett Society. He contributed several papers to the *Transactions of the London and Middlesex Archaeological Society*.

**MR. STENNING.**—The death is announced of Mr. Oswald Francis Stenning, in his thirty-fourth year. On leaving Halseybury School, Mr. Stenning entered the office of his father, Mr. Alexander Stenning, of Cannon-street, architect, and in 1903 was elected out of a large number of candidates as surveyor to the Merchant Taylors' Company.

## GENERAL BUILDING NEWS.

**ROMAN CATHOLIC CHURCH, ANNITSFORD.**—The Right Rev. Dr. Collins, Bishop of Selinus, recently laid the chief stone of the new Roman Catholic Church, to be dedicated to St. John the Baptist, for the Annitsford Mission. The building will accommodate 400 worshippers, and the cost will be about 6,000. It is being built by Mr. John Charles Ferguson, of Newcastle, from plans by Mr. James Charles Parsons, architect, also of Newcastle.

**CHURCH, DUNDYVAN, N.B.**—A new parish church is to be built at Dundyvan, Coatbridge, upon an elevated site in Henderson-street. It is in the form of a Latin cross, with nave, aisles, transepts, and chancel, and provides accommodation for 800 worshippers. The west front has two entrances, both leading to a large vestibule and giving access to the gallery, while at the east side there are two exit doors, one of which forms the entrance to the session-house and vestry. The building is of red stone from Closeburn Quarries, Dumfries. The main entrance is marked by a tower, surmounted by a Scots crown and provided with a bell. The total cost is 10,000. The architect is Mr. Alexander Cullen, Hamilton.

**ASTON WORKHOUSE CHURCH.**—On the 19th inst. the Chairman of the Board of Guardians, Aston, laid the memorial-stone of the new workhouse church, which is about to be erected on the east side of the workhouse, facing Union-road. The building has been designed to accommodate about 450 persons, and the cost will be about 2,500. The architects are Messrs. C. Whitwell & Son, of Birmingham, and the builders are Messrs. W. Lee & Son, of Aston. It is to be built of red brick, and it will have a slated roof.

**HOLY TRINITY CHURCH, EXMOUTH.**—The foundation-stone of the work of restoring and enlarging Holy Trinity Church, Exmouth, was laid on the 18th inst. by the Bishop of Crediton. The scheme embraces, in addition to the internal work, the encasing of the tower and the whole of the nave in Ippesden limestone, with Bath stone dressings; the building of a north transept, vestries, organ loft, and the lengthening of the chancel. The cost of this work will be 6,092, 17s. 4d. The architect is Mr. George H. Fellowes Prynn.

**PRIMITIVE METHODIST CHURCH AND SCHOOL, WATFORD.**—The foundation-stones were laid a short time ago at Watford of a new Primitive Methodist church and school. The buildings comprise a porch, giving access to both chapel and school—chapel to seat about 170 and school to accommodate about 125 children—minister's vestry and vault. Internally, the chapel will be finished with figured pitchpine, open ornamental pitchpine, principals, and the windows glazed with coloured lead lights. The building is designed after the Elizabethan style, and the porch is carried up as a turret. The dressings to the openings and buttresses will be of Alton stone. The builders are Messrs. J. F. Eising & Son, of Alton, and the architects, Messrs. Ford & Slater, of Burslem.

**CHURCH EXTENSION, DERBY.**—St. Augustine's Church, at New Normanton, is to be enlarged by the addition of a south aisle. The architects are Messrs. Naylor & Sale, of Derby.

**CHURCH RESTORATION, WINGERWORTH.**—The parish church of Wingerworth, which has been restored, was recently reopened by the Bishop of Southwell. The work of restoration includes

a new east window, constructed by Messrs. Clayton & Bell, London. The pillars and tower have been stripped and plastered, and the floors have been relaid. The gallery has been removed, the heating apparatus re-arranged, and a new coil placed in the chancel. The whole of the work has been carried out under the supervision of Mr. P. H. Curry, Diocesan architect, Derby.

**CHURCH RENOVATION, GREAT WAKERING.**—St. Nicholas Church, Great Woking, which has been closed for renovations, was recently reopened. The work has been carried out by Mr. E. Burgess, of Great Woking, under the direction of Mr. A. Blomfield Jackson.

**CHURCH RESTORATION, LANDRAKE.**—The tower of the parish church of Landrake has been restored. The work was carried out under the direction of Mr. E. Sedding, architect, of Plymouth. The south and west parapets, including two angle pinnacles which were out of the perpendicular, have also been restored, and the walls have been strengthened by grouting with liquid cement.

**WESLEYAN CHAPEL, BRACKLEY.**—A new Wesleyan chapel has been opened at Brackley. It is Tudor Gothic in style, and has been constructed of old stone redressed, its facings being of Bath stone. The seats are of red deal, and the pulpit is of pitchpine. The building is warmed by low-pressure hot-water apparatus and illuminated by incandescent gas. With the accommodation afforded by the small gallery over the narthex, the new church seats 450 people. The site cost about 1,000, and the cost of Mr. G. F. Booth, of Banbury, who has carried out the work, was 2,000. Messrs. Ewen Harper & Brothers, of Birmingham, were the architects.

**WESLEYAN METHODIST CHAPEL, RAVENSTONE.**—The foundation-stones of a new Wesleyan Methodist chapel were laid at Ravenstone on the 11th inst. The building, which is being erected by Messrs. Howes Brothers to designs prepared by Messrs. Goddard & Wain, architects, of Coalville, consists of red brick, with Derbyshire stone dressings at the front. The main room is 67 ft. long by 25 ft. wide, and is calculated to accommodate about 250 people. There are also outbuildings for social gatherings.

**SCHOOL, ABERDEEN.**—The new school in Frederick-street has been occupied by classes since the holidays in August, but the work has only just been practically finished. The general plan of the new school may be described as a combination of the "corridor" and "central hall" plans. The total length of the building is 154 ft. 6 in., and the width 69 ft. There are two entrances, for boys and girls respectively. There are five classrooms for infants on the ground floor, containing accommodation for 332 scholars. Towards the front of the ground floor is situated the central hall and gymnasium, which measures 59 ft. by 32 ft. On the first floor there are seven classrooms, with cloakrooms for boys and girls respectively, and teachers' rooms. On the second floor there are six classrooms, and also a cookery-room, which, with its scullery, will be fully equipped, and there is also a manual instruction room and a wood store. In all, the school has accommodation for 1,116 pupils—332 infants and 784 boys and girls—seniors and juniors. A special feature of the school is the playground on the roof. Instead of the ordinary wood-framed and slated roof the whole area of the building is laid with concrete upon steel beams and joists, the concrete being ultimately covered with Limer asphalt 1 in. thick. The whole of the roof playground is enclosed by parapet walls, 9 ft. high at the lowest parts. At the west end of the building there has been erected a steel fire escape staircase, with access to it from the roof and each of the upper floors. Regarding the exterior walls of the school, the basement floor is built in rustic ashlar, and the walls above in hammered, blocked, and snook ashlar. The building is lighted by electricity. The Department has sanctioned a loan of 18,000, to cover the total cost, including heating, ventilating, desks, and furnishings, and all other expenses, exclusive of the cost of site. The school was planned and designed by the School Board's architect, and master of works, Mr. J. A. O. Allan. The contractors were: Mason work, Messrs. Gall & Walker; carpenter work, Messrs. Hendry & Keith; slater work, Mr. Forbes Morrison; plaster work, Messrs. J. Scott & Son; plumber work, Mr. Alex. Fiddes; painter and glazier work, Messrs. George Donald & Sons; electric lighting, Mr. John F. Anderson; heating and engineering work, Mr. Robert Tindall; steam boiler, Messrs. J. Abernethy & Co.; desks, Messrs. James Garvie & Sons; furnishings, Messrs. J. and A. Ogilvie.

**CARLTON SCHOOL, SPRINGFIELD.**—At Springfield, Gidlow, recently the Roman Catholic Bishop of Liverpool laid the foundation-stone of the new day school erected in connexion with the Mission Church of the Sacred Heart. The new school consists of a central corridor 8 ft. wide, with a window over each end. On the north side will be the mixed school, 65 ft. by 22 ft., divided into three classrooms by movable screens. On the south side of the corridor, facing Kimberley-street, will be the infants' school, 33 ft. by 19 ft.,







French coat-of-arms, the horns and the fleur-de-lis are depicted more than once, and it is believed that the work is of the XVth century period.—*English Express.*

**NORTHAMPTON BUILDERS' ASSOCIATION.**—The Northampton Builders' Association held its annual dinner at the Peacock Hotel recently, when the President, Mr. G. W. Souster, occupied the chair. The vice-chair was occupied by the Vice-President (Mr. J. T. Powell). The loyal toast having been honoured, Mr. H. W. Hanwell gave "The Mayor, Magistrates, and Members of the Corporation." The Mayor first replied, and in the course of his remarks he said that when he came to office he confessed he hoped for a revival of trade. Unfortunately, that revival had not come so quickly as he had anticipated; still, he thought that so far as the staple trade was concerned they had taken a turn for better things—and that improvement would, he hoped, extend to all other trades. Messrs. Martin and Green and Councillor Wright also replied.—Mr. A. P. Hawtin, giving "The Architects," expressed the hope that the day would speedily come when they would be fully employed. He hoped it was not alone for their sakes, but for the sake of those willing men who walked the streets of the town unemployed.—The toast having been honoured, Mr. Ingram, who had been elected President, said that although trade was not in the state they desired, the future could be faced with hope.—Mr. Stevenson said that if architects were permitted to survive the next year they would find trade in a higher state. At present he was afraid the building trade was in rather a bad way, and he did not see any prospect of improvement. In a town which relied upon one trade for its prosperity, the state of that trade was of vital importance.—Mr. Dorman thought that better times were in store, and Mr. Fidler and Mr. Gibbins also replied.—Mr. Caleb Archer, of Wellington, gave "Success to the Northampton Builders' Association," being upon his feet for 40 years' connexion with architectural work, alluded to the great advance which building had made in its methods during that period.—The Chairman briefly responded to the toast, which he heartily received.—Mr. Redwood, of London, commenting "The Town and Trade of Northampton," observed that some time ago much was talked about the evils of American competition in the boot trade; little was heard of it now. The ability and energy of the Northampton manufacturers and tradesmen could, he thought, be trusted to hold its own always against competition of that sort without any outside help.—The dinner having been drunk, Mr. S. B. Wilkinson replied. He believed that trade was slowly reviving. Trade would have to be attracted, and could not be done by increased rates. To do it they rather needed cheap land and low rates. He congratulated the Northampton builders on the fact that if they could not find work at home they sought it elsewhere. The work in course of execution by Northampton contractors in various parts of the country were a testimony to their energy, enterprise, and reputation.—Councillor Henry Green proposed "The Visitors," and replies were made by Mr. F. Oates, of London, and Mr. George Wilkinson. Mr. W. Heap gave "The President," and Mr. Souster responded. The loyal toasts were "The Vice-President," given by George Harris and replied to by Mr. J. T. Powell; "The Secretary," submitted by Mr. Souster and responded to by Mr. F. J. Ains; and "The Host."

**ENGINEERING LECTURES AT UNIVERSITY COLLEGE.**—The Council of University College, London, have decided to divide the annual three months' work in the engineering department since the resignation of Professor Vernon Harcourt, and have invited Mr. H. Deans, of the Great Western Railway staff, to lecture upon "Railways" during the first term; Mr. A. T. Walmisley, Engineer to Dover Harbour Board, to lecture upon "Docks, Harbours and Rivers" during the second term; and Mr. W. W. Blair, Engineer to St. Albans Local Board, to lecture upon "Roads, Bridges, Paving, and Tramways" during the third term.

**MEMORIAL TABLETS, NEWPORT.**—The unveiling of two memorial tablets to the memory of the late Alderman T. Jones, of Newport, took place recently. The tablets, which are from the studio of Mr. Goscombe John, R.A., consist of bas-reliefs in bas-relief, and have been placed in the town hall, Newport, and the corporation of Newport.

**ROYAL MEMORIAL, YORK.**—The statue which has been erected at York to the memory of the Queen Victoria has just been unveiled by the Royal Highness the Princess Henry of Battenberg. It is situated in the Guildhall, and is of white Carrara marble on a dark red base. The work is that of the local sculptor, Mr. George W. Colburn.

**REPAIRS IN ST. PAUL'S CHURCHYARD.**—An inquiry has been held in the City Court respecting the fire which occurred on September 27 at No. 63, St. Paul's churchyard. The inquiry was held in the City Court, and the building was 200 years old and all the walls were of brick. Colonel Fox, of the Salvage Corps, and the Superintendent Evans, of the London Fire

Brigade, testified to the dangerous construction of the premises and to the obstruction presented to the passage of the engines and appliances of the brigade by the barrier across the road in front of the chapter house. As a rider to their verdict upon the origin of the fire the jury recommended that the Dean and Chapter should be asked to give such prompt facilities for the removal of the barrier in case of a fire as might be necessary. On the occasion in question some delay arose in opening the barrier; the padlock scutcheon had become stiff through long disuse, and was eventually broken open by a fireman; no lives fortunately were lost, but the loss of time might have been attended with fatal consequences, for the fire spread with great rapidity, and fourteen persons were in imminent peril. The cathedral authorities are averse to the permanent abolition of the barrier, but will concur in any suggestion which does not involve its removal.

**THE LIGHTING OF ALDWYCH AND KINGSWAY.**—Some special plant for producing increased pressure has been fitted up near the new street in connexion with the gas supply. Tenders were made for the supply of light and the maintenance of lamps at a minimum of 700 candle-power per lamp. The tenders amounted to 27l. and 15l. on the part of the electrical light and gas companies respectively. The latter illuminant has been adopted, and will be used in about fifty lamps, having pieces an average power, under increased pressure, of 1,000 candles, which is equivalent to about 60 per cent. in excess of the average light of an arc lamp.

**BLACKFRIARS BRIDGE.**—The Court of Common Council have adopted, by a large majority, a report framed by the Bridge House Estates Committee of the Corporation, which recommends the introduction of a Bill, in course of the ensuing session, which shall enable the Corporation to either widen Blackfriars Bridge to an extent of from 20 to 30 ft. or construct a new bridge at the cost of the Bridge House Estates revenues. The report was made in connexion with the expressed intention of the London County Council to reintroduce in Parliament their measure for laying down tramway lines along Westminster and Blackfriars Bridges, and the Council's request to the Corporation to widen or rebuild Blackfriars Bridge. The bridge was built in 1865-9 by J. and H. Cubitt and H. Carr.

**A NEW WHARF ON THE THAMES.**—A special committee of the Court of Common Council has been instructed to consider, and report upon, a proposal for the construction of a riverside wharf opposite Dartford, to be 3,600 ft. in length, with provision for an amount of traffic estimated at 3,000,000 tons. The promoters do not seek for any financial assistance from the Corporation.

**MEMORIAL TO DEAN HOWELL.**—A memorial to the late Dean David Howell has been erected by members of his family in St. David's Cathedral. The memorial consists of a mural tablet, executed by Mr. Goscombe John, R.A., containing a bronze panel with a medallion portrait of the late Dean set within a frame of Numidian marble.

**BELGIAN ART EXHIBITION, GUILDHALL.**—The exhibition in the Guildhall Art Galleries for next year will include examples of the Flemish School in the XVth-XVIIIth centuries, many of which, it is hoped, will be lent from abroad, specimens of the XVth century painters, comprising Rubens and XVIIth century painters, comprising Van Dyck, and works of the modern Belgian artists. Mr. Temple, director of the Guildhall Gallery, has received many assurances of support from Brussels and elsewhere, and anticipates that a highly interesting collection of pictures will thus be brought together.

**ROYAL SANITARY INSTITUTE.**—At an examination in Hygiene in its bearing on School Life, held in Leicester on October 20 and 21, two candidates entered for the whole examination, and two for Part I. only. The following candidates were awarded certificates:—Evangeline Halsey (Birmingham); Alice Emily Moss (Birmingham); Miss Belle Hall (Leicester) passed Part I. only of the examination.

## Legal.

### ACTION BY A QUANTITY SURVEYOR.

THE case of Howard v. Mappin, on the 25th inst., came before Mr. Justice Bucknill and a jury in the King's Bench Division, an action by the plaintiff, a quantity surveyor, of the Outer Temple, to recover from the defendant, Mr. Walter Samuel Mappin, 62½, for work done in connexion with a building scheme of defendant at Twickenham.

Mr. Garland appeared for the plaintiff, the defendant not being represented and absent.

In opening the case for the plaintiff, Mr. Garland said the sum in question was composed of 290l. for quantities at the rate of 2 per cent. on the lowest tender, viz. 14,493l., the balance being made up of work done in revising the quantities, for the reduction of the estimate. Defendant did not appear, but had put in a defence to the effect that he denied the indebtedness and that he ever gave the plaintiff any instructions.

Mr. Alfred Howard, the plaintiff, said that in February, 1903, he was consulted by Messrs.

Billing, Son, & Rowley, architects, Tooley-street, to prepare estimates for quantities for the erection of certain flats at Twickenham for the defendant, and he did so. He was afterwards advised to revise the quantities, and this he also did, resulting in the present claim. It transpired that the building scheme had never been carried out and defendant had not taken any notice of witness's applications for payment.

In the result the jury returned a verdict for the plaintiff for the amount claimed, and judgment was entered accordingly with costs.

### BUILDER'S APPEAL CASE UNDER THE WORKMEN'S COMPENSATION ACT.

THE case of Howells v. Thomas came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Mathew, on the 25th inst., on the appeal of the defendant against an award made by the judge of the Pontypridd County Court, sitting as arbitrator under the Workmen's Compensation Act, 1897.

Mr. S. T. Evans, K.C., and Mr. Kelly appeared for the appellants, and Mr. Bailhache and Mr. Jacobs for the respondent on the appeal. Mr. Evans, in opening the case, said that the applicant in the court below was Thomas Howells, and he filed his request for arbitration in respect of injuries he sustained while working in a quarry on the Blaen-Cly-Dach building estate. The defendants were a firm of builders. The County Court Judge gave his decision on January 18 of this year, awarding the injured man 1l. a week. On March 11, however, Howells died from the effect of his injuries, and his widow, taking out letters of administration, had filed a request for a different scale of compensation—a lump sum—in respect of the death of her husband. That matter the County Court Judge had adjourned, pending the hearing of this appeal, the point being whether or not the County Court Judge was right in holding that the case came within the Act at all. The first question was whether the defendant was the undertaker of the quarry. Defendant said he was not. The second was whether Howells was a workman within the meaning of the Act. The defendant contended that he was a contractor, or a person doing work on his own account, and selling produce to defendant. The facts were as follows:—The defendant was building two cottages on the estate in question for two persons who had permission from the proprietors of the estate to take stone from the quarry (forming part of the estate), to be used in building the cottages. Howells arranged with the defendants to get the stone from the quarry at 1s. 6d. per load. It was while Howells was so engaged in the quarry that he met with the accident. Counsel contended that in the circumstances the County Court Judge was wrong in holding that the defendant was the "occupier" and therefore the "undertaker" of the quarry, and further that he was wrong in deciding that the man was a workman within the meaning of the Act. The evidence clearly established, he submitted, that the man was an independent contractor.

Without calling upon counsel for the respondent, the Master of the Rolls, in giving judgment, said he was unable to say on the evidence that the County Court Judge was wrong in holding that Howells was in the employ of the defendant. The question was one of fact, and there being evidence to support the view of the County Court Judge, this Court could not interfere. As the defendant's servant, therefore, Howells' occupation of the quarry involved their occupation, and rendered the defendant an "undertaker" within the meaning of the Act. The appeal failed on both points.

The Lords Justices concurred, and the appeal was accordingly dismissed with costs.

### ARE PORTERS SERVANTS?

IT will be remembered that the case in which the Kensington Borough Council summoned Mr. W. H. Collbran, at the Kensington Petty Sessions, for unlawfully allowing rooms in mansions—1-26, Sussex-mansions, Sussex-place—to be used as dwelling-rooms, was adjourned in order to hear the decision of the Borough Council on a proposition made to them by Mr. Collbran.

Mr. Chambers Leete, in stating the case for the Borough Council on Tuesday last week, gave some additional information. He said that the rooms were occupied solely by the porters, and not in conjunction with other rooms, and they were very stuffy and unfit for use as dwelling and sleeping-rooms.

The sub-committee reported to the Public Health Committee that the use of these rooms should be discontinued, because they did not comply with the Act. They were nearly a foot below the level of the street and were not ventilated, as they had closed areas. One room had no fireplace, and the windows did not, as they should, open externally into the open air. Therefore in no instance did they comply with the Act.

Mr. Collbran, when first summoned in January, 1905, had written a letter expressing his willingness to do any work the Council thought necessary. The Council replied that they were prepared to consider any proposal, but not prepared





## ESTATE EXCHANGE REPORT

By T. B. WESTGOTT.  
Caden Town, 60, Clarence rd., u.t. 254 yrs. . . . . \$250  
g. fl. w.r. 62l.  
28, Jeffrey u.t. 44 yrs. g. fl. 68s. w.r.  
62l. 101. 110  
Common words used. *These* *Here*—F.g.r. for freehold  
ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for  
improved ground-rent; g.r. for ground-rent; r. for rent;  
f. for freehold; c. for copyhold; l. for leasehold; p. for  
possession; e.r. for estimated rental; w.r. for weekly  
rent; a.r. for annual rent; y.r. for yearly rental;  
u.t. for unexpired term; p.s. for purchase money; s.  
years; l. for lane; st. for street; rd. for road; s.g. for  
square; pl. for place; ter. for terrace; cres. for crescent;  
gates; h.b. for herbaceous; g.d. for garden; y.g. for yard; g. for  
grove; a. for shops; c. for carriages; o. for offices.

FRIDAY, OCTOBER 27.  
*Junior Institution of Engineers (Westminster Palace Hotel).—Annual General Meeting and first meeting of the Incorporated Institution. 8 p.m.*  
*Royal Sanitary Institute.—Mr. A. Saxon Snell on "Sanitary Building Construction (Advanced)." 7 p.m.*  
*The Institution of Engineers and Shipbuilders of the United Kingdom (Incorporated).—The opening meeting of the session, to be held at B. Whitehall-club, London, S.W., at 7.45 p.m., when the inaugural address will be delivered by the President, Mr. James Boyton.*

*Incorporated British Institute of Certified Carpenters.*—Visit to the new Hearts of Oak offices, Euston-road, N.W. 2.45 p.m.

*London Institution.*—Sir R. S. Ball, LL.D., F.R.S. on "A Cruise with the Commissioners of Irish Lights," illustrated. 5 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—  
Ordinary meeting of the members. 8 p.m.  
*Royal Archaeological Institute.*—Mr. Alfred Dobrée on  
*'Japanese Sword Blades.'* 4 p.m.

*London Institution.*—Mr. M. H. Spielmann, F.S.A., on "Art and Humour," illustrated. 6 p.m.  
*Architectural Association.*—Conversazione, to be held at No. 18, Tufton-street.

Junior Institution of Engineers.—Presidential address by Mr. Dugald Clerk, entitled "The Problem of the Gas Turbine." 8 p.m.

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BRICKS, &c. (continued).		
	s.	d.
Thames and Pit Sand	6	9 per yard, delivered
Thames Ballast	5	3 " "
Best Portland Cement	26	0 per ton, " "
Best Ground Blue Lias Lime	19	0 " "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	11s. 6d. per yard, delivered
Stourbridge Fireclay in sacks	27s. 0d. per ton at 40 cwt.

BATH STONE—delivered on road wag-	s.	d.
gons, Paddington Depot.....	1	6½ per ft. cub.
Do. do. delivered on road waggon,		
Nine Elms Depot .....	1	8¼ " "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road		
waggon, Paddington Depot, Nine		
Elms Depot, or Fimlico Wharf. .	2	1 " "
White Basebed, delivered on road		
waggon, Paddington Depot, Nine		
Elms Depot, or Fimlico Wharf. .	2	2½ " "

Beer	"	1	6	"	"
Greenshill	"	1	10	"	"
Darley Dale in blocks	"	2	4	"	"
Red Corsehill	"	2	2	"	"
Closeburn Red Freestone	"	2	0	"	"

Scrapped random blocks. 2 10 " "  
6 in. sawn two sides land-  
ings to sizes (under  
40 ft. super.)..... 2 3 per ft. super., "

3 in. sawn two sides slabs (random sizes).....	0 11½	"	"
2 in. to 2½ in. sawn one side slabs (random sizes) .....	0 7½	"	"

Scrapped random blocks.	\$	0	per ft. cube,	..
5 in. sawn two sides land-				
ings to sizes (under				
40 ft. super.)	2	8	per ft. super.,	..

3 in. sawn two sides slabs	0 0	"	"
(random sizes)	1 2	"	"
2 in. self-faced random			
flags	0 5	"	"

"	"	"	6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
"	"	"	3 in. sawn both		

2 in.	do.	0 8½	33	33
SLATES.				
n. In.	£	s.	d.	
0x10 best blue Bangor 13	2	6	per 1000 of 1200 at r. d.	

0x12	"	13 15 0	"	"
6x8	"	7 5 0	"	"
0x10 best blue Port.			"	"
madoc .....	12 12 6		"	"
3x8			"	"

	fading green...	15	17	6		
10x12	"	18	7	6	"	"
10x10	"	18	5	0	"	"
10x8	"	10	5	0	"	"
10x10	permanent green	11	12	6	"	"

TILES.		
	s.	d.
Best plain red roofing tiles...	42	0 per 1000 at rly. depôt.
Hip and Valley tiles ...	3	7 per doz.

Hip and Valley tiles ..	4	0	per doz.	..
Best Ruabon red, brown, or				..
brindled do. (Edwards) ...	57	6	per 1000	..
do. Ornamental do. ....	60	0		..
do. Tiles ..				..

shire do. (Peakes) ....	51	9 per 1000	..
Ornamental do. .	54	6	..
Hip tiles .....	4	1 per doz.	..
Valley tiles ....	3	8	..

st Ornamental tiles .....	50	0	per 1000	..
Hip tiles .....	4	0	per doz.	..
Valley tiles.....	3	8		..
st "Hartshill" brand				
plain tiles, sand faced	50	0	per 1000	..

Ornamental do. ....	50	0	"	"
Hip tiles .....	4	0	per doz.	"
Valley tiles .....	3	6	"	"

**WOOD.**

BUILDING WOOD	At per standard
---------------	-----------------

by 9 in. and 11 in. ....	13	10	0	...	15	0	0
cls: best 3 by 9 .....	13	0	0	...	14	0	0
tens: best 2½ in. by 7 in. and							
8 in., and 3 in. by 7 in. and 8 in.	11	0	0	...	12	0	0
tens: best 2½ by 6 and 3 by 6...	0	10	0				less than

... 2 0 0 less than cost
... 0 10 0
in. by 4 in. and 2 in. by 6 in.... 9. 0 0 ... 10 0 0
in. by 4 1/2 in. and 2 in. by 5 in... 8 10 0 ... 9 10 0
Foreign Sawn Boards--
in. and 1 1/2 in. by 7 in. 0 10 0 more than

PRICES CURRENT—Continued on page 459



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.
*CENTRAL PUB. LIBRARY BUILD. MARE-ST.	Hackney Borough Council .....	50, 30, and 20 guineas
*NEW SECONDARY SCHL. & TECHNICAL INST.	Bedfordshire C.C. ....	(See advertisement in this issue)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Shield's road Sewer, Motherwell .....	Caledonian Railway Co. ....	Engineer to the Company, Buchanan-street Station, Glasgow
Depot, Milton-road .....	Stowmarket U.D.C. ....	H. G. Bishop, Architect, Bury-street, Stowmarket
50,000 5-in. Kariwood Paving-blocks .....	Manchester Paving Committee .....	Chief Clerk, Highways Department, Iowa Hall, Manchester
50,000 6-in. Crenscot English Beechwood Pav. blocks .....	do. ....	do.
Road-making, Grantlam-road .....	Newcastle-on-Tyne Corporation .....	City Engineer's Office, Town Hall, Newcastle-on-Tyne
Dam at Glenlivet Distillery .....	Bromley Borough Council .....	C. G. Dorr, C.E., Bognor
Ironmongery, Tools, Builder's Materials, etc. ....	Bombay, Baroda, etc., Railway Co. ....	Municipal Office, Bromley, Kent
Cast-iron Sleeper Pits .....	do. ....	T. W. Wood, Gloucester House, Bishopsgate-street Without, E.C.
Pig-iron .....	do. ....	do.
Collecting Tank at Rodney Stoke, near Cheddar .....	Street U.D.C. ....	A. P. J. Catterell, Engineer, Baldwin-street, Bristol
Underground Lavatories, etc., Market-place .....	Huddersfield Corporation .....	Borough Engineer, 1, Peel-street, Huddersfield
Street Works, Clarke-street, etc., Ely .....	Llandaff and Dinas Powis R.D.C. ....	J. Holden, Surveyor, 20, Park-place, Cardiff
Pennon-hill Widening, etc., Llancafan .....	do. ....	do.
400 yds. of Kerbing in Whitchurch Village .....	do. ....	do.
100 yds. of Drainage, Whitchurch .....	Congregational Chapel .....	Rhys Jones, Secretary, Trefeca House, Llandrindod Wells
450 lineal yds. of 12-in. Stoneware Sewers, etc. ....	Easingwold R.D.C. ....	J. Woodside, A.M.I.E.E., Ocean-buildings, Belfast
Temp. Bldgs., Hamilton (Trades Exhib. Sect. of Exhib.) .....	Arts and Crafts Exhibition .....	A. Newman, Clerk, Haldigh, Suffolk
64 Cottages at Chopwell .....	North-Eastern Railway .....	C. E. Oliver, Architect to Company, Consett
*WAREHOUSE, NEW BRIDGE-ST., NEWCASTLE .....	Bramby and Frodingham U.D.C. ....	Company's Architect, Central Station, Newcastle-on-Tyne
Engine-house, Boiler-house, Dwelling-house, Appley .....	Pleatwood U.D.C. ....	A. Atkinson, C.E., Brigg
New Bulking adjoining Ferry Landing at Knot End .....	Bristol Libraries Committee .....	E. Brobster, Surveyor, Town Hall, Fleetwood
Bookstacking for Library .....	do. ....	H. P. Adams, Architect, 28, Woburn-place, Russell-square, London
*FENCING A NEW ASYLUM, SR. COLCHESTER .....	Essex County Lun. Asy. Visit. Com. ....	County Architect, Chelmsford
Elec. Light, etc., Scottish Temperance-bldgs., Belfast .....	Essex Ed. Com. Tendering Ad. Com. ....	F. Whitmore, County Architect, Duke-street, Chelmsford
School, Bradfield, near Manningtree .....	Costford R.D.C. ....	A. Newman, Clerk, Haldigh, Suffolk
Drain, 36 yds. in length, Duke-street, Bideston .....	Cheshire C.C. ....	J. Howarth, Education Officer, Market-street, Altrincham
Electric Wiring and Fittings, Stamford Park Schools .....	Maybole Town Council .....	J. Sturrock, Engineer, 65, Kings-street, Kilmarnock
Bacterial Sewage Purification Works, etc. ....	Bexhill Corporation .....	G. Ball, Borough Surveyor, Town Hall, Bexhill
500 tons of Blue Quartzite Macadam .....	Staffordshire C.C. ....	Graham Balfour, Education Officer, Stafford
*EXTENSIONS to ABBASTON COUNCIL SCHOOL .....	Kirkmichael School Board .....	Town and County Bank, Tomlinson, N.B.
Plumber Work for Water Supply, Tomachlaggan Schl. ....	Paddington Borough Council .....	Council's Surveyor, Town Hall, Paddington, W.
*MAKING-UP AND PAVING DELAWARE-ROAD .....	Fitchley U.D.C. ....	Engineer and Surveyor, Church End, Fitchley
Sewerage Works, North Finchley .....	Parc Isaf Building Club .....	Park Hotel, Oswestry
Twenty-five Houses, Barroet-street, Oswestry .....	do. ....	Shaw & Morton, Engineers, 224, St. Vincent-street, Glasgow
Formation of Roads, etc., Oswestry .....	Kilmarnock District Committee .....	F. Holland, Engineer, 11, Parkinson's-ch., Rustlegate, Bradford
7 miles Cast-iron Pipes, etc. (Cathrine Water Extension) .....	Bradford Guardians .....	Newcombe & Newcombe, Architects, 59, Pilgrim-st., Newcastle-on-Tyne
*ERECTION OF FOUR COTTAGES AT TAPLOW .....	Gateshead Guardians .....	Electricity Offices, Whitaker-buildings, Victoria-square, Bradford
Alterations to Workhouse Buildings, Bensham .....	Great Western Railway Co. ....	J. Fatten Barber, Borough Engineer, Town Hall, Upper-street, N.
Galvanised Wrought-iron Shingle Blus, etc. ....	Tallington Borough Council .....	W. Farrington, Surveyor, Council Offices, Woodford Green
*MATERIALS FOR EXTEN. PRECIPITA. TANKS .....	Woodford U.D.C. ....	Council's Engineer, Dyne-road, Kilburn, N.W.
Reconstruction, etc., of Works, Hunslet .....	Willenden District Council .....	J. B. Fraser, Architect, 5, Park-square, Leeds
Additions, etc., to Deri Council School .....	Messrs. C. & E. Roberts .....	T. M. Frankland, Clerk, Westgate-street, Cardiff
Offices, Tank, Ventilators, etc., Cowbridge Council Sch. ....	Glamorgan C.C. ....	do.
*TARRAH WOOD FENCE AT BRAINTREE .....	Featherstone U.D.C. ....	F. B. Rothera, Engineer, District Council Offices, Featherstone
*WIDENING ROADS, ETC. ....	Essex Education Committee .....	John Gleave, Hollywood, Baintree
Making-up Broomfield-lane, Hale .....	South Mims R.D.C. ....	Council's Surveyor, 40, High-street, Barnet
Six Hand-fired Marine Type Boilers, etc. ....	Hale U.D.C. ....	T. Biagburn, Surveyor, Council Offices, Ashley-road, Hale, Cheshire
Covered Reservoirs, part of Boveney-road, Forest Hill .....	Bradford Electricity Committee .....	Electricity Offices, Whitaker-buildings, Victoria-square, Bradford
County Hall, Trades .....	Metropolitan Water Board .....	District Engineer, Southwark Bridge-road, S.E.
Corrugated Iron Isolation Hospital .....	Kerry C.C. ....	Surveyor's Department, Town Hall, Cardiff
Additions, etc., to Council School, Gosmont .....	Visit. Com., Salop & Montgomery Asy. ....	P. M. Quinlan, County Council Chambers, Courthouse, Tralee
*NEW POST OFFICE, CANTERBURY .....	Monmouthshire Education Committee .....	A. T. Davis, M.Inst.C.E., Shirehall, Shrewsbury
Widening Road, South-road .....	Commissioners of H.M. Works, etc. ....	A. Swash, Architect, Midland Bank-chambers, Newport
*ERE. OF SCHOOLS, DERBY-ROD, GLOUCESTER .....	Gower R.D.C. ....	Postmaster, Canterbury
Infirmary and Nurses' Home at Workhouse .....	do. ....	H. J. Ind, Clerk, Church-street, Swansea
*ERE. OF MUNICIPAL BUILDINGS, TWEDDY-ROD .....	Gloucester Education Council .....	J. F. Trew, Architect, Station-road, Gloucester
*NEW INFANTS' COUNCIL SCHL. AT WALL HEATH .....	East Preston Guardians .....	A. Shelley, Clerk, Town Offices, Littlehampton
Draining Property in Thorner .....	Bromley Borough Council .....	F. R. Atkinson, Architect, 8, Sackville-street, W.
Electrical Plant, Hotel Majestic, Harrogate .....	Staffs. Education Committee .....	Graham Balfour, Stafford
Warbury at Six Bells Colliery, Aberbeg .....	Hon. J. H. Savile .....	Pastor, Wood, & Awdry, Architects, 35, Park-street, Bristol
	Frederick Hotel Co. ....	J. Richardson, M.I.C.E., Savile East Office, E. Parade-chies, Leeds
		Lee & Bloombury-square, London, W.C.
		J. Lancaster & Co., Ltd., Bialna, Mon.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.
*TWO DRAUGHTSMEN .....	Durham Education Authority .....	100l. each
*ASSIS. ORGAN. TEACHER OF MANUAL TRAIN. ....	London C.C. ....	200l. per annum

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. vii. x.

Public Appointments, xiv.

PRICES CURRENT.—Continued from page 457.

## WOOD (continued).

Portland Cement (continued).	At per load of 50 ft.	£ s. d.
Best mudding Damsel	18 0 0	£ s. d.
Small (average specification)	4 0 0	£ s. d.
Seconds	4 0 0	£ s. d.
Small timber (8 in. to 10 in.)	3 12 6	£ s. d.
Small timber (6 in. to 8 in.)	3 0 0	£ s. d.
Swedish balks	2 10 0	£ s. d.
Third-class timber (30 ft. average)	3 5 0	£ s. d.

## JOHN'S WOOD. At per standard.

White Sea: first yellow deals,	24 0 0	£ s. d.
3 in. by 11 in.	20 0 0	£ s. d.
Battens, 2 in. and 3 in. by 7 in.	16 10 0	£ s. d.
Second yellow deals, 3 in. by	18 10 0	£ s. d.
11 in.	18 10 0	£ s. d.
Battens, 2 in. and 3 in. by 7 in.	13 10 0	£ s. d.
Third yellow deals, 3 in. by 11 in.	13 10 0	£ s. d.
and 9 in.	13 10 0	£ s. d.
Battens, 2 in. and 3 in. by 7 in.	11 0 0	£ s. d.

## Petersburg: first yellow deals,

3 in. by 11 in.	21 0 0	£ s. d.
Do. 5 in. by 9 in.	18 0 0	£ s. d.
Battens	13 10 0	£ s. d.
Second yellow deals, 3 in. by 11 in.	16 0 0	£ s. d.
Do. 5 in. by 9 in.	14 10 0	£ s. d.
Battens	11 0 0	£ s. d.
Third yellow deals, 3 in. by 11 in.	13 0 0	£ s. d.
Do. 5 in. by 9 in.	12 10 0	£ s. d.
Battens	10 0 0	£ s. d.

## White Sea and Petersburg:

First white deals, 3 in. by 11 in.	14 10 0	£ s. d.
Do. 5 in. by 9 in.	13 10 0	£ s. d.
Battens	10 0 0	£ s. d.
Second white deals, 3 in. by 11 in.	13 10 0	£ s. d.
Do. 5 in. by 9 in.	12 10 0	£ s. d.
Battens	10 0 0	£ s. d.
Under 2 in. thick extra	10 0 0	£ s. d.
Yellow Pine—First, regular sizes	4 0 0	£ s. d.
Second, regular sizes	3 2 0	£ s. d.
Yellow Pine—First, regular sizes	4 0 0	£ s. d.
Second, regular sizes	3 2 0	£ s. d.
Yellow Pine—First, regular sizes	4 0 0	£ s. d.
Second, regular sizes	3 2 0	£ s. d.

## Kauri Pine—Planks, per ft. cube.

Large, per ft. cube.	0 3 6	£ s. d.
Small	0 3 6	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.
Manomet Oak Logs, per ft. cube.	0 5 0	£ s. d.

## Mahogany—Honduras, Th-

Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.
Selected, per ft. super, as inch	0 0 9	£ s. d.

## American Whitewood Planks,

per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.
per ft. cube	0 4 0	£ s. d.

## Pine—First, regular sizes

per ft. cube	0 13 6	£ s. d.
per ft. cube	0 13 6	£ s. d.
per ft. cube	0 13 6	£ s. d.
per ft. cube	0 13 6	£ s. d.
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## Pine—First, regular sizes

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per ft. cube	0 13 6	£ s. d.
per ft. cube	0 13 6	£ s. d.
per ft. cube	0 13 6	£ s. d.
per ft. cube	0 13 6	£ s. d.

## LEAD, &amp;c. Per ton, in London.

Sheet, English, 3 lb. and up.	17 10 0	£ s. d.
Pipe in coils	18 0 0	£ s. d.
Soil pipe	20 10 0	£ s. d.
Compo pipe	20 10 0	£ s. d.
Zinc—Sheet—	31 15 0	£ s. d.
Vieille Montagne	31 10 0	£ s. d.
Silesian	31 10 0	£ s. d.

## COPPER—

Strong Sheet	per lb.	0 11	£ s. d.
Thin	per lb.	0 11	£ s. d.
Copper nails	per lb.	0 11	£ s. d.
Brass—			
Strong Sheet	per lb.	0 10	£ s. d.
Thin	per lb.	0 11	£ s. d.
Sold—English Ingots	per lb.	0 11	£ s. d.
Timmen's	per lb.	0 7	£ s. d.
Blowpipe	per lb.	0 9	£ s. d.

## ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	22d. per ft. delivered.	£ s. d.
fourths	24d. per ft. delivered.	£ s. d.
21 oz. thirds	34d. per ft. delivered.	£ s. d.
fourths	34d. per ft. delivered.	£ s. d.
26 oz. thirds	34d. per ft. delivered.	£ s. d.
fourths	34d. per ft. delivered.	£ s. d.
33 oz. thirds	34d. per ft. delivered.	£ s. d.
fourths	34d. per ft. delivered.	£ s. d.
Fluted Sheet, 15 oz.	34d. per ft. delivered.	£ s. d.
21 oz.	34d. per ft. delivered.	£ s. d.
Harley's Rolled Plate	34d. per ft. delivered.	£ s. d.
4	34d. per ft. delivered.	£ s. d.

## OILS, &amp;c.

Raw Linseed Oil in pipes	per gallon	£ s. d.
" " in barrels	per gallon	£ s. d.
Boiled	per gallon	£ s. d.
" " in barrels	per gallon	£ s. d.
" " in drums	per gallon	£ s. d.
Turpentine in barrels	per gallon	£ s. d.
" " in drums	per gallon	£ s. d.
Genuine Ground English White Lead	per ton	£ s. d.
Red Lead, Dry	per ton	£ s. d.
Best Linseed Oil Putty	per cwt.	£ s. d.
Stockholm Tar	per barrel	£ s. d.

## VARNISHES, &amp;c.

Fine Pale Oak Varnish	per gallon	£ s. d.
Pale Copal Oil	per gallon	£ s. d.
Superfine Pale Elastic Oil	per gallon	£ s. d.
Fine Extra Hard Church Oil	per gallon	£ s. d.
Superfine Hard-drying Oil, for seats of	per gallon	£ s. d.
" churches	per gallon	£ s. d.
Fine Elastic Carriage	per gallon	£ s. d.
Superfine Pale Elastic Carriage	per gallon	£ s. d.
Fine Pale Maple	per gallon	£ s. d.
Finest Pale Durable Copal	per gallon	£ s. d.
Extra Pale French Oil	per gallon	£ s. d.
Eggshell Flattening Varnish	per gallon	£ s. d.
White Copal Enamel	per gallon	£ s. d.
Extra Pale Paper	per gallon	£ s. d.
Best Japan Gold Size	per gallon	£ s. d.
Best Black Japan	per gallon	£ s. d.
Oak and Mahogany Stain	per gallon	£ s. d.
Brunswick Black	per gallon	£ s. d.
Best Black	per gallon	£ s. d.
Knottin	per gallon	£ s. d.
French and Brush Polish	per gallon	£ s. d.

## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the Editor, and drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 1000, unless in some exceptional cases and for special reasons.]

\* Denotes accepted. \* Denotes provisionally accepted.

## ABERDARE.—For erecting sixty-one houses, for the

ABERDARE.—For erecting sixty-one houses, for the			
Gadlys Uchaf Building Club:—			
	Per House.		Per House.
E. Davies .....	£285 10	L. Davies .....	£245 0
D. T. Davies .....	259 10	W. F. & L. Price .....	231 0
D. Rees .....	253 0	T. W. & J. Jenkins .....	224 10
R. Jones .....	255 0		

BO'NESS (N.B.).—For cast-iron and fireclay sewers in the western district, for the Town Council. Mr. J. P. Laurie, Borough Surveyor, Bo'ness. Quantities by Surveyor:—

R. Edrington	£230 4 0	W. Mitchell &	
J. Adams & Co.	587 12 0	Sons	£493 10 5
J. McKernacher	487 15 3	Jipps & Sudden	418 2 4
		Balkie & Peattie	405 2 8

BOTCHESTON.—For erecting a Council school, etc., for the Leicestershire County Council Education Committee. Mr. W. Brand, architect, 33, Bowling Green-street, Leicester:—

H. Herbert &	£1,100 0 0	W. Moss	£930 17 6
Son	1,100 0 0	H. Askard	
A. J. Wileman	1,090 0 0	Rudkin, &	
W. F. Harding	1,050 7 6	Beck	928 0 0
Bradshaw		C. F. Mason	925 0 0
Bros.	1,061 4 0	T. Herbert	918 0 0
N. Dilks	1,042 0 0	J. C. Kellett	
Bentley & Co.	1,011 0 0	Sons	910 0 0
E. Fox	994 11 0	B. Shipman	882 0 0
W. Hanson	970 0 0	Griffin Bros.	
E. Orton	964 10 0	Hagglescote	877 0 0
Bowles & Son	963 17 0	J. Cole	876 12 5
Corah & Son	955 0 0		

BRISTOL.—For constructing a culvert and the erection of boundary walls, etc., at Eastville Workhouse, for the Guardians. Mr. T. J. Scoones, engineer, 10, Orchard-street, Bristol:—

J. Browning	£1,728 0 0	E. Clark &	
W. & J. Ben		Sons	£1,196 10 0
netts	1,550 0 0	T. Thatch	
J. A. Wood-		Bros.	1,182 15 6
ward	1,475 0 0	J. Perkins &	
B. H. B.		Sons	1,140 0 0
Neale Ltd.	1,416 0 0	S. Wood	1,130 3 10
H. H. Forse	1,275 0 0	E. L. O'ye	
H. G. Heard	1,263 7 0	Redland	1,109 0 0
J. Hatherly	1,247 0 0		

BRISTOL.—For construction of culvert and erection of boundary wall, etc., at Eastville Workhouse, for the Guardians. Mr. T. J. Scoones, engineer, 10, Orchard-street, Bristol:—

J. Browning	£1,728 0 0		
W. & J. Bennett	1,550 0 0		
J. A. Woodward	1,475 0 0		
R. H. B. Neal Ltd.	1,416 0 0		
H. A. Forse	1,275 0 0		
H. G. Heard	1,263 7 0		
J. Hatherly	1,247 0 0		
E. Clark & Sons	1,196 10 0		
Thatcher Bros.	1,182 15 6		
J. Perkins & Son	1,140 0 0		
S. Wood	1,130 3 10		
E. Love, Bristol	1,109 0 0		

BRITON FERRY.—For pulling down old buildings, erection of new power boiler-house, for the Cape Copper Co. Mr. J. M. V. Money-Kent, engineer, 17, Sloane-street, London:—

H. Billings	£1,027	W. H. Michael & Co.	£1,012
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EASTBOURNE.—For erecting a fire station at the side of the Technical Institute, Grove-road, for the Corporation. Mr. P. A. Robson, architect, Palace-chambers, 9, Bridge-street, Westminster, S.W.:—

M. Hookham	£5,423	R. Cook & Sons	£4,914
W. Burgess	5,354	F. G. Minter	4,912
Norman & Burd	5,195	M. Miller & Selmes	4,847
J. Wood & Sons	5,190	A. J. White	4,834
Martin, Wells, & Co.	5,150	J. Longley & Co.	4,768
J. Garrett & Son	5,084	Peeries, Dennis, &	
Strange & Sons	5,077	Co. Langney-road,	
E. Cornwall & Sons	5,062	Eastbourne	4,747
J. Martin	5,050	Rowland Bros.	4,659

EASTBOURNE.—For alterations and additions at Town Hall, for the Corporation. Mr. William Chapman Field, Borough Architect, Eastbourne.

GUILDFOUR.—For alterations to buildings, underpinning, pile driving, and reconstruction of roof, for the Guildford Electricity Supply Co. Mr. J. M. V. Money-Kent, engineer, 17, Sloane-street, London:—

Tribe & Robinson	£328	Higlett & Hammond	£273
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HALBERTON.—For taking down and rebuilding farmhouse at Halberton Court, Devon, for Mr. R. P. Elworthy. Mr. William Barrons, architect, Deepway, Tiverton:—

Tucker, Parr, &	£1,195 0	S. Manning	£1,195 0
Pincott	£1,651 0	H. Nott & Son	1,189 0
J. Grater & Sons	1,524 0	Nicks Bros.	
R. Hill & Son	1,440 0	Bradish	
R. Grater & Sons	1,435 0	Cullumpton	1,135 17
Sons	1,400 0		

HEREFORD.—For alterations to premises in Eign-street, for Mrs. Parker. Mr. W. E. H. Clarke, architect and surveyor, Cathedral Chambers, Hereford:—

E. J. Davies	£228	G. Cooke	£204 0
W. Ede	270 0	W. Powell	202 10
R. Friend	280 0	E. W. Wilks	193 0
J. C. M. Vaughan	220 0	Davies & Co.	187 0

[All of Hereford.]

HUNSTANTON.—For new building for children (Convalescent Home), for the Committee. Mr. A. Paul Alister, architect, 20, St. Andrew-street, Cambridge:—

F. Giddings	£6,830 0	R. Dye	£5,762 0 0
Oak Build-		R. Shanks	5,69



LONDON.—For the erection of dairy premises at the rear of No. 3, Perry-vale, Forest Hill, for Messrs. Edwards & Sons. Messrs. Bingham & Broughton, architects, Crofton Park, S.E.—  
A. Black & Sons, £255 0 | F. Tingley ..... £208 0  
E. C. Christmas, 233 0 | Bliss Bros. .... 203 10

LONDON.—For the supply of cables and electric plant, through tramways route, from Strand to the "Angel," Islington, for the London County Council:—

Supply of Low-tension Cables.	
Anchor Cable Co., Ltd. ....	£4,141 5 4
Siemens Bros. & Co., Ltd. ....	4,093 12 4
British Insulated & Helsby Cables, Ltd. ....	4,068 10 0
Callender's Cable and Construction Co., Ltd., London* .....	4,025 4 4
Laying of Cable-Ducts.	
J. Mowlem & Co., Ltd. ....	£4,435 0
British Insulated and Helsby Cables, Ltd. ....	2,992 0
Reid Bros. ....	2,974 8
J. A. Ewart, London* .....	2,813 14

NORWICH.—For the erection of billiard-room, bath-rooms, etc., at Istead House, Norwich, for Mr. J. R. Nutman. Messrs. Morgan & Buckingham, architects, Norwich. Quantities by architects  
C. Wiseman ..... £1,035 5 J. Youngs & Son, J. S. Smith ..... 949 Norwich\* ..... £893  
T. Gill ..... 924

ORMSKIRK.—For certain building work at work-house, for the Guardians. Mr. J. Dod, architect, D 16, Exchange-buildings, Liverpool:—  
H. E. B. Greene ..... £718 6  
W. Hall & Son, Ltd. .... 797 0 J. Robinson & Son 710 10  
J. Pilkington ..... 735 0 R. Taylor & Son ..... 674 10  
P. W. Mayor & Co. 735 0 Costain & Sons, Liverpool\* ..... 620 0  
Duthie & Dobson 733 10

PENARTH.—For erecting Wesleyan chapel and schools, etc., at the corner of Albert-avenue and Albert-road, Mr. H. Budge, architect, 95, St. Mary-street, Cardiff:—  
W. Thomas & Co. £13,500 E. Turner & Sons £11,488  
W. Williams ..... 13,400 G. Hallett ..... 11,450  
J. Hatherly ..... 13,200 J. E. Evans ..... 10,800  
Shannon & Sons ..... 12,287 J. Jones ..... 10,770  
Smith, Jones & Sons 12,280 E. T. Bevan ..... 10,700  
D. Davies ..... 11,554 D. G. Price, Penarth\* ..... 10,600

PONTNEWYDD.—For erecting two houses for Mr. Lowellyn Williams. Messrs. Swatwell & Havard, architects and surveyors, Dock-street, Newport:—  
C. H. Reed ..... £959 0 J. Dean & Son, £699 0 0  
D. W. Richards 941 0 A. S. Morgan & J. Jenkins, Ltd. 875 0 Co. .... 650 0 0  
W. L. Walker, 854 19 7 Poulton & J. H. Lead-beater ..... 790 0 Whitting, Pontnewydd, J. E. Jenkins ..... 765 0 Mon\* ..... 660 0 0  
H. Berse & Son 576 10 0  
Herbert ..... 750 0 0

RUSHDEN (Northants).—For erecting Council offices, in Newton-road, for the Urban District Council. Mr. W. B. Madin, C.E., Surveyor, Vestry Hall, Rushden. Quantities by Surveyor:—  
T. Wilmott, jun. £2,697 0 Hackley Bros. £2,490 0  
T. Hickman ..... 2,568 0 Berrill & Green 2,169 0  
Harrison & Wilmott ..... 2,566 10 Kettering Co-op. Builders ..... 2,411 0  
Whittington & Toulton ..... 2,335 0 Murdett ..... 2,395 0  
Brown & Son 2,520 0 R. Marriott, C. E. Bayes ..... 2,499 0 Rushden\* ..... 2,365 0  
W. Packwood ..... 2,467 16  
(Surveyor's estimate, £2,497.)  
\* Accepted subject to consent of the Local Government Board to a loan for carrying out the works.

RYE.—For building a water tower, Rye Workhouse, for the Rural District Council. Mr. E. J. Cory, Surveyor, High-street, Rye.  
Ellis Bros., Rye ..... £1,187 10  
(This includes the laying of water mains).

SLEAFORD.—For additions to master's house at Sleaford, for the Governors of Carre's Grammar School. Mr. Jesse Clare, architect, Sleaford:—  
H. Rose, West Banks, Sleaford ..... £930

SWANSEA.—For the erection of new machinery-house, and laying main drain through the works, for the English Crown Spelter Co. Mr. J. M. V. Money-Kent, engineer, 17, Sloane-street, London:—  
H. Billings ..... £675 Lloyd Bros.\* ..... £617  
W. H. Michael & Co. .... 630

WESTMINSTER.—For paving Jermyn-street, west of Lower Regent-street, with asphalt:—  
Per yd. super. f. 3.  
Val de Travers Asphalt Co. .... 8 3  
Limmer Asphalt Co. .... 8 1  
French Asphalt Co.\* ..... 7 9  
(Estimated value of tender £660.)

WALSALL.—For the erection of a manual instruction centre for twenty boys, in connexion with North Walsall Schools, for the Education Committee. Messrs. Bailey & McConnell, architects, Bridge-street, Walsall:—  
T. Tildesley, New-road, Willenhall, Staffs. .... £375

WOLVERTON.—For the erection of new secondary school for about 165 children, from plans and specifications prepared by Messrs. Harrison, Ley, & Kerkham, 65, Bishopsgate-street, Without, E.C., and quantities prepared by Messrs. Farthing & Son, 46, Strand, W.C.:—

F. Wood & Co. ....	£5,660 0 0
T. Yirell ..... 5,595 0 0	
W. J. Bloxham ..... 5,586 0 0	
A. J. Colborne ..... 5,559 0 0	
Martin, Wells, & Co. .... 5,499 0 0	
S. Page & Son ..... 5,480 0 0	
A. J. Chown ..... 5,030 0 0	
Coulson & Loftis ..... 4,996 0 0	
W. J. Sturgess & Son ..... 4,915 15 6	
G. Tombs & Sons ..... 4,900 0 0	
G. Hanson & Son ..... 4,838 0 0	
T. Stimson ..... 4,741 0 0	
A. P. Hawtin ..... 4,629 0 0	
C. Wright ..... 4,619 0 0	
H. Martin ..... 4,580 0 0	
C. H. Hunt & Son ..... 4,573 0 0	
G. J. Fisher ..... 4,560 0 0	
E. Archer ..... 4,543 0 0	
A. J. Colborne ..... 4,532 3 0	
A. Nash ..... 4,325 0 0	
W. Higgins ..... 4,485 0 0	
Hackley Bros. .... 4,449 0 0	
W. Heap ..... 4,399 0 0	
Kettering Co-op. Builders, Northampton* ..... 4,350 0 0	
E. Green, 24, Palmerston-road, Northampton* ..... 4,088 0 0	
Front Boundary Walls. ....	£135

WOLVERTON.—For the erection of girls and infants' school, to accommodate 820 children, and also cookery centre, from plans and specifications prepared by Messrs. Harrison, Ley, & Kerkham, 65, Bishopsgate-street, Without, E.C., and quantities prepared by Messrs. W. T. Farthing & Son, 46, Strand, W.C.:—

G. Tombs & Sons ..... £10,426 12 6	
F. Wood & Co. .... 10,178 0 0	
J. Barker & Co. .... 9,953 0 0	
W. J. Bloxham ..... 9,935 0 0	
Sturgess & Son ..... 9,890 0 0	
W. E. Bennett ..... 9,102 0 0	
W. J. Dickens ..... 9,250 0 0	
J. Parnell & Son ..... 9,240 0 0	
A. J. Colborne ..... 9,160 17 7	
Coulson & Loftis ..... 8,875 0 0	
H. Martin ..... 8,780 0 0	
C. H. Hunt & Son ..... 8,773 0 0	
A. P. Hawtin ..... 8,728 0 0	
G. Hanson & Son ..... 8,728 0 0	
A. W. Nash ..... 8,685 0 0	
W. Heap ..... 8,680 0 0	
G. H. Gibson ..... 8,493 0 0	
J. Honour & Son ..... 8,437 0 0	
Parren & Son ..... 8,417 0 0	
T. Hickman ..... 8,150 0 0	
W. Moss & Sons, Ltd. .... 8,006 1 0	
C. Wright ..... 7,846 0 0	
Kettering Co-operative Builders, Ltd., Central Joinery Works, Northampton* ..... 7,846 0 0	

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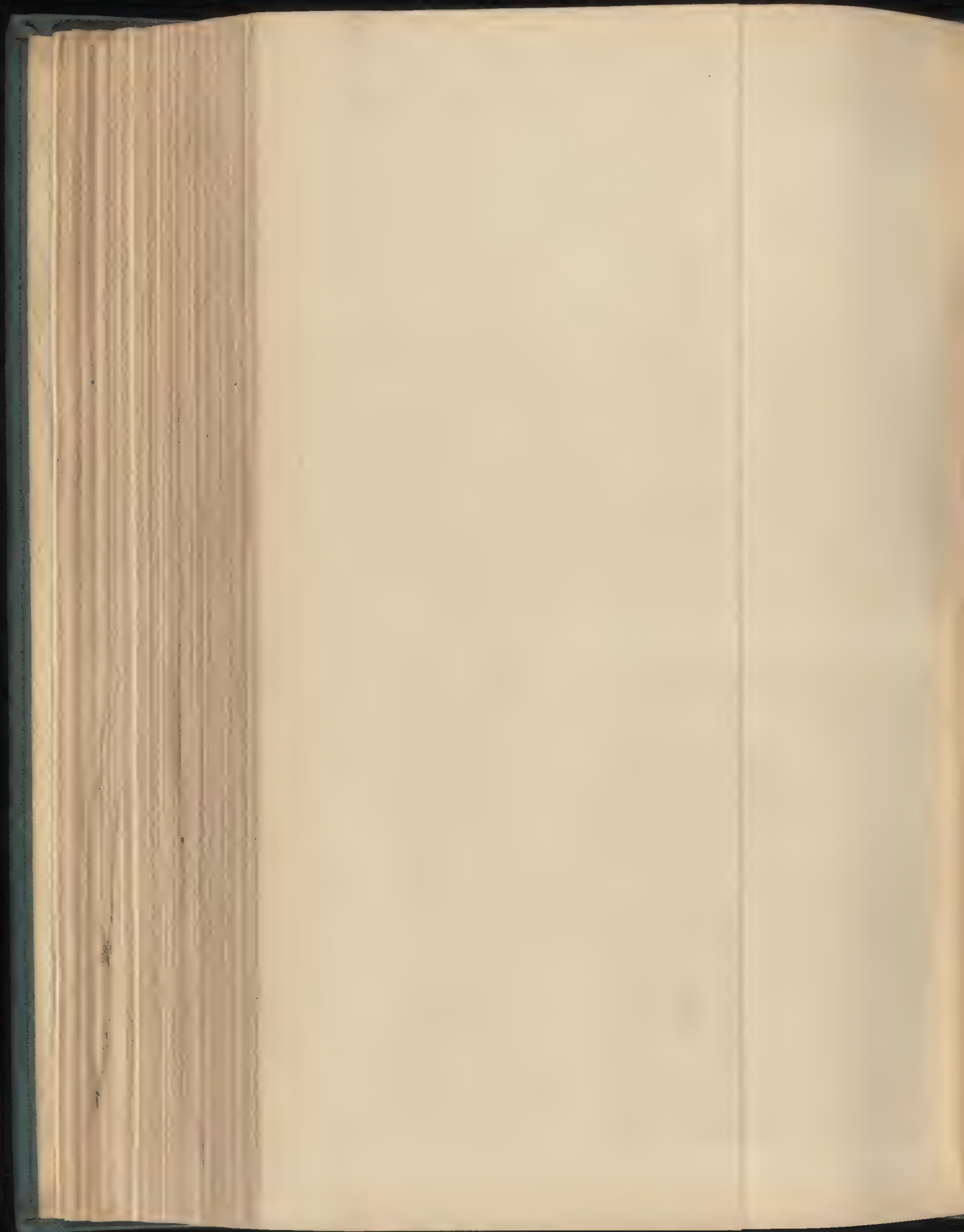
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ALL HALLOWS STAINING.



ST. BENNET, PAUL'S WHARF.



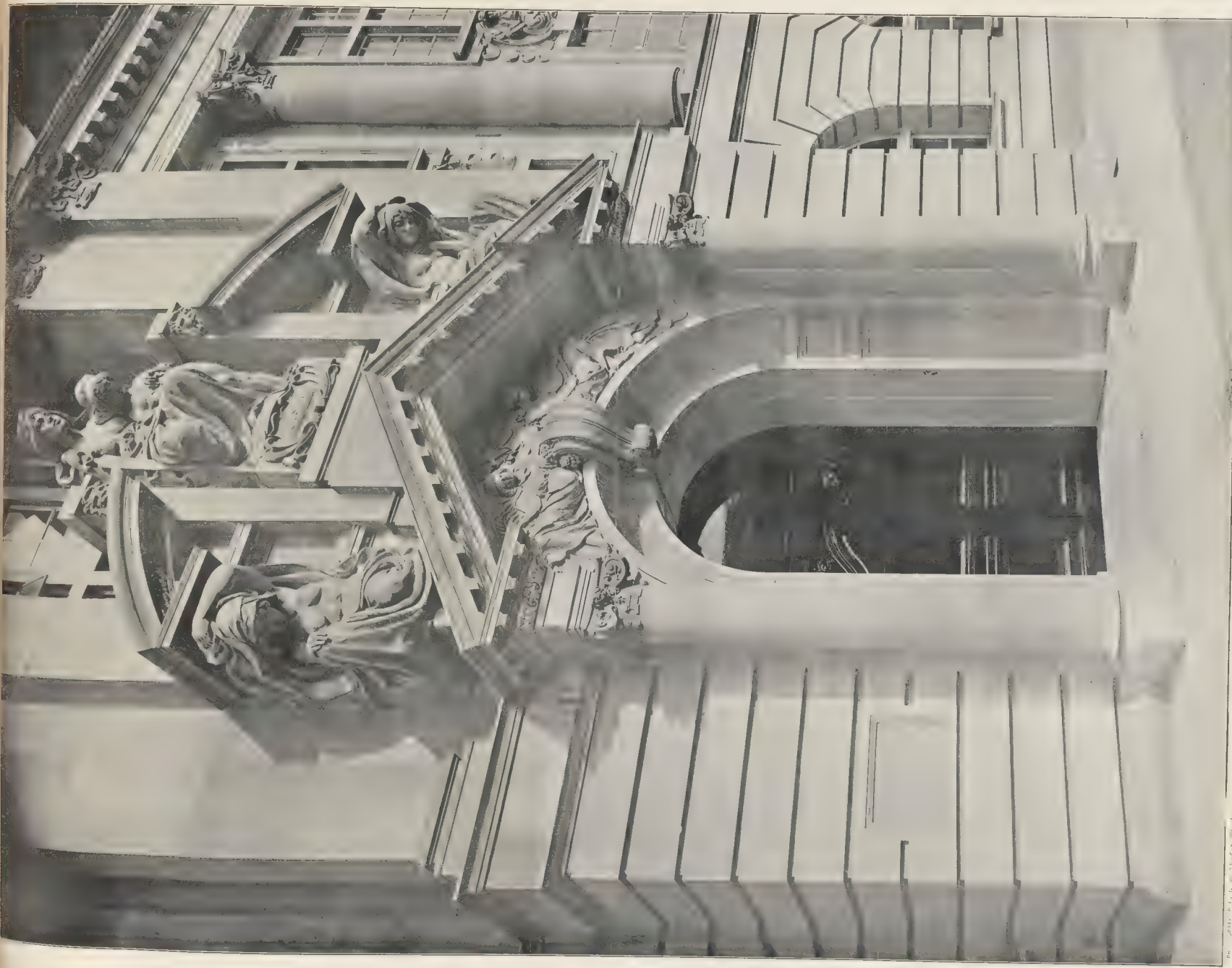
ST. DENIS BACKCHURCH.



ST. MICHAEL'S, FINSBURY.

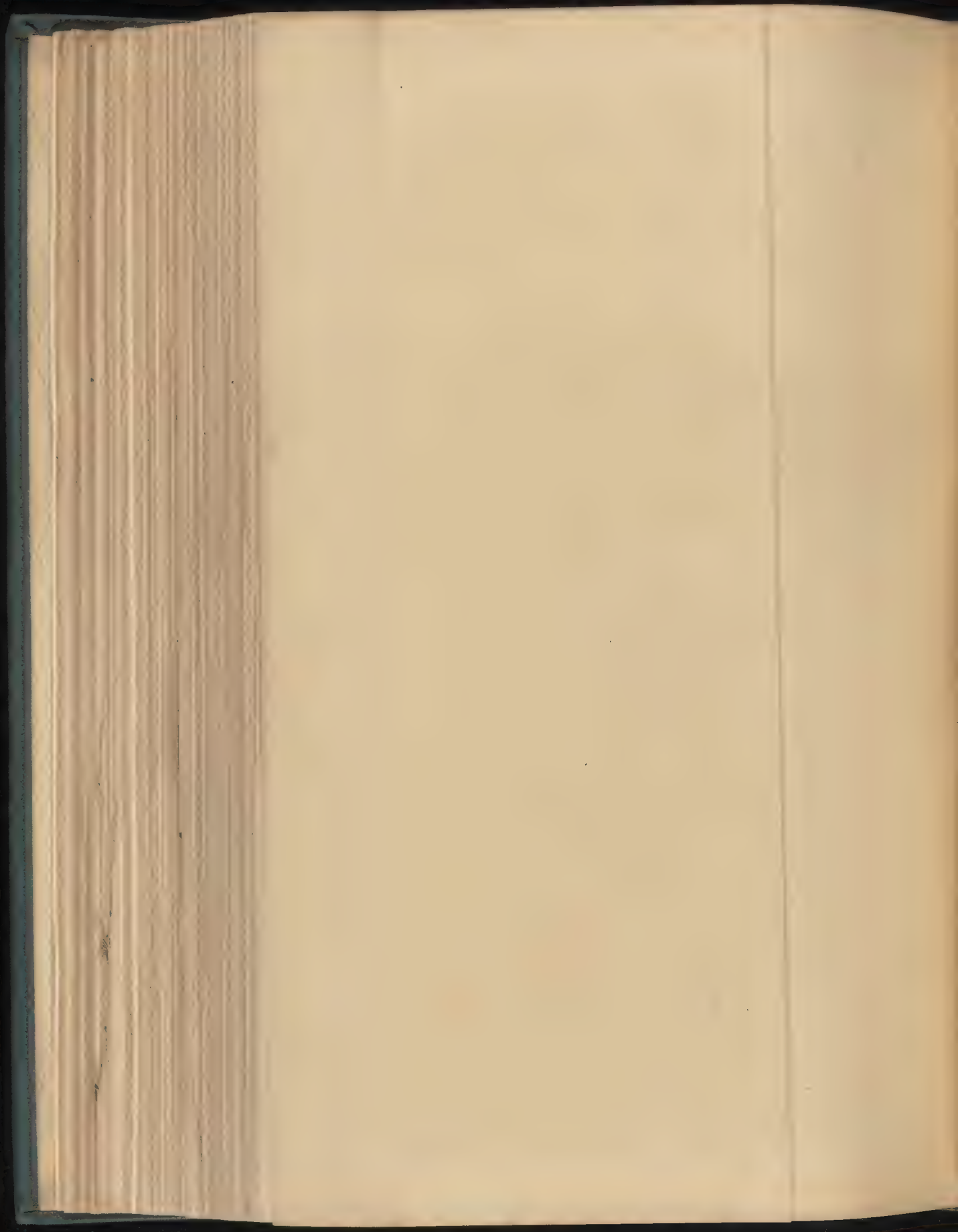


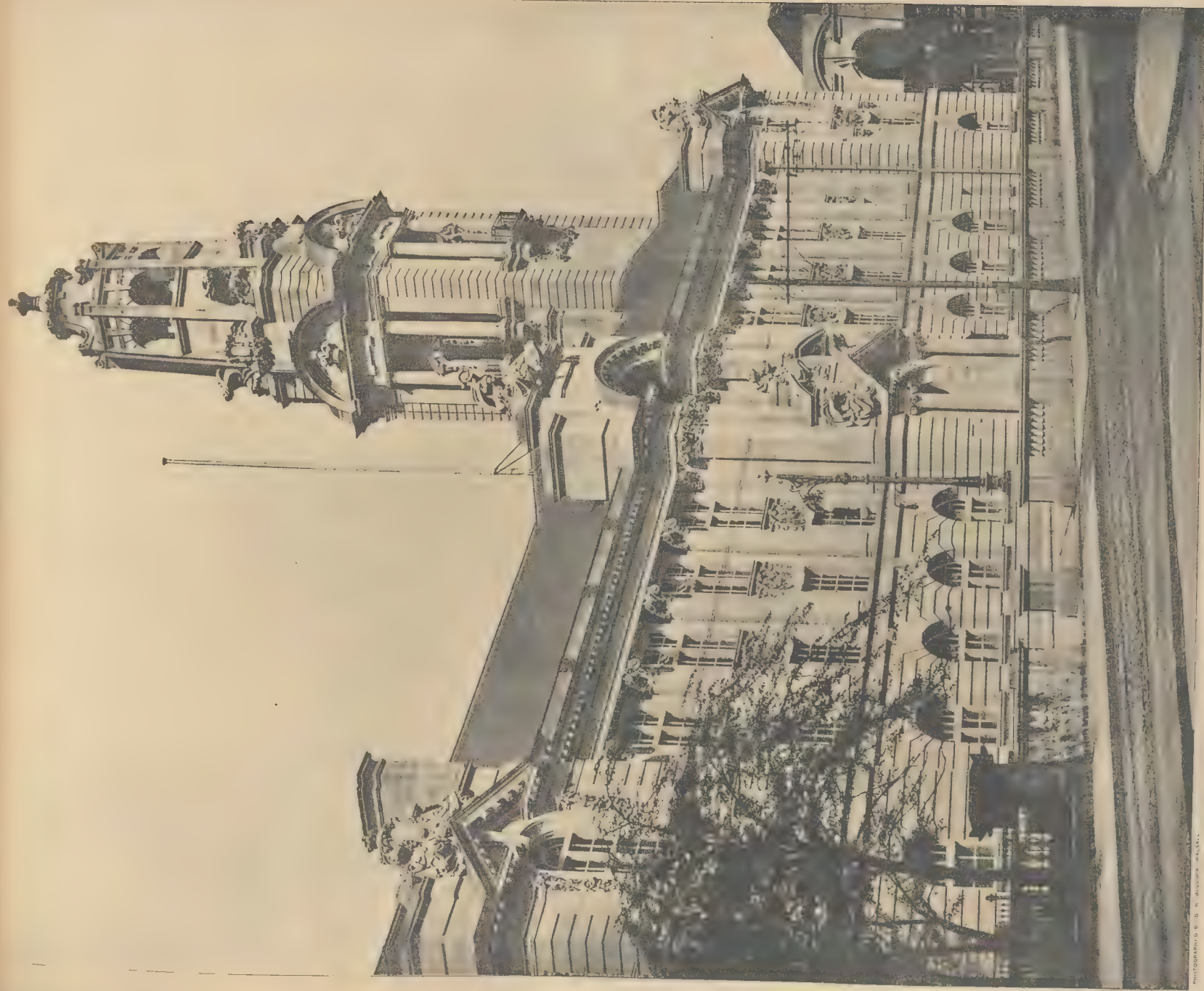




MUNICIPAL BUILDINGS, WALSALL.—MR. J. G. S. GIBSON, F.R.I.B.A., ARCHITECT  
DETAIL OF MAIN ENTRANCE.



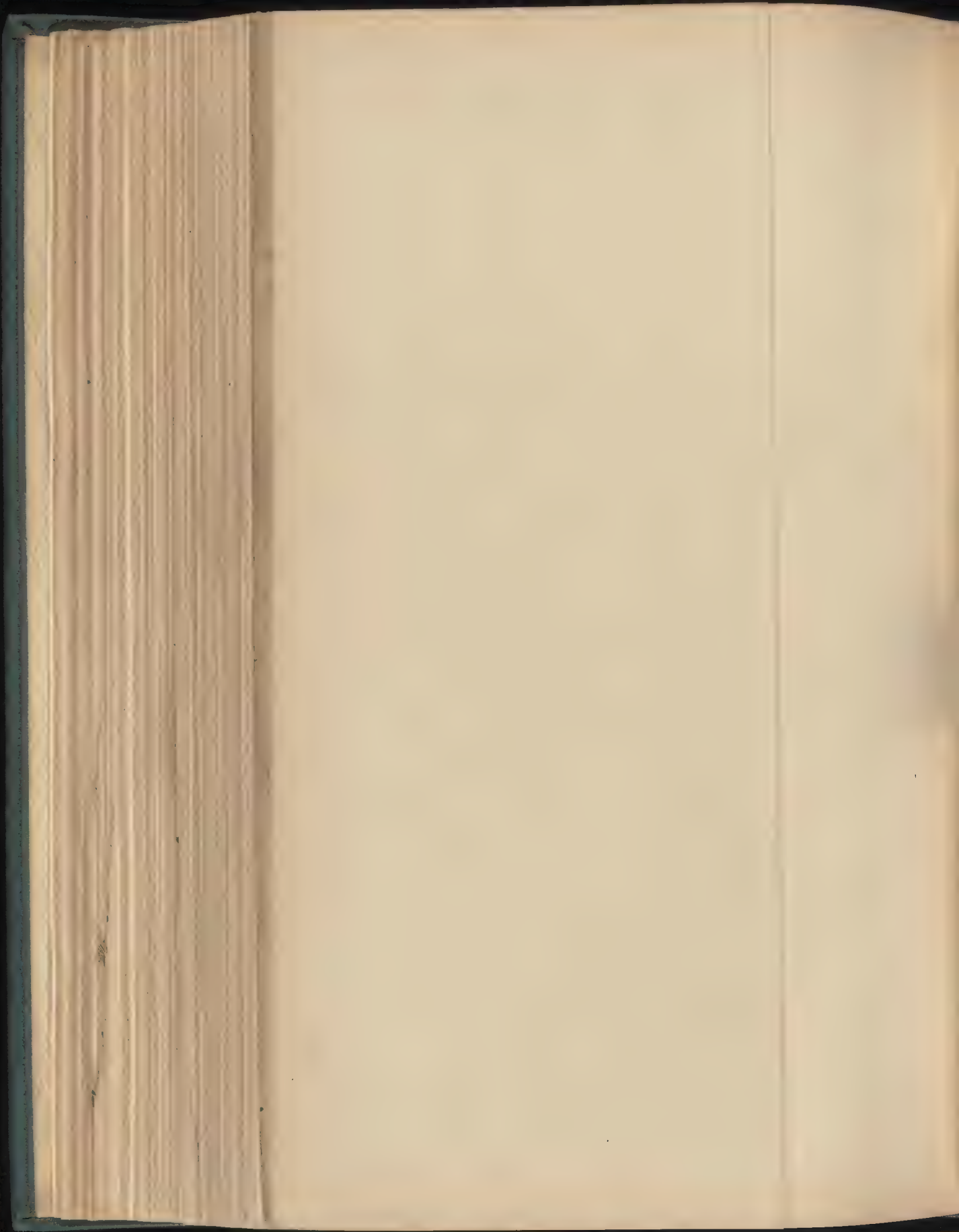




MUNICIPAL BUILDINGS, WALSALL.—MR. J. G. S. GIBSON, F.R.I.B.A., ARCHITECT.  
GENERAL VIEW.

PHOTOGRAPHED BY W. G. GIBSON, WALSALL.





# The Builder.

VOL. LXXXIX.—No. 3274.

NOVEMBER 4, 1905.

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2. General View.	
3. Section and Detail of Dome	

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### The Westminster Improvement Scheme.



THE scheme which may now be considered to have entered on a practical stage, for making over a large area of land at Westminster to a

Syndicate who

undertake to rebuild the property on hygienic and architectural lines, differs from the one most important point from the larger scheme which a company of building speculators attempted to carry out some years ago. The area to be acquired is more limited; it stops short northward at Wood-street, and therefore does not include the very interesting and picturesque old houses in Great College-street, Barton-street, and Newley-street. By the former scheme, which fortunately proved abortive, it may be remembered that this interesting quarter of London was considered as a whole, then the proposed syndicate, which consisted entirely of what are called "business men," being prepared to sweep it all away without the slightest compunction. Fortunately this scheme, which was sardonically called the "improvement" of Westminster by turning it into a gathering ground for a set of property speculators was frustrated, though we have no doubt there are capitalists at this moment who would jump at the opportunity for demolition if they could get it. It seems fortunately to be the present.

From a financial point of view the transaction between the London County Council and the Syndicate appears to be a sound one, which will bring in a revenue instead of putting any new burdens on the ratepayers. It is almost entirely from this point of view that the scheme has been considered in the London County Council, and that its praises have been sung in the *Times* by an irrepressible politician who is always anxious to show how his prophecies have been borne out by results. Of the effect of the scheme upon the architecture of the district involved, of the principle or plan on which it is proposed to be carried out, not a word has yet been said; that is the last thing that an English company or an English official body ever thinks of. We have the formal proviso that architectural elevations must receive the approval of the London County Council, and that is all.

This, however, is not a financial but an architectural journal, and it is of more interest to us to consider how the scheme may or could be carried out in an architectural sense, than what percentage it will pay.

The block plan of the building land, exhibited in the Council Room of the London County Council, shows, if we understand its indications aright, Smith-square and the Church of St. John the Evangelist as a reserved centre to the scheme, not to be meddled with; the red scoring which denotes the building area stopping short of the margin of Smith-square.\* This is almost more than we

had ventured to expect. The block plans of the former syndicate simply ignored the church, and obviously regarded the whole district as a site to be swept clear for their buildings; a matter to which we drew attention at the time. As the block plan of the County Council stands, it would appear that St. John's church and the small square which surrounds it may be regarded as the natural architectural centre of the new district.

This is as it should be, and we wish to take the first opportunity of emphasising this idea and of pointing out the value of the church and square as an architectural centre to the district. So much nonsense has been talked and written about St. John the Evangelist that a word on the subject seems really required, or we shall next hear that some members of the Syndicate want to have it removed as an inferior building that is in the way of their schemes. The fact is that the church has been the subject of a number of stupid gibes, which have been repeated from book to book, by people who thought (as people generally do think in this country) that it must be wrong because it was different from every other classic building. Archer, the architect who designed it, was a pupil or follower of Wren, who, had he had the great opportunities that fell to Wren, might have showed that he inherited not a little of Wren's genius. This church,

street was undoubtedly called: he was says Mr. Wheatley (*London, Past and Present*) ground landlord of that street, and had a fine house there. He probably had something to do also with the laying-out of Smith-square.

\* The name of Smith-square appears to have had reference to Sir James Smith, from whom Great Smith-



and his cupola of the Parish Church, Birmingham, are two works in which something like the large and bold handling of Wren is at once recognisable. It seems to have been assumed by writers of guide-books that St. John's is absurd because it has a tower at each angle. There is nothing whatever that is architecturally absurd in such an arrangement in any case; but in the case of St. John's the four towers are actually the illustration of one of the most important requirements of a true architectural theory, viz.: the expression in design of the necessities of construction. They were not at first included in the design. The foundation was bad and swampy and the building began to settle unequally; and the architect then thought of weighting the angles by towers in the hope of steadying the whole structure. It was exactly what a mediæval builder would have done under the same circumstances; and so far from being absurd, the four towers are a monument to Archer's true and practical architectural perception. Internally the church is admirably fitted for congregational worship, and is a fine and rather unusually designed interior, at present in a somewhat dingy condition, and a good deal in want of a comprehensive scheme of decoration, which would bring out its best effect.

We hope we shall hear no more, therefore, about the absurdity of St. John's Church, which is in fact one of the most remarkable of the XVIIIth century churches of London, and very well fitted to act as the architectural centre of the new district in the manner which its position on the land at once suggests. The district to be taken in hand by the Syndicate extends from Wood-street on the north to Horseferry-road on the south, and is bounded westward by Tufon-street. On the eastern side is Milbank-street and the row of various warehouses between it and the river. It is to be presumed that these will be cleared away, since part of the scheme of the Syndicate, as its title—The Victoria Embankment Contract Syndicate—implies, is to continue the embankment at this point. We should like, therefore, to contemplate the new district as one symmetrically laid out, with St. John's Church and Smith's-square as its architectural centre, and four main avenues arranged axially with each face of the church. Two of these are now provided or nearly so; Church-street, on the east side, is axial with the church; it is not quite wide enough, but might be widened, and on the south side is the County Council's new and wide street also axial with the building. North-street, on the other side, is too narrow, and would have to be rebuilt, as in the course of developing the property it naturally would be. The removal of the warehouses on Milbank-street, and the widening of Church-street, would open out the church to the river, with fine effect; and we should suggest, if it is not too great a financial sacrifice, some little extension of Smith's-square and the erection in it of buildings of a monumental and classical type in harmony with the church, and forming with it an architectural whole. That would be a good foundation for the architectural laying out of the site.

## THE GARDENS OF ITALY.

WHEN "the bishop ordered his tomb in St. Praxed's church," one of the bribes he held out to his so-called nephews to induce them to give him the best marbles for his tomb was the promise of leaving them "that brave Frascati villa with its bath." Villas with sumptuous and architecturally planned gardens were a passion of the Renaissance mind, and the ideal thrived in a climate and country exactly suited to give it its full effect. An Italian garden in England is a thing out of place and lost to its true effect, except in perhaps a dozen days of the year. It is a form of out-door art for bright skies and warm sunlight; in a northern atmosphere it loses its beauty and significance, and seems cold and comfortless. By a happy chance, too, the makers of the great Italian gardens had at their command the very style of vegetation which seems to harmonise best with the classic architecture to which the Renaissance gave renewed birth. Nothing could go better with columnar architecture and classic statues than the dark masses and severe outline of the cypress tree, whether occurring in its natural tall spires, or cut into those immense square blocks of thick dark foliage which form the background to the columns and statues ranged along the walks of the Villa Albani. There is about such garden scenery an atmosphere of repose, of dignity, and of palatial distinction which no other form of garden has realised. How many of such villa gardens once existed on Italian soil, whose place knows them no more, one can only conjecture; when every family of any position must have its villa and garden, there must have been many more such pleasures than can now be counted. Nor are we, probably, likely to see more of them. Out of Italy the effect cannot be adequately realised; and in Italy there is not the wealth available now for such costly artificial scenery. A municipal corporation might create such a garden, but the style would hardly be in place for a popular resort. The Boboli and Borghese gardens are used as such, certainly; but the style of the Italian Renaissance garden is essentially that which speaks of retirement and aristocratic leisure: a crowd seems out of place in such a creation.

A sumptuous book of illustrations of Italian gardens, such as Mr. Latham has furnished,\* though, for reasons already stated, it is hardly of value as affording models for English gardens, is a very pleasing addition to an architectural library, giving one in a collective form a number of views in the finest of these gardens; for these are above all others the gardens in which the architecture element is most predominant; so much so that we may say at once that no illustration of them could be considered complete without the plans. No plans are given, and one can easily understand that the cost and difficulty of producing such a work would have been immensely increased by an attempt to provide the plans, except where an engraved

one existed; it might even have been impossible to obtain permission or opportunity to make the necessary surveys; but their absence is an important defect. This is, we take it, essentially a photographer's book; it is a collection of views of effective points in the gardens. Occasionally we get a general view of a high point which gives the scheme as a whole; but most of the views are only parts which we cannot piece together into a whole.

The first of the series illustrated is the garden of the Villa Albani, the mansion built by Cardinal Albani as a museum for the collection of ancient works of art got together in great measure under the advice of Winckelmann, whose name will always be connected with it, and who was murdered on his way back to it by a stranger to whom he had imprudently shown some objects of value which he was taking back with him. The Villa was bought in 1868 by Prince Torlonia. A late Renaissance building, it has architecturally less interest and a less monumental style than some of the earlier ones. In the view of "The South Terrace," for instance, the light iron railing between the pedestals and terminal figures makes a poor show; it seems doubtful, indeed, if it is even of the same date as the house. The garden view of "The Villa" shows a square block of very ordinary formal Italian architecture; the value of the house lies in its contents rather than in its architecture. But some of the garden effects are of the finest, especially "The Cypresses" with the column in the centre, and the massive cypress hedge before alluded to, with the white columns and statues in front of it. The Villa Pamphili (Donna Pamphili) have generally heard it called) is a XVIIIth century house of more interest, showing on a large scale what used to be regarded in England in the last century as the typical form of villa in the Italian style: a main block, a parallelogram, with a smaller square block superimposed, a form which has been largely imitated in England; "of all Italian palaces it most resembles an English country seat," says Mr. March Phillips rather oddly, in his literary notice, the fact rather being that many English country mansions resemble it. The layout of the garden, in terraces with geometric designs, seems to have suggested the treatment of the celebrated garden of Drummond Castle, though the house in this case is, of course, of a very different stamp. The gardens produce their effect by multiplicity of resource rather than by the monumental grandeur of effect that we find in the Albani garden. In the Vatican gardens we come to the sentiment of the XVIth century Renaissance, and the glorious dome of St. Peter's groups beautifully with several of the views. The Borghese gardens have less of architectural character than those already mentioned. The Villa Medici, the foundation of Ferdinand de' Medici in the XVIth century, is, as everyone knows, the happy home and studious place of those fortunate, or rather, those gifted and industrious young French artists who achieve the "Prix de Rome." The site is one historically devoted to pleasure grounds since the late Roman

\* "The Gardens of Italy." By Charles Latham. With descriptions by E. March Phillips. London: George Newnes, Ltd. 1905.



period. As the Medici family declined in wealth and influence the Villa was gradually more or less neglected, and some of the treasures of art it held vanished or were removed to other places; the lions of the Loggia dei Lanzi at Florence formerly belonged to it. In 1801 it passed to the Duke of Parma, and two years later Napoleon's government had the sense and spirit to purchase and renovate the Villa and grounds, and devote them to the service of French art. The building is a noble one, and the mingling in the grounds of man's and nature's architecture has a singularly happy effect. No place could be better framed as an abode in which the artistic spirit and the love of beauty can take root and flourish. It is worth while to quote a portion of Mr. Philipp's description:—

"At every step you come across some beauty of Nature or of Art. The whole shrubbery and garden is set in marvellous hedges of clipped box, above which towers the dark velvet of stone pines, sarcophagi serve as basins to the fountains, crumbling statues gleam from niches cut in the thick greenery, huge ancient receptacles for oil or wine stand on pedestals, vases and tubs of lemon trees are placed on richly-carved capitals of Ionian columns. In front of the garden entrance is a broad gravelled court, in the midst of which is a fountain overgrown with arum lilies; beyond it lies a formal garden, where oleanders grow rosy in the summer and magnolias make the air heavy with perfume. A charming statue of a dreaming girl is placed here upon an old tomb. At the entrance to a long alley, between two columns, supporting an architrave, which once sheltered a famous statue of Cleopatra, is now placed an antique statue of Apollo, which has been restored by the addition of a most beautiful head, said to be of Meleager, and attributed to the hand of Scopas himself. Standing beneath the graceful canopy, with roses rioting all round it, and the dark ilexes as a background, this statue is one of the most striking features of the garden. Velasquez has left two interesting sketches, which are now in Madrid, of the long gallery in the garden, and a fountain with ilexes."

The tumultuous wall fountain in the court of the Palazzo Borghese, with its crowd of statues, forms an effective illustration as a piece of late Renaissance garden architecture, or rather sculpture; and a plate is devoted to the bumptious fountain of Trevi, with its medley of artificial rockwork and sea-horses. Mr. Philipp seems much concerned to show that this piece of bombast was in all probability really due to the ideas of so great a man as Bernini, though actually made after his time; as to which it may be observed, first, that Bernini was not so great an artist as Mr. Philipp thinks and as Bernini's own contemporaries thought; and that if he were, the Trevi fountain would be little credit to him. But these popular tastes die hard; it has long been settled in guide-books that the Trevi fountain is one of the glories of Rome, and no doubt nineteen out of twenty English visitors still think so.

The splendid gardens of Villa d'Este—where the foliage, however, plays more part than the architecture, save in regard to the flights of steps—are well illustrated; but even finer are the tall solemn cypresses of Villa Falconieri, the oldest of the Frascati villas, mirrored in the pond around which they stand. At Mondragone, another of the Frascati villas, architecture plays a larger part than usual, and is massive and monumental in character; while in the illustrations of Villa Torlonia we see the effect of huge flights of steps, in some cases with cascades dropping down them, as an element in garden architecture.

Though, as we have seen, the author

of the literary notes can hardly be considered an art-critic, his contributions are well written and give a good deal of interesting history in regard to some of the villas, which were connected in some cases with a good deal of human tragedy and pathos, which however is beyond the scope of our consideration in this article. We may thank both contributors for a beautiful book in illustration of a most attractive subject.

#### THE WORK AT VICTORIA STATION.

**T**HE immense work involved in the rebuilding of Victoria Station is progressing by slow degrees, being considerably hindered by the necessity for keeping open for the present some of the railway tracks which cross diagonally over part of the station yard where the new tracks will have to run parallel with the longer axis of the station, and where the piers must therefore be eventually built on the same axis. The part of the station next Buckingham Palace-road, where the arrival platforms will be grouped, is however nearly finished, and promises an immense addition in respect of space and convenience. The platforms are of ample width, and departing cabs and carriages from the arrival platforms will have their own wide exit into Buckingham Palace-road, completely separated from the traffic coming into the station, which will enter at the same quarter as at present. But the new entrance front has been pushed back 30 ft. from the present frontage line, so as to leave a much larger cab yard, and a wide overhead shelter roof will cover a considerable portion of this space. Half-way down the new station will be crossed by a bridge with stairs from each platform, which bridge will have exits (only) on to Eccleston Bridge, so as to afford a quicker and readier exit for passengers from short trips and with no luggage. One of the most important improvements is one to provide for backing out a first train from a long platform without disturbing the one that has come in behind it. At the lower half of the station the platforms are kept rather narrower, leaving room for a third track between the "up" and "down" tracks. At the upper end the platforms are widened and leave only two lines of rail, of which the "up" rails are connected by points with the middle line of rails lower down. Thus, when the first train has delivered its passengers at the upper end of the platform, it can back out down the middle track without interfering with the train that has come in behind it. Everyone who has watched the business of clearing out empty trains from a terminus will see how much this arrangement, which is entirely new, will facilitate the work. There is also on the Buckingham Palace-road side a large parcels van yard, from the delivery platform of which the parcels will be dropped to an underground sorting room, to be there sorted and delivered by underground passages to their respective trains.

The new front building of the station is in fact only a very large annexe to the Grosvenor Hotel, which is at present far too small for its requirements. A large staircase and landings with com-

munication doors connects the existing hotel with the new portion. Considering that this latter is merely an addition to the Grosvenor, there may be some excuse for not treating it in any monumental way as a station front; but it is a great pity that it has not received better architectural treatment. This is the only part of the work of which the Company have no reason to be proud, but to architectural effect they are apparently even more indifferent—hostile, in fact—than railway companies generally are. They seem even to be exceedingly sore about the fact that they have been compelled by *force majeure* to supply a really fine wall along Buckingham Palace-road; a feature they ought to be proud of, but which they apparently grudge having been compelled to carry out. If similar compulsion could have been exercised in regard to the front building, there might have been something there which the Company could be proud of, instead of what they will perhaps some day discover that they ought to be ashamed of. The elevation would be somewhat improved, or at least less offensive, if the wretched pieces of gimcrack ornament shown in the drawings, at the springing of the gables, were cut off; these represent the very worst architectural taste, and look like the decorations of a public-house.

In everything, however, that concerns purely engineering work the new station, carried out under the superintendence of the Company's able engineer, Mr. C. L. Morgan, is a splendid piece of work, to every portion of which special thought has been given; and the inside boundary next Buckingham Palace-road, with its plain solid brick and stone treatment (with no bad ornament to spoil it), looks so well at present that it is quite a pity to think that before the station comes into use it will all be spoiled by advertisements. It is to be regretted also that, owing to the necessity of carrying out the work in sections, the public will never see a new station as a whole; by the time the last section is finished, the one first executed will have lost its freshness.

The new portion of the railway bridge over the river, which is being widened by an addition sufficient to carry two more lines of rail, affords a good example of the fact that, in work of this kind, that which is most scientific also looks best. In the new portion the upper straight member and the lower curved member of the girder are connected by vertical ties, instead of the lattice of the older portion, a weaker form and a inferior method of meeting strains which was apparently supposed to be "ornamental." If engineers would only apply the same reasoning to their stone structures, and strike all that they think is ornamental, how thankful we should be!

**CHURCH RENOVATION, CANTERBURY.**—St. Peter's Church, Canterbury, was recently reopened, after being closed for the carrying out of repairs. The work, which has cost about 500*l.*, included the channelling of the outside, re-lighting and partially reflooring, and stripping and re-cementing the walls. Mr. W. J. Jennings was the architect, and the work has been carried out by Mr. A. J. Brewster. A window has also been erected in memory of the late Rev. Dr. Maclear. It was designed and executed by Mr. J. N. Comper, of Messrs. Bucknall & Comper, Westminster.



## NOTES.

**The Institute of Architects.**  
We are glad to know that a group of very able architects who have for various reasons either left the Institute of Architects or have never belonged to it, have collectively resolved to abandon this attitude and to throw their talents into the scale of the Institute and assist it in its formally stated task of the "advancement of the art of architecture." It would be perhaps premature to mention names this week, but more will be heard about the subject, probably, in the course of the President's address next Monday.

**Suggestion for a Campo Santo.**  
IN regard to the difficulty of finding room for further interments of distinguished persons in Westminster Abbey, Mr. Bodley makes the suggestion of erecting on the open space in the centre of Dean's Yard a Campo Santo somewhat on the model of the celebrated one at Pisa:—

"Externally there could be four walls, which might be made handsome and dignified, and within them a wide, cloister-like building, the inner walls having many glazed windows. The four long blank walls would afford much space for the monuments of many coming years. There could be four arches into the cloister with bronze gates and a cross walk. Its height need not be at all great, nor incommode the houses in Dean's-yard. The memorial services would be held in the Abbey, and the ancient cloister would afford a beautiful path to the final resting-place."

Such a structure might be made beautiful, but we hardly think that residents in Dean's-yard would agree that it would be no inconvenience to them. It must be a pretty fair height, not to look mean, and it would take away the air and light of the square to a considerable extent. And it would not be "burial in the Abbey," however much one may make believe. Our own opinion has always been that the true solution of the question would be the erection of a new north aisle to the nave of the Abbey, outside the present one, to be regarded as the monument aisle, and which would really then form part of the Abbey. Of course this suggestion would be met by many with shrieks of protestation; "vandalism" and "irreverence" would be, in Cuddie Headrigg's phrase, "the best words in their wame"; but it is what would have been done in the Middle Ages if a similar difficulty had occurred.

**Trafalgar-square Again.**  
WE must regret what we call the rather impracticable letter addressed by Professor Pite to the *Times* on the subject of Trafalgar-square. He proposes, in the first place, that if anything is done to the Square we should commence by pulling down the Nelson column, to replace it by a monument to Nelson in a better style. That may not be done. Everyone who knows anything about architectural fitness of course knows well enough that a mammoth Corinthian column with a statue on the top is a bad and unarchitectural form of monument. But we have no moral right to remove, to suit our present taste or knowledge, a monument erected with enthusiasm by a former generation in commemoration of a great man. That is the same spirit which has suggested the removal of some of the Westminster

Abbey monuments, because they are in bad taste and out of keeping with the building. Of course they are; but a monument put up in good faith ought to be a sacred thing to posterity; otherwise no monuments will ever be safe from demolition under the pretence of improvement in taste. And after all, the Nelson Monument is not the only column dominating a square; there is the Place Vendôme with its Napoléon column to keep us in countenance. And we must protest against the attempt to contradict, at this time of day, the long-established conviction as to the paltry proportions and poor style of the National Gallery dome. It is true that Wilkins's details and mouldings in this building are very refined—more refined than many people realise; but that does not alter the fact that the façade as a whole is a poor and inadequate conception for its position; and as it is not a monument to anyone, there ought to be no sentimental objection to improving it; not to speak of the ridiculous interior plan, with its absence of vista and medley of staircases having no architectural relation to each other. In regard to the fountains, the question is not one of controlling the splashing of the water, but of making it splash from better designed fountains, worthy of the situation, instead of the commonplace furniture-shop things which now occupy the position. There are always plenty of people in this country ready to decry any attempts at architectural improvement of a site; it is a pity to find eminent architects joining hands with the Philistine.

**Municipal Expenditure.**  
THE annual address of the Chairman of the London County Council contained, as usual, some very interesting figures. He stated that in 1889 the Council took over a net debt of 17,563,262 $\frac{1}{2}$ . At the end of March of this year this debt stood at 44,620,266 $\frac{1}{2}$ . Of this increase 11,546,883 $\frac{1}{2}$  is attributable to the debt of the School Board, now taken over by the Council, and 5,622,221 $\frac{1}{2}$  is assigned to remunerative purposes, but even deducting these amounts the debt shows an increase of close upon 10 millions in the comparatively short period under review. The expenditure has increased from 3,303,923 $\frac{1}{2}$  in 1889-1890 to 16,176,030 $\frac{1}{2}$  in the past year. The Chairman stated that owing to the number of different municipal administrative authorities in London the total amount of expenditure in London upon local government in one year was difficult to determine, but for the year 1903-4 he estimated it approximately at 19,250,000 $\frac{1}{2}$ , an expenditure which, with pardonable pride, the Chairman pointed out, was comparable with the expenditure of such States as Saxony, the Argentine Republic, Sweden and Norway combined, the Netherlands, and Portugal, whilst it exceeds that of Rumania and Denmark, and is within 1,000,000 $\frac{1}{2}$  of that of Belgium. These figures are very lurid and interesting, but what do the ratepayers say? and who is to call "Halt!"? The National expenditure is by no means standing still, and taxation is severely felt, and this weight of National and Municipal burdens is a

severe strain on the solvent, especially in times of depression.

**Electric Power for London.**  
At the meeting of the London County Council last Tuesday the Highways Committee presented a lengthy report on the supply of electric power for London; which, however, was not considered at that meeting. It will be remembered that in Parliamentary session many electric power Bills were discussed, but that very few of them were passed. One of the Bills, which very nearly became law would have given power to a private company to supply electricity in bulk and to large retail consumers over an area of 500 square miles in London and its suburbs. The companies seeking powers to break up streets, etc., proposed to supply electricity at what apparently was a very cheap rate. Remembering, however, that they proposed supplying only the most profitable class of consumer and would have practically no statutory obligations to supply unprofitable consumers, the proposals are not quite so philanthropic as they appeared on first consideration. If these Bills had been passed they would undoubtedly have led to a monopoly, and although a few manufacturers and the promoters of the companies would have profited largely, yet there would be many cases of hardship to local undertakings and therefore to many ratepayers. Half of the electric supply of London at present is furnished by local authorities, and the other half is by companies whose undertakings, with rare exceptions, will be purchasable in 1931. As a matter of fact the right of purchase granted by the Electric Lighting Act of 1882 and 1888 is, in many cases, of little value. Companies often supply areas which cover those of several local authorities. Hence some authorities will have the option of buying old electric mains, whilst others can purchase a generating station far too large for their area of supply. The contention of the largest of the companies applying for Parliamentary powers was that the present generating stations were far too small to generate electricity at the most economical rate. We are glad to see that the Highways Committee of the County Council recognise this, and as the London County Council is in an exceptionally favourable position to get the best possible advice on the method of generating electricity in bulk, and as they can always secure a good load factor by supplying their own tramways, it is suggested that the London County Council should supply electricity to London. It is proposed to hold a conference of the representatives of local authorities on November 20, 1905, to discuss the Council's proposals. As these proposals offer an equitable solution of many of the difficulties which have arisen in connexion with wholesale supply we hope that they will be favourably received.

**Street Lighting.**  
The recent adoption of gas lighting instead of electric lighting in Fleet-street and Queen Victoria-street, and the use of incandescent gas lamps for the lighting of Kingsway and Aldwych, have greatly



interested engineers and municipal authorities. In the present condition of Kingsway, however, the test is a very trying one for lighting by gas, as there are practically no walls to reflect the light, and the lighting seems dim and poor in comparison with the Strand. The quality of the light also is unpleasant and compares very unfavourably with that given out by "flame" arc lamps. The light could be considerably improved by using suitable diffusing globes, and although these would absorb a certain fraction of the light generated, yet it is a well-known physiological fact that the apparent illumination can often be increased by this means. Another advantage of using a suitable globe would be that it would obviate the necessity of the large reflector now used to reflect the light downwards. This would greatly improve the perspective effect, and later on, when there are buildings on each side, the upper stories, as well as the lower stories will be illumined. It has to be remembered that the ratepayer, who is the final authority as to which system of lighting is to be adopted, pays more attention to the general appearance of the lanterns, the brilliancy of the light, and the perspective effects than to the question of whether the ground or the vertical illumination is the more important or whether the minimum illumination is to be one-quarter or one-half of a candle foot. The ordinary lighting expert often loses sight of the fact that photometric measurements which fail to take into account the "quality" of the light being tested are of little real value. The difference that this makes will be appreciated by anyone who compares the lighting by flame arc lamps at the Mansion House with the "high-pressure" gas lamps in Queen Victoria-street.

A SUBJECT of considerable interest to civil engineers was discussed by Professor Oliver in his last Harben lecture at the Royal Institute of Public Health. The lecturer stated that his experience of caisson disease, or compressed-air illness, had been obtained in Newcastle during the construction of the new high-level bridge. The caissons used on that work are the largest hitherto employed, and afford working accommodation for fifty-five men at a time. When working to the depth of 80 ft. below high-water level the men are under a pressure of 35 lb. per square inch, having been treated before admission to the process of "compression" in the air lock. Compression work in the compressed air of the caissons seem to cause no particular inconvenience, but when the process of "decompression" is being performed serious symptoms frequently arise, the nature of which is not entirely clear. As a result of various experiments, Professor Oliver has arrived at the conclusion that caisson disease is caused by the setting free of gas in the blood by too rapid decompression, and that to provide for the safety of men working in caissons it is necessary to allow ample time for that process. A course of treatment which has been found with very beneficial results is that known as "recompression," in which the affected are put back into a "medical

lock," where they are again subjected to pressure, which is very gradually relaxed.

As we have remarked more than once, the railway companies of Great Britain have shown commendable enterprise in the adoption of independent motor vehicles on existing branch lines of their systems, and of motor omnibuses for use on highways inadequately provided with other means of communication. The activity displayed is largely due to the constantly increasing rivalry of electric tramways, and in this circumstance we have a practical illustration of the stimulus afforded by healthy competition. The credit of introducing the railway motor belongs to the London and South-Western Railway, a line that has long since emerged from the chrysalitic state into which it had sunk and is now one of the most enterprising undertakings in the whole country. The first steam motor-cars were introduced on the Fratton and Southsea branch in 1903, with the result that the Great Western and other companies speedily followed suit. Last year the London and South-Western Railway introduced two additional motor services, one between Eastleigh and Fareham, and the other from Plymouth to Plymstock and Turnchapel. The three services have proved so successful that the company now propose five other motor routes in the West of England. One of these, between Bournemouth and Christchurch, represents a serious attempt to meet tramway competition in a large centre of population, and the experiment will doubtless be watched by other companies with considerable interest. Three road motor services have been established so far in connexion with the South-Western system—between Exeter and Chagford, Lymington, Milford and New Milton, Farnham and Haslemere. In the meantime other companies have been equally active, and the progressive policy of the North-Eastern Railway in the same direction is especially worthy of note.

In consequence of the recent fire which consumed some premises on the north side of the western end of Long Acre, the adjoining premises, No. 137, will very soon be pulled down. The house has been occupied since 1834 by the Dryden Press, where Phelps, the actor, worked at press in the office, and where, it is said, Douglas Jerrold worked as a compositor, in or about 1818. Dryden lived there in the interval 1682-1686, and removed thence to the house, lately demolished, in Gerard-street, Soho. The head of the firm of printers who occupy the premises is our authority for saying that the house appears to have been structurally altered but little since the poet's time. The printing office forms a separate building in the rear, erected in what was once the garden, where yet remains a relic of former days in the shape of an artesian well with a pump. With that house will disappear the last of the houses which Dryden inhabited in London. During the period we mention he finished his satire, "Absalom and Achitophel," and wrote the first part of "The Hind and Panther." In Rose-street, opposite, he,

when returning home one night, was waylaid and beaten by the hired ruffians of Lord Rochester and the Duchess of Portsmouth.

It is stated that the municipal authorities of Amsterdam have paid 45,000fl., or 3,750l., for the two-roomed house, No. 4, in Joden-Breestraat, in the Jewish quarter of the city, inhabited by the painter. We may mention that Rembrandt bought the house a few years after he married, in 1634, his first wife, Saskia Uilenburg, who died in 1642. When Rembrandt became insolvent in 1656 his son Titus took possession of the house in terms of his mother's marriage settlement in favour of her children after her husband's death or in the event—which happened—of his second marriage. It is intended to devote the house to the purposes of a Rembrandt museum.

THE Winter Exhibition at Messrs. Tooth's Gallery. Messrs. Tooth & Sons' Gallery includes a good many things of interest; among which the finest perhaps is a very small painting by Fantin-Latour, "Diana" (71), one of those combinations of nude figure with dark masses of trees which are worth more than his paintings of flowers (fine as those are), and which represent the pure poetry of art. Henner did the same kind of thing in his own way; but a small and good example of Henner in the outer room—"A Nymph" (16)—enables one to realise how much more simple and vigorous, how much more free from affectation of style, is Fantin-Latour's treatment of the same class of subject. The central position in the large room is occupied by Bouguereau's large, hard, and learnedly drawn composition "Offrande à l'Amour" (42), which has its value as representing what may be called the perfection of academic art. Among the smaller landscapes are a fine little example of Daubigny (18), more vigorous than is sometimes the case with this rather sentimental painter; a quite beautiful landscape by M. Harpignies (1), and an admirable work by Cazin (23). Two or three small paintings by L. Deutsch of Oriental figures and bric-à-brac are almost amusing in their palpable imitation of Gérôme's works of the same class; one of them, "An Eastern Dealer" (31), is a most conscientious piece of work of its class, and worthy in its way of Gérôme himself. Mr. D. Farquharson's "Summer" (35) is a noteworthy work, showing this artist's individuality of style in the treatment of landscape; the trees are perhaps a little too wanting in detail, but one is glad to find a picture with the title "Summer" which really has sunlight in it. The cattle paintings by Mme. Dieterle, the daughter of the late Van Marcke, recall, and are equal to, her father's paintings of the same class. Animal painting of another kind is illustrated in Schreyer's powerful and almost pathetic picture, "Chevaux de Poste en Velachie" (45), in which the wretched unkempt horses, the strange antediluvian-looking vehicle, and the grey dreary landscape, carry one in fancy quite out of the bounds of civilisation. On the south wall, among works of only respectable



interest, hangs M. Dagnan-Bouveret's noble and beautiful "Sibylle" (52), a recent work, remarkable both for the conception of the figure and for the subtle harmony of colour which pervades the work, and makes the pictures around it look commonplace. Among the Dutch paintings are a well-known and very fine work by Israels (63), and two small landscapes (66, 67) of exceptional quality by De Bock. In the small room are to be noticed also Mr. D. Farquharson's landscape "Flowery Pastures" (11), in which the painter shows himself a kind of rival of Mr. H. W. B. Davis on his own ground, and an interior and figures (4) by a young Dutch painter, Herr Kever, one of the numerous followers of Israels, who shows at least an admirable sense of composition, if the work does not exactly bear out the title, "Happy as the Day is Long." With all the ability of the modern Dutch artists, there seems to be, whether they paint figures or landscape, a kind of pall of greyness and melancholy hung over everything.

Mr. McLean's  
Gallery.

THE exhibition at Mr. McLean's Gallery contains three remarkable landscapes: Troyon's "Changing Pasture" (26), exhibited lately among Mr. Forbes's pictures at the Grafton Gallery—a solidly-painted landscape with its solitary tree in the centre standing out against the sky; a Corot, "Evening" (31) in the painter's most poetic style—a woodland scene with figures in the foreground; and Crome's "On the Norfolk Broads" (6), an unusual subject with this artist, who seldom painted trees as a principal subject, and treats them here with a boldness and solidity which has an affinity with the art of Troyon. Among the other exhibits are a fine seascape by Henry Moore (13); one of Lewis's highly finished Oriental scenes (2); one of Chevreillard's amusing studies of a priest, contemplating "The Church Mouse" (11); "The Mandoline Player" (20) by Munkacsy, a painter whose superficial cleverness has had its day; a fine Highland landscape (15) by Mr. Hurt; a picture of "Grouse Driving" (36) which shows that Mr. Blinks can paint birds as well as dogs; and Millais' life-size figure entitled "Jessica" (40), a fine painting, but hardly an embodiment of Shylock's daughter.

Water-colour  
Society  
Art Club.

THE exhibition of the members of the Royal Water-colour Society Art Club, on view last week at the rooms of the Society, is mainly an exhibition of amateurs, in which ladies take an important part both in respect of quantity and quality. Architectural subjects, we observed, were numerous, and in most cases well treated: those by Mr. Phœnix Spiers and Mr. Marshall are of course beyond criticism, but we may mention also an interior of the church of Grand Audely, by Miss Catherine Maggs, which is exceptionally good in solidity of effect and in accurate perspective, and a remarkable drawing of the interior of St. Paul's seen by artificial lighting at an afternoon service, by Mr. James Cafe. Among the numerous landscape sketches we may mention Mr. Hall's view of Lincoln; Mr. Harding Smith's illustrations

of Lyme Regis and its neighbourhood; two fine drawings by Mr. Newton Benett; Mr. Milnes's "The Shepherd"; Miss Drake's "Charing Cross Railway Bridge"; Mr. R. A. K. Marshall's "Willapark, Tintagel"; and two landscapes by Mr. Butler Cato; and Miss Streatfield's two views of the same scene under different weather conditions—"A Dull Day on the Cornish Coast" and "A Bright Day on the Cornish Coast"—an interesting kind of experiment not very often made. A special point in the exhibition was the collection of twenty-one drawings by the late Mr. Collingwood Smith, who, it appears, was the originator of the Royal Water-colour Society Art Club. We confess that we have never much cared for the works of this artist, which are of rather a superficial and showy quality; but two drawings among those shown were exceptions, both of them illustrating "The Downs, Eastbourne." In these the simple and severe lines of the landscape seem to have had a fortunate effect in inducing a severity of style in the pictures, different from that of the other examples exhibited.

The Cheyne  
Art Club.

THE Club thus named appears to consist of a group of mostly young artists living in the Chelsea neighbourhood, who are holding their first exhibition at Messrs. Dickinson's in Bond-street. We were not very much impressed with the oil-paintings, partly perhaps because the lighting of the room is not favourable for seeing them; there are two good sea-pictures by Mr. Gregory Robinson (3 and 12), Mr. Wallace's "Summer's Morning" and "The Landing Place" (24 and 42) are good landscape compositions, also Mr. J. M. Aiken's "Hay Harvest" and "Gloaming" (29, 30); the last-named artist also exhibits one or two life-size portraits. The small exhibition of sculpture is more interesting. Mr. Gillick's "Memorial to Thomas Millar," an inscription slab with a bas-relief figure at each end of it, is very pleasing; his small alto-relief—called rather oddly "Skating," for it does not suggest skating—is an original fancy; and Mr. C. A. Palmer's "Aradne" is a very graceful little bas-relief fitting a square panel. The most important work, however, is the model for a monument with bronze sculptured figures, by Mr. C. Pibworth. This shows a rather new and in every way excellent treatment of architectural elements as a centre for sculpture. We should imagine, from the style of it, that the author owed something to study in Paris; it is much more like a French than an English work.

The Ways of  
Christian  
Brethren.

A CORRESPONDENT sends us the following advertisement for an architectural competition, cut from a daily paper:—

TO ARCHITECTS AND OTHERS.  
CHRISTIAN BRETHREN CONGREGATIONAL CHAPEL, LEES.

The Building Committee invite plans for a new Chapel and School and offer 10*l.* as First Prize and 5*l.* as Second for the plans approved. The Committee do not bind themselves to accept as architect the person or persons whose plans are adopted, but reserve the right to use the plans without further claim.

We omit the details as to address and time of sending in. This is one of the

most amusing advertisements of a competition we remember to have seen. The "architects and others" are one of M<sup>me</sup>. Vauquer's celebrated advertisement on the wall of her house in "Le P'tit Gort" (Paris). Les personnes des deux sexes et autres. It appears that the Christian Brethren propose to pay an architect 10*l.* for plans of a chapel and school and reserve the right, for that sum, to use them as they please without further payment to the architect. In this case it cannot be said that "the children of this world are wiser in their generation than the children of light"; on the contrary, the children of light seem to go on the very worldly principle of getting as much and giving as little as possible.

#### LETTER FROM PARIS.

On Saturday last took place the election of a successor to Henner as the Institut. There was a close competition ending in the election by nine votes of M. Lhermitte, who at the first "tour de scrutin" had only one vote, and who had as competitors three eminent artists, MM. François Flameng, Tony Robert-Fleury, and Bonnat. It was therefore a great success for M. Lhermitte. The new Academician is sixty-one years of age. He studied under M. Léon de Bonaudran, and is an "Officier" of the Legion of Honour. M. Lhermitte's works are as well known in England as in France, but among those which have made his reputation in Paris may be mentioned "La Mousse," exhibited at the Salon of 1874, and now in the museum at Carcassonne; the "Parade de Ploumanach"; "L'Aïeule," which is in the museum at Ghent; "La Paix des Vainqueurs" and "La Mort du Buchon," in the Luxembourg; two decorative paintings in the Sorbonne representing Claude Bernini and Ste. Claire Deville in their laboratories, and which brought him the Grand Prix at the great exhibition of 1889; and the large picture of "L'Arrivée aux Haies," formerly in the Hôtel de Ville and now at the Petit Palais. M. Lhermitte is a member of the Société Nationale des Beaux-Arts (New Salon).

A successor to Bouguereau has now to be found, and the probability is that the election will fall on M. François Flameng. The Société des Amis de Luxembourg have offered to that museum a very realistic picture by an artist of Toulouse, M. Lantrec, representing a public bath at that rather too notorious resort the Mairie Rouge. In spite however of the favourable opinion of the curator, M. Bédotte, the National Museums Committee, whose assent is indispensable, have refused the picture. Hence wrath and recrimination against the Committee, who are accused of being academic in their tastes, and a violent campaign against M. Bonnat, the President of the said Committee, which will however have no result. The work in question is not a *chef d'œuvre*, as would have been sooner or later recognised; and the incident shows the value of the veto possessed by the National Museums Committee, which is indeed the safeguard of the artistic character of the national collections. M. Bonnat is not an artist of any partisan prejudices, and has conscientiously acted in the best interests of the Luxembourg.

The statue to Camille Desmoulins, prematurely inaugurated and then removed for the completion of the bronze work, has now been definitely placed in the Palais Royal garden, on the side next the Galerie d'Orléans. M. Boyer, the author, is a sculptor who has given proof of his talents, but has hardly been successful in the present instance, and his work is not in harmony with its architectural surroundings, and is unfortunately not infrequently obscured by the case of works both by sculptors and painters who are too apt to despoil their external to the relation of their work to its external or internal architectural setting. For the same reason it is to be regretted that Marcel, former Directeur des Beaux-Arts and who is an ardent partisan of "evolution

contemporaine" in art, proposed to place M. Rodin's figure entitled "Le Penseur" in the Place des Panthéon, where it is altogether out of its element. The plaster model was first set up as a test, and was removed to make way, it was understood, for the actual work in bronze; but though the plaster figure has gone, the bronze does not make its appearance. It is believed that the Minister of Fine-Arts has intervened, and has recognised that M. Rodin's statue, whatever its merits, is a "pièce de musée" and not a work to be grouped with Soufflot's classic building.

M. Dujardin Beaumetz, who now controls, in an admirable spirit, the official destinies of art, has arranged that we are to have, for the first time, a collective exhibition of the works executed by pupils of the Schools of Design, of Industrial Art, and of Decorative Art, in France. This exhibition will include works in painting, sculpture, architecture, ceramic, lithography, engraving, and etching; also embroidery, lace, and other textile work. A jury will be commissioned to select the best works, the authors of which will receive prizes, and these selected works will form an exhibition for circulation throughout various places in the provinces. It is hoped that this will give rise to a wholesome emulation among the pupils of the various schools of all the towns in France, and afford also opportunity for comparing and criticising the systems employed in different Schools of Design.

In connexion with this subject it may be mentioned that a general exhibition of Applied Art is to be held during the week from November 20 to 25, at the Galliera Museum. This is to lead up to an exhibition of work in silk, in its various applications, to be held in the same museum in April or May next, under the management of the Paris Municipal Council.

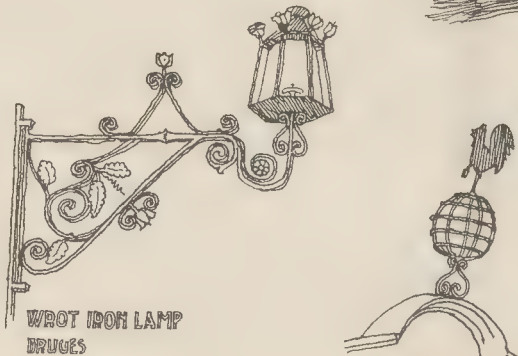
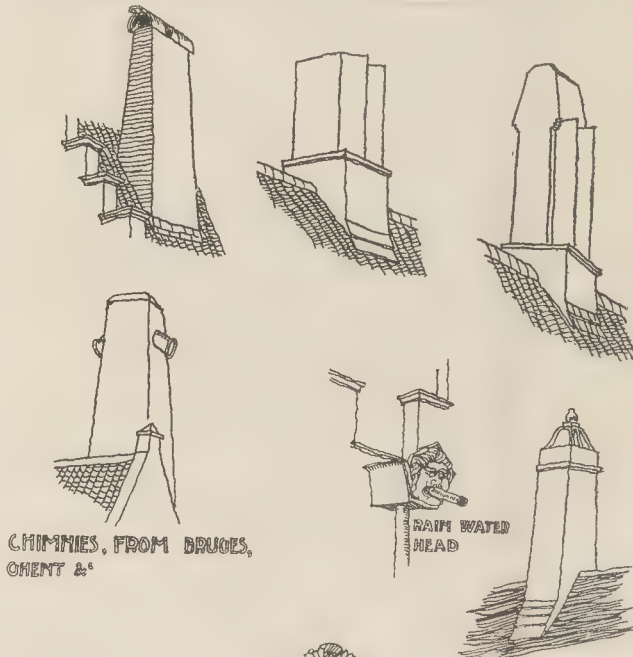
M. Florent Willens, the painter, who was a "Commandeur" in the Legion of Honour, has died at Neuilly-sur-Seine, at the age of eighty-three. For the last twenty years he had lived in retirement, and his work was no longer seen in the public exhibitions in which he had formerly realised a triumphant success. At twenty years old he had already become famous; his works, widely known through engravings, were principally devoted to interiors and scenes of the time of Louis XIII. His profound knowledge of the works of the old masters rendered his judgment invaluable in questions of the authenticity or of the preservation of ancient pictures. He devoted two years' labour to the restoration of Raphael's "St. John the Baptist," now in the Louvre, which had faded so as to have become almost unrecognisable. His original work was very considerable. Among his most important works may be mentioned "La Fête des Vétérans" (1844); "La Veuve" (1853); "Le Baptême des Soirées en 1660" in the reign of Napoleon III.; "Coquetterie," the collection of the Empress Eugénie; "L'Heure du Duel," in the collection of M. Achille Fould; "Au Roy," in the collection of the Duc du Morny; and "La Partie de Billard," in the collection of the King of Belgium. Willens was the instructor of Alfred Stevens. In spite of rather brusque manners, he was much esteemed among his contemporaries both as a man and artist.

# NOTES AT BRUGES.

In a VIIIth century MS. by St. Owen mention is made of a Municipium Brugense, which is supposed to date back as far as the Roman invasion. This Municipium was the "Ouden Burg," or old borough, which existed until Baldwin I. built a new borough during the closing decades of the IXth century. Documents, still extant, tell us that the old burg consisted of a castle (steen), a dungeon, a court, and a warehouse. This latter was probably used solely for wool, as we hear that in the time of Charlemagne the weavers of Bruges were celebrated in many countries. The Burg was protected by walls and ditches, and it is said that traces of it may still be found beneath certain houses on the north side of the Rue du Vieux Burg. Baldwin's later edifice was raised at the bidding of Charles the Bold to keep off Norman invasions. In the IXth century Bruges was subject to the Counts of Flanders.

So early as the XIIth century the town which had arisen round the buildings erected by Baldwin had become a place of more than ordinary commercial importance, and 200 years later, when docks had been built and canals cut in various directions, it was very generally termed the centre of European trade. In those days the town was in easy communication with the sea through Sluys, but many of the *swin*, or creeks, were gradually filled up with sand deposits, and in the XVth century the town's prosperity was

already on the wane. Its actual decay was due to more than a single cause. Although Bruges, Ghent, and several other Flemish towns owned a common lord, they did not fail to exhibit all those petty municipal jealousies which, centuries before, had been so fatal to the cities of the Grecian Archipelago. Bruges was jealous of Ghent, Ghent of Bruges. Bruges was the chief emporium of the cities of the Hanseatic League (formed by European merchants with the design of consolidating their interests in various countries), but the German Hanse there, one of the most important of all, fell to pieces. The traders of Antwerp and Amsterdam, eager to put forward claims of their own, succeeded in getting much of the trade at Bruges into their own hands. In 1488 the people of Bruges were unwise enough to cast into one of their prisons no less a person than the Archduke Maximilian on account of some violation on his part of what they regarded as their prerogative. For this indignity it was not to be supposed that Maximilian would lose any opportunity of inflicting harm upon men who had dared to be his gaolers. Vengeance upon the town was taken in more ways than one. Again, in 1492, the discovery of America turned the attention of traders to other and more distant parts than Bruges with its disappearing harbours. Later, in the XVIIth century, the religious riots which took place all through the Netherlands, succeeded in tearing away from the



Sketches at Bruges and Ghent. By Mr. E. Stanley Mitton.

THE ORDNANCE SURVEY.—The Ordnance Survey have just issued a folding map, to the scale of 1 in. to the mile, of Epping and the neighbourhood. The map has the hills shaded, the rivers are coloured red, the water blue, and the roads brown, with an indication of their character by material.

PERSONAL DECORATIONS.—In the City of London on October 23 Judge Lumley Smith, found for the plaintiff, and awarded him 25l. damages in a suit of an omnibus conductor, who, as he alleged, the negligence of Messrs. Smith & Sons, public decorators. The plaintiff said that on the day after the visit of the King of Spain to the City of London in June he was on duty as an omnibus collecting fares in the service of his duty in Oxford-street, and was seriously injured in the neck by a wire which was attached to one of the garlands or festoons, which the judge held that the decoration in question was hung too low and discarded the claim on behalf of the defendants. The defendant had been pulled down by







height on the new building, which is then allowed to be carried nearly as high again above this cornice. It was almost impossible to make a decent thing of it on such a system. The only way, it seems to us, would have been to have treated the cornice ranging with the existing ones as an intermediate one, and to have dominated it by a very powerful cornice above. Possibly, however, this would not have received official sanction either. Restrictions made in this spirit are evidently not calculated to assist in the improvement of London street architecture.

Up to the cornice just mentioned there are three stories in height, and there is a feeling about this part of the elevation that it has been fortunately kept in subjection by the introduction of the cornice at this level, and the effect of the design for this lower half is more restful than the upper portion, though it is rather difficult to reconcile the introduction of the huge engaged columns which simply carry the shallow balcony just above the cornice on the front elevation towards Pall Mall. This prominent feature has a palpably stuck-on appearance, marking it as a sham, as it does not perform any structural duty, and, not being incorporated with the other features, is manifestly only ornamental. This unfortunate effect still further suffers by the addition of an unshapely protruded stone porch to the main entrance, which is backed against the columns, and gives the impression of having been planted on as an afterthought. Another isolated-looking porch juts out at the corner of the elevation next the adjoining building in Cockspur-street, and timidly marks the entrance to the offices on the upper floors.

As the eye carries upward in the elevation, trying to find some feeling of repose, it is simply dazed at the effect produced by the employment of columns, pilasters, and pediments which have no relationship with the general outline of the building, and the superincumbent features, which are very much broken up, give the impression of overpowering the portion of the elevation below the cornice. The pilasters and pediments framing the nichelike recesses, which are carried through two stories directly above the cornice, and are introduced in groups at the angles of each of the elevations, overlap the simple lines of the main building, and add to the general feeling of restlessness and double design. One cannot help noticing, also, the variety of window design, and the absence of uniformity in the treatment of the sashes.

The sky-line is most incongruous, broken up here and there with shapeless little truncated piers, linked by means of the curved lines of the copings to the pediments in the central portions of the elevations, and curious little pieces of flank parapet walls. The perspective of the structure looking eastward, as seen from the pavement on the south side of Pall Mall, is very undignified in its high-shouldered appearance, and the treatment of the corner to Cockspur-street and Pall Mall does not impress one as being the proper way of getting over the trouble caused by the close angle of the site at this point. More satisfactory solutions of similar troubles may be seen in the new Gaiety Theatre building on the Strand, the National Liberal Club at the bottom of Northumberland-avenue, and the Finsbury Town Hall in Rosebery-avenue.

The idea of obtaining uniformity in the design of the buildings on this island site may be a good one, provided the purpose for which the premises will be used can be controlled, and the designer of the new shopping offices should have carefully studied the very satisfactory and structural manner in which the engaged columns are incorporated in the facade of the Union Club towards Trafalgar Square, and the grand portico to the College of Physicians, before sticking on a columnar feature to the Pall Mall elevation.

One of the most striking features is the stumpy-looking fortification to the areas, with its curiously quaint piers built of granite, to correspond with the plinth of the main building, and the delicately wrought-iron gates to the area in Pall Mall East are worthy of note. The superstructure is built of Portland stone, and the colour effect is very pleasing—only the London atmosphere would be

In conclusion, it seems a great pity that a splendid opportunity of erecting a worthy architectural addition to London street architecture has been missed, and, instead, the site has been saddled with a conglomeration of architectural features which might have been knitted together in a more artistic manner. It would be interesting to find out what first impresses the passer-by in forming a general opinion of the architectural effect of a new building. In considering the new shipping offices, the writer of these notes was forcibly reminded of early days, when the conventional box of bricks was introduced into the nursery to teach the young 'idea' how to build.

#### THE SANITARY INSPECTORS' ASSOCIATION.

THE twenty-second annual general meeting of this Association was held on Saturday night at the Carpenters' Hall under the chairmanship of Mr. I. Brown.

The Report of the Council, read by the Chairman, stated that they were gratified to be able to report that most excellent progress had been made during the year under review. By reason of the fusion of common interests, the centres established under the revised articles have been severally working together for the common good. So far as an organisation could be complete and comprehensive, embracing as it did England and Wales, their Association that day occupied that proud position, and the Council was confident that nothing now remained but for every centre and every member not to be satisfied until every sanitary inspector became enrolled as a member. Today the membership stood at 1,053, allocated as follows:—Midland Centre, 108; Northern, 54; North-Eastern, 133; North Wales, 32; North-Western, 214; South-Eastern, 415; South Wales, 32; and South-Western, 65. This showed a gain on the year's working of over 150 members. They had a large number of members in South Africa and China, etc., but the difficulties of establishing a centre were probably of such a character that some legislation might be necessary. The members, however, might rely on the new central executive applying themselves diligently to the task of securing one organisation of sanitary inspectors for the whole of His Majesty's dominions, if not by amalgamation, then by schemes of federation. It was also anticipated that at the Congress at Blackpool the voice of the Scottish inspectors would be heard in their deliberations. Four Council and twenty-four Committee meetings had been held in the year under review, in addition to many meetings in connexion with the Chadwick Trust award and the Public Health Bill.

If this Bill was to become law it would be absolutely necessary that individual members should show more active interest in it than had been apparent during the past year. The financial position of the Association continued good, and in the capital account the assets over liabilities amounted to 3,340l. 5s. 8d. Having referred to deceased members and to the annual dinner and conference, the Chairman, passing on to the Tenure of Office Bill, said the Council and the British Medical Association Parliamentary Committee were working harmoniously together to get this measure passed. The question of examinations for sanitary inspectors had received very careful consideration by the Council, and correspondence had been entered into with certain examination authorities. The result was not at present in a sufficiently advanced stage to submit to the members but they could rest assured that the Council was fully alive to the necessity for altered conditions, and would press the matter forward for the protection of their members and the safeguarding of the interests of the future. The question of establishing a library and a mutual assurance fund was being dealt with by a Special Committee, who hoped soon to report. The Council again wished to record its appreciation of and sincere thanks to the Carpenters' Company for their continued interest in the work of the Association, and they were also conscious of the great debt of gratitude they owed Sir James Crichton-Browne, their highly esteemed President, for all the labour

he had bestowed in their interests. They had also had the invaluable assistance of the Treasurer and Secretary on all occasions, and, although the work had been heavy, it had at all times been freely and happily performed for their mutual advancement.

The Report was adopted, and various votes of thanks were passed to the retiring officers and Committee.

#### BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A SPECIAL general meeting for the election of pensioners was held on the 31st ult. at 31 and 32, Bedford-street, Strand, by permission of the Master Builders' Association, Mr. Jas. Carmichael in the chair. At the ordinary monthly Committee meeting, held prior to the election, the Secretary (Mr. J. Austin) read a letter from a pensioner retiring from the list of beneficiaries, as she was now able to earn her own living, and therefore no longer required, or was entitled to, her pension. On this it was unanimously resolved to increase the number to be elected from four to five out of the six eligible candidates. Scrutineers having been appointed, the election was proceeded with. On receiving the scrutineers' report, the Chairman read the list of successful candidates as follows:—Mrs. Ball, Mrs. White, Mr. Wall, Mrs. Cole, and Mrs. Chapman. After the usual votes of thanks to those gentlemen who had assisted, the proceedings terminated.

#### THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 9,722l. for electric lighting; Camberwell Borough Council 1,815l. for housing purposes; Fulham Borough Council 25,000l. for electric light installation; Islington Borough Council 4,308l. 4s. 4d. for street lighting purposes (sanction to loan); Lambeth Borough Council 9,827l. for paving works; St. Marylebone Borough Council 90,405l. for electric light installation; and Stepney Borough Council 10,000l. for electric light installation.

**Unemployed Committee.**—It was decided that Lord Elcho and Messrs. J. W. Benn, J. W. Cleland, and W. C. Steadman should represent the Council on the Central Unemployed Body for London.

**School Sites.**—On the recommendation of the Education Committee, it was agreed:—

(a) That the estimates (Nos. 5,202 and 5,220) amounting to 12,678l., submitted by the Finance Committee in respect of the acquisition of (i) the Cutcombe-road site (Camberwell, N.), and (ii) property for enlarging the boys' playground of the Broad-street School (Limehouse), be approved.

(b) That expenditure on capital account not exceeding 12,678l. in respect of the acquisition of (i) the Cutcombe-road site (Camberwell, N.), and (ii) property for enlarging the boys' playground of the Broad-street School (Limehouse), be sanctioned.

**Westminster Improvement.**—The Council resumed the debate on the recommendation of the Improvements Committee that the offer of the Victoria Embankment Contract Syndicate for a lease of ninety-nine years of the whole of the surplus land from the Westminster improvement be accepted on terms already detailed in the *Builder*.

Mr. Straus moved an amendment to insert a proviso to the effect that the acceptance of the offer should not in any way commit the Council to support any application by the syndicate to Parliament for power to acquire the additional property outside the Council's land, or prohibit the Council opposing any such application if deemed necessary.

Mr. Glanville seconded the amendment. Mr. Horniman, the Chairman of the committee, said that if the syndicate acquired the additional land the Council would get Horseferry-road, Marsham-street, and Tufton-street widened without any cost to the rates. Further than that, if the syndicate did not acquire that land by compulsory powers, they would doubtless do so piecemeal, and then they would escape any obligations with reference to rehousing.

Dr. Napier urged that the position the Council should take up should be to say to



the syndicate: "We accept your offer, but we cannot undertake to support your Bill until we have seen it. If it is a reasonable Bill, and if it provides sufficiently for rehousing the working classes and other matters of that kind, we will support it, and we will not be unreasonable in our requirements." If the Council accepted the amendment it seemed to him they would be practically saying to the syndicate: "After the bargain between ourselves is signed you must take all the risks of our opposition with reference to the additional land."

Sir Melvill Beachcroft suggested that the Council should accept the offer without adding any words which would hamper the Council one way or the other.

Dr. Cooper asked the chairman of the committee if behind the recommendation there was any tacit understanding that the Council should not oppose the application of the syndicate for Parliamentary powers, or if the syndicate would drop their offer if the Council did not undertake to support their Bill.

Mr. Horniman said he could not reply definitely. The committee had pressed the syndicate for an answer as to whether they would go on if the Council declined to support their Bill, but no answer had been received.

After further discussion the Council divided—for the amendment, fifty-three; against, sixty.

The amendment was accordingly defeated.

Sir William Collins then moved a further amendment to the effect that the acceptance of the offer should not in any way bind the future action of the Council in reference to the additional land.

Mr. Horniman said he did not see any objection to that amendment.

The amendment was carried by seventy-three votes to forty-one.

Subject to that proviso, the recommendations of the committee were then adopted.

**Fire in the City Mills-building, Upper Thames-street, E.C.**—The Fire Brigade Committee reported as follows:—

"On February 14, 1905, we reported with regard to a fire that had occurred on January 17, 1905, during the early hours of the morning, at the City Mills-building, Upper Thames-street, E.C., and the Building Act Committee submitted a report dealing with the building. We have now to report that on October 5, 1905, at 11.31 a.m., a call was received to another fire in the City Mills-building. The fire was discovered by one of the employees of Spiers & Pond, Ltd., who saw smoke issuing from the hardware depot on the first floor, which is occupied by that company. The fire was confined to brown paper used for packing purposes, and was extinguished by the company's private fire brigade. As a fire occurred in a cupboard in this building on September 20, 1905, and as a fire in the hardware store would have effectively blocked the exit to the staircase, the city coroner deemed it necessary to hold a fire inquest, under the City of London Fire Inquests Act, 1888. The inquest was held on October 24, 1905, when the jury returned a verdict that there was not sufficient evidence to show the cause of the fire, and they added a rider that they were of opinion that the premises should be closed until adequate means of escape in case of fire had been provided."

Mr. Burns, M.P., drew special attention to the report, and said he hoped that the committee would be able to do something in the matter.

Mr. S. Sankey said that the building was undoubtedly dangerous, but had the Council allowed the City Corporation Fire Bill to pass the City would have had power to deal with the building.

Captain Hemphill, Chairman of the Building Act Committee, said that in the London County Council Building Act Amendment Bill the Council will have power to deal with City Mills-building. They had already sent a communication to the owners of the building, pointing out the dangerous state of things and intimating that as soon as the necessary powers can be employed, which will be at the commencement of next year, they would take the necessary steps against the owners. If the London County Council Bill as it left the House of Commons had not been interfered with by the House of Lords it would have been a very useful Bill, and of great importance, whereas its value had been whittled down by the House of Lords.

Mr. E. Smith said that the Corporation Bill would, so far as City Mills-building was concerned, have only aggravated matters. An exit would have had to be formed to the roof, and in the case of fire the persons who "escaped" that way would have been burnt

to death or would have had to jump 60 ft. into the river.

**The Sewer Fatality.**—Mr. Gosling, speaking on behalf of the chairman of the Main Drainage Committee, said he regretted to have to announce that two men had lost their lives owing to a very sudden storm coming on in the northern parts of St. Pancras and Islington, by which they were swept away, and their bodies had not been recovered. The two men formed part of a gang of seven who were working in the Fleet relief sewer, and when the storm-water came down the two failed to get to the next side entrance. It was feared that their bodies had been swept down to the Thames by Blackfriars Bridge, as a lantern belonging to one of them had been found on the foreshore there.

**Tramways: Erection of Midmay-park, Limehouse, and Shoreditch Sub-stations.**—The following recommendations of the Highways Committee were agreed to:—

(i.) That expenditure, on capital account, of sums not exceeding 23,930, in all, be sanctioned in respect of (1) the erection of the Midmay-park, Limehouse, and Shoreditch sub-stations of the London County Council (Northern) Tramways, (2) the wiring and fitting of the buildings for electric lighting, etc., and (3) the execution of the paving works in connection with the Midmay-park and Limehouse sub-stations.

(ii.) That the erection of the Midmay-park, Limehouse, and Shoreditch sub-stations be executed with the drawings and specifications and estimates of 6,700, 6,800, and 6,900, respectively, be referred to the Works Committee for that purpose.

(iii.) That the paving works, etc., in connection with the Midmay-park and Limehouse sub-stations be executed by the Council's permanent way staff under the supervision of the chief officer of tramways.

(iv.) That the wiring and fitting for electric lighting, etc., of the Midmay-park, Limehouse, and Shoreditch sub-stations be executed by the electrical staff of the tramways department under the supervision of the chief officer of tramways.

**The Lowest Tender.**—The Housing of the Working Classes Committee brought up the following report:—

"The Council on August 1, 1905, considered tenders received for the reconstruction of the tramways from North-street, Wandsworth, to Westminster Bridge, and for the execution of paving works, etc., in Nine-elms-lane, York-road, and Battersea-park-road, as follows:—

	Tramway Work.			Paving Works for Street Widening.		
	£	s	d.	£	s	d.
Muirhead, Greig, & Matthews ....	175,548	12	4	35,068	9	7
G. Lavie .....	177,254	19	6	27,370	0	6
W. Griffiths & Co., Ltd. ....	173,880	4	1	30,547	14	2
Dick, Kerr, & Co., Ltd. ....	169,786	8	0	30,483	2	9
J. G. White & Co., Ltd., London ..	163,874	11	2	*35,871	4	8

Engineer's revised estimates .. 165,491 4 10 33,491 14 7 195,262 19 5

The tender of Messrs. J. G. White & Co. for the execution of the tramway work was accepted, and we have since considered the arrangements to be made for the execution of the paving, etc., works. If the tramway work and the paving works were entrusted to different contractors, it would be almost impossible to arrange for the works to be executed in such a way as to cause as little inconvenience to the public as if they were executed by one firm. Moreover, considerable difficulties would arise with regard to the delivery and stacking of the necessary materials, and delay in repaving the roads to traffic would ensue, owing to the impossibility of arranging for the two portions of the work to be synchronous. As the tramway work is carried out under the direction of the Highways Committee, and the paving works under the direction of the Improvements Committee, we have shown how much cost of each work in the tender represents the cost of each work, but it was not the intention when inviting tenders that different portions of the contract should be given to different firms, and no indication was given to the firms tendering that such a course might be adopted. After a careful review of the facts, we think that Messrs. White's tender, which is the lowest for the complete work, is slightly in excess of the lowest tender for that portion of the work. . . .

The committee recommended accordingly, and considerable discussion ensued, during which it was suggested that the lowest or the second lowest tender should be accepted; but, after the defeat of an amendment to refer the matter back, the recommendation of the committee was carried.

Having transacted other business, the Council adjourned.

**WALSALL TOWN HALL.**—In reference to this building, illustrated in our last issue, Mr. Gilbert Seale asks us to mention that the whole of the decorative fibrous plaster work was modelled and executed by him.

## APPLICATIONS UNDER THE 1894 BUILDING ACT

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

### Lines of Frontage and Projections

**Brixton.**—Buildings upon the site of Nos. 117 to 131 (old numbers) of above street. *See plan.* Brixton (Mr. P. Tree for Foster's Institute).—Consent.

**City of London.**—Oriel windows and a projecting balcony at Nos. 2, 3, and 4, Cheapside (Mr. F. Rowntree for The Scottish Temperance Life Assurance Co., Ltd.).—Consent.

**Marylebone, East.**—A projecting balcony at No. 80, Portland-place, St. Mary's. Messrs. Boehmer & Gibbs for Messrs. Matthews, Rogers & Co.).—Consent.

**Strand.**—For deviation from the plan approved for the retention of projecting signs and awnings on Savoy-buildings, Strand, so far as it relates to the sign at the "Wine Lodge" and the erection of an additional lamp at the corner of Carling-lane and Strand (Messrs. T. E. Colclutt & S. Hamp).—Consent.

**Wandsworth.**—Buildings on the front portion of "The Nook" estate, to abut upon Tooting Bec-road, next Tooting-common (Mr. W. C. Poole for Mr. Coates).—Refused.

**City of London.**—An iron and glass shelter at the entrance to De Keyser's Royal Hotel, Victoria-embankment, City (Messrs. J. W. Singer & Sons, Ltd., for De Keyser's Royal Hotel, Ltd.).—Refused.

### Width of Way and Lines of Frontage

**Islington, East.**—A building on a site abutting upon Prush-road, St. Thomas-road, Finsbury-park (Messrs. F. Matcham & Co.).—Refused.

**Chelsea.**—An addition at the western end of Christ Church, Christ Church-street, Chelsea (Mr. E. Geldart for the Rev. J. P. Thompson).—Refused.

### Space at Rear

**Lambeth, North.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of Nos. 8, 9, and 10, Levenham, Lambeth, with irregular open space at the rear (Mr. W. H. Rogers).—Consent.

**Means of Escape from top of High Buildings.**

**Holborn.**—A deviation from the drawings

approved in respect of the means of escape in case of fire proposed to be provided on the fifth (top) story of Nos. 118-122, Holborn, Mr. J. Sawyer for Messrs. A. W. Gamage, Ltd.).—Consent.

### Buildings for the Supply of Electricity

**Paddington, North.**—A sub-station on the southern side of Randolph-mews, Paddington-road, Paddington (Mr. S. H. Highfield for the Metropolitan Electric Supply Co., Ltd.).—Consent.

### Cubical Extent and Construction

**St. Pancras, West.**—The retention of a building to be used as a motor garage at the premises of the London Motor Omnibus Co., Ltd., Albany House, Albany-street, St. Pancras (the London Motor Omnibus Co., Ltd.).—Refused.

### Formation of Street

**Woolwich.**—That an order be issued to Messrs. F. C. Heneasy and S. A. Douglas relating to the sanction the formation or laying-out of a new street for foot traffic only at the rear of houses on the east side of Godfrey-street, Woolwich.—Refused.

The recommendations marked \* are contrary to the views of the local authority.

## ANCIENT FONT, DOLTON CHURCH, DEVON.

THIS curious example of a font division, made from portions of an ancient cross, of Celtic character, is in Dolton Church, Devon. The work itself must date back to the VIIIth or VIIIth century, but as to its provenance, and when and by whom the fragments came to be put together in their present pose, it would be useless to speculate. The illustrations are from drawings by Mr. Sidney Heath, of Weymouth.

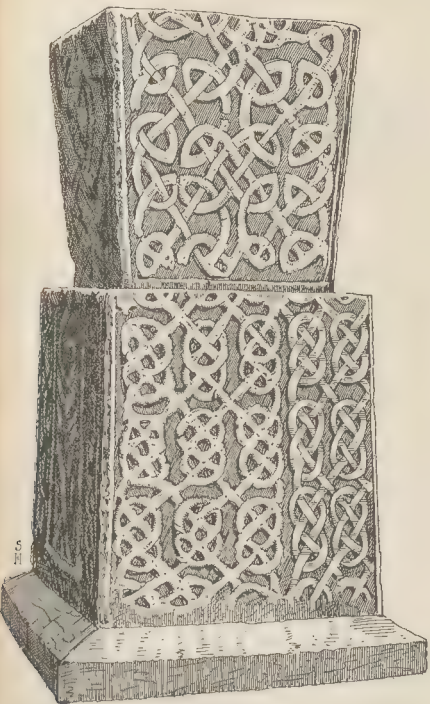




East Side.



West Side.



North Side.



South Side.



THE ARCHITECTURAL ASSOCIATION  
DISCUSSION SECTION.

A MEETING of the Discussion Section of the Architectural Association was held at 18, Tufton-street, Westminster, on Wednesday, October 25, at 7.30, when Messrs. Waring and Wainwright read combined papers on "Lead Lights and Casements."

Mr. H. F. Waring's paper on "Lead Lights" was briefly as follows:—

"The glass most commonly used is 21 oz., of various qualities—15 oz. in cheap work, where panes are small in size, and 32 oz., in important glazing in large panes, being also used. If an exceptionally clear glass is required, patent plate—i.e., thick sheet, ground and polished—is the most satisfactory. Besides these clear glasses, others may be used where the outlook is unimportant—such as crown, antique, ambettis, and of these the crown gives a very brilliant effect from the outside. Crown glass is made by blowing large bubbles, which are then cut and flattened, the part which was attached to the blow-pipe giving the bottle-end so noticeable in old glazing. As British-made glass is, on the whole, the better, it might more often be specified, if only for the benefit of home trade.

Modern glazing has usually too narrow comes; of course, the width depends largely on the size of the pane, but for one 7 by 5 the lead should not be less than  $\frac{1}{2}$  in., while for larger sizes  $\frac{3}{4}$  in. may well be used.

The squares of glass, being cut to size, are glazed into the lead comes and cemented. This process consists of pressing "mastic," a solution of red lead, whitening mastic, and putty, into the light, and rubbing it well into the joints with a hard brush. When set the light is cleaned down, and the leads usually blackleaded. Much depends on the cementing for the efficiency of the light, and, in inferior or low-priced work, it is very commonly this item which is scamped; liquid plaster, swilled over the light, being substituted.

In setting out the squares, should the light be long in proportion to the height, it is advisable to have panes of somewhat similar proportion, and the squarer the light the squarer also should be the pane.

Where a fixed light adjoins an opening casement, the question arises—should the lines be set out independently, or should the leads range through the two windows? In old work, the former was the general rule, and it certainly seems the better for domestic work. It is, however, a question if this applies to public buildings, where dignity and continuity are essential.

Saddle-bars are usually  $\frac{1}{2}$  in. or  $\frac{3}{4}$  in. round, preferably at every two panes in height, the light being attached by copper or lead bands fixed to the lead came. A square or flat bar is better, not merely for strength, but for appearance.

Leads with a steel core have been introduced, but hardly seem to give as pleasant an effect as the saddle-bar. Many forms of strengthening bars of iron, fixed into or on the came, can be advantageously used in large lights.

Ornament in domestic work has been abused and brought into disfavour, but small heraldic devices in richly-painted glasses are most decorative. Such glazing as is to be found in some of Mr. Norman Shaw's houses, and in old country mansions, is surely a veritable treat, and, in moderation, would not prove costly."

Mr. Wainwright then followed with a paper on "Casements."

"The advantages gained by metal casements over wood are lightness and strength, less obstruction to daylight, and greater ease in working. They are also much superior in weather tightness, but cost considerably more, probably about double. The cost quoted by makers covers painting (two coats) and delivery to nearest station. The makers also quote specially for fixing, and it is advisable that they should do so, as fixing is an important point.

Section No. 1 is one of the lowest in price, and is much used; it should be fairly well recessed, and is most suitable for cottage use. As the working frame is hung from the jamb or mullion, it is best that it should be used in wood frames rather than stone, where a great deal of drilling and plugging would be needed. Another, but more costly, form

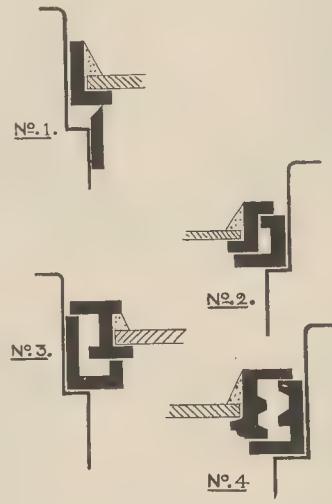
of this casement has a flat 14-in. by 8-in. working frame with welded corners, the leaded lights being fixed on the face. This requires very strong hangings, which have to be let into the stone. Unless the casement is deeply recessed, there is thus great risk of the stone breaking away on the face.

Section No. 2 is one where the two frames are hung together, fixed by screws to hold it securely in the opening. It can safely be used in exposed positions, but is not safe in sizes over 3 ft. 6 in. to 4 ft. in height and 2 ft. wide.

Section No. 3 can be made up to 5 ft. in height, and No. 4 in larger sizes.

Somewhat similar sections are used for casements opening inwards, but, as a rule, are more difficult to keep weather-tight. The question of cleaning, especially to upper-floor windows, is a difficulty in connexion with casements opening out. Numerous patents have been introduced, chiefly of complex character; a much simpler way is to hang a few of the opening casements at top and bottom, instead of side; the arm can then be passed through on either side to the adjoining casements.

Where transoms lights are used they are made to hinge at top or bottom or to swing on centres. In the latter form they are specially useful in schools, but in domestic



work this interferes with the blind; if pivoted at a third, or less, distance down the light this objection is minimised. Casements hung from the top are specially suitable for cottage work, an ordinary stay-bar being used. For windows at a greater height screw or rod-gearing must be used. Large windows for workshops and factories are built up of 14-in. moulded-steel sash-bars, up to 60 ft. or 70 ft. super. These large windows are usually fixed by building into the work.

Another variation is the hospital window, where absence of ledges and ventilation without draught are essentials.

In important work, especially where frequent painting is undesirable, bronze casements are used."

The lecturer then shortly described the process of building up casements with mitred and brazed corners and the methods of producing the various channel sections used in their construction.

Both papers were illustrated by drawings and examples of leaded lights, casements, and fittings, and a demonstration given of the production of lead comes from the cast-lead strips.

The discussion was opened by Mr. A. C. Dickie, and continued by Messrs. Gregory Collins, Wonnacott, Prest, Pearson, Belcher, Whiteside, and Jefferson.

Among the various points raised by the speakers was the wisdom of using severe and geometric forms in design, and special appreciation was given to Messrs. Balfour

& Turner's church in Davies-street in this particular. A recent reprint of a XVth-century design-book, suitable for gardens and not impertinent for glaziers, was commended. A general agreement was that the workmanship in cementing and wiring of saddle-bars was all-important.

Mr. C. F. A. Voysey, the Special Visitor, said that his preference for iron casements and lead lights arose from modern requirements, as he did not consider wood casements suitable for our somewhat dirty and misty climate. Glass was to be lived with, not necessarily to be looked through. Touching on practical points, Mr. Voysey said the pins of hinges should be easily movable, and he liked long-arm stay-fasteners.

Casements should not be set back more than 24 in. from face of stonework, where latter was of square section; in fact, 2 in. enough in very hard stones; where this could be safely done casements should be fixed by maker. Wide leads and saddle-bars were preferable, and the latter were better if square in section.

Messrs. Waring and Wainwright very briefly replied. Votes of thanks to the authors and Mr. Voysey were passed by acclamation. The Chairman, Mr. E. W. M. Wonnacott, stated that the paper on November 8 would be on "Libraries." The meeting then terminated.

## ARCHITECTURAL SOCIETIES

**MANCHESTER SOCIETY OF ARCHITECTS.**—The second meeting of the students of the Manchester Society of Architects was presided over by Mr. E. Hewitt, F.R.I.B.A., when Mr. G. Goldsmith read a paper entitled "The Design of Small Libraries." The lecture was illustrated by several sketch designs of the latest methods of setting out libraries. Only one of the designs in question showed lavatory accommodation for the public, and this was deprecated by the lecturer, who thought that it was too liable to abuse. In the debate which followed this question was discussed, with the result that accommodation was thought very advisable if sufficiently under supervision. One strong point was that lavatory accommodation would encourage the public to wash their hands and thus preserve the books.

**NORTHERN ARCHITECTURAL ASSOCIATION.**—The following is the list of Council and officers appointed for the ensuing season: President—Mr. J. T. Cockett; Vice-President—Mr. G. T. Brown; Hon. Treasurer—Mr. R. Burns Dick; Hon. Secretary—Mr. A. B. Plummer (13, Grey-street, Newcastle-on-Tyne); Hon. Solicitor—Mr. H. C. Harvey; Hon. Librarian—Mr. H. C. Charleswood; Assistant Secretary—Mr. W. A. Chamberlin; Council—Messrs. H. G. Badenoch, H. Barnes (Hon. Local Secretary for Harlepool), J. Bruce, F. Clark (Hon. Local Secretary for Darlington), J. W. Dyson, G. S. Errington, J. H. Morton (Hon. Local Secretary for South Shields), J. Oswald, F. Rich, J. Spain (Hon. Local Secretary for Sunderland), J. W. Taylor (ex-President), J. W. Boyd, M. G. Martinson, A. K. Tasker, R. P. S. Twizell, and H. A. Wilson.

**GLASGOW INSTITUTE OF ARCHITECTS.**—The usual quarterly meeting of this Institute was held on the 25th ult. at 115, St. Vincent-street. The President, Mr. Kippie, referred to the death of two of the members, viz. Messrs. William Kerr and Robert Turnbull, and it was agreed to place on the minutes expressions of deep regret. Messrs. James H. Craigie, St. Vincent-street, and D. Bannet Dobson, West George-street, were elected members of the Institute. The secretary reported, regarding the finding of the Committee on the Royal Infirmary Reconstruction Scheme as to a resolution passed by the Master Masons' Association protesting against the proposal to use terra-cotta blocks, instead of stone, in reconstructing the Royal Infirmary, that the Committee were not prepared to approach the Royal Infirmary Board by deputations or otherwise regarding the material for the walls of the proposed buildings, but it was considered advisable from the point of view of the amenity of the building that any frontage to Cathedral-gate should be faced with stone. The result of a reference on "subcontractors" was reported to the meeting, viz. that the names of the contractors should be disclosed in the



schedules of tender when one contractor is asked to offer for all departments of the work and where he does not carry on these wholly by workmen in his own employment. Messrs. James Lindsay and A. N. Paterson were appointed representatives to Haldane's Trust for five years, and Messrs. James Lindsay and Thomas Baird, jun., were appointed adjudicators for the prize given by the Institute to the Technical College.

#### ARCHÆOLOGICAL SOCIETIES.

**BRISTOL SOCIETY OF ANTIQUARIES.**—The members of this Society had an old Bristol ramble on Saturday last week. They visited Red Lodge first, where Mr. A. W. Little read a paper dealing with the history of the Carmelite Priory, which explained the site of the Convent buildings. The present Red Lodge was erected for Sir John Young in 1590, on the site of some of the buildings which he had purchased from the Corporation. The present entrance to the mansion is not the original one, which is situated at the south side overlooking the yard, and a passage leads to the hall. On either side of the staircase are panelled rooms and kitchens, and in the cellar is a short underground passage, containing four cells. Each cell has a door with a small iron grating, by which the occupant could be seen or communicated with. The grating was also the only means of ventilation. These cells are supposed to have been used for refractory monks. It is not certain whether these are part of the original Carmelite Priory. Ascending this staircase, the visitors were shown into what must have been the best room of the mansion, an apartment of stately proportions. Here Mr. Little read his paper, and much admiration for this lovely room was expressed. The walls were panelled, each panel being treated with a beautiful carving representing an arch. The ceiling was also a fine specimen. The fireplace was one of magnificence, both in proportion and decoration, being of carved stone. There were carvings representing Greek mythology, the arms of the builder being displayed on a shield standing out in bold relief from the centre of the upper portion. The porch was a mass of rich carving, the upper part supported on Corinthian columns of carved oak. Miss Langabeir, the matron, explained the different points of interest. Other rooms on the same floor had carved panels. At St. Mark's, or the Mayor's Chapel, the party were to have been guided by Alderman Barker, but he could not attend through illness, and the task devolved upon Mr. C. E. D. Southflower, Vice-President, who read Mr. Barker's paper. It was seen that the church and hospital of St. Mark were originally of considerable importance and dimensions, the grounds reaching up to and adjoining the Carmelite grounds. The boundary wall still exists in Frogmore-street, where a niche is still to be seen, together with a carved figure in stone representing a winged lion, a portion only remaining. The paper dealt with the many changes and alterations that have taken place. Some of the nave dated from 1230, part from the south aisle 1265, the tower 1487, the choir 1500. The great restoration of 1889 covered many unsightly objects from the building, which were lath and plaster erections, and the new north transept was then erected. It was pleasant to note that the old Mayor's Chapel, upon which the evil influence had fastened itself, was now in such a perfect condition, within and without, that it should last for centuries to come. The Red Lodge School was the next place visited, and when the party had reached the dining-room, Mr. A. W. Little read a paper dealing with the history and foundation and the traditions of the founder of the institution. The stone chimney-piece was removed from the residence of the founder, Alderman John Whitson, in Nicholas-street, and bears the date 1628 and the founder's arms.—*Western Daily Press.*

**NEWCASTLE SOCIETY OF ANTIQUARIES.**—A meeting of the Newcastle Society of Antiquaries was held on the 25th ult. at the Castle. Dr. Thomas Hodgkin, F.S.A., presided. Mr. Blair (Secretary) read a letter from Mr. R. A. Filby, announcing the discovery of an ancient British grave at Hildesheim. A memoir of the late Mr. Charles Spence, a Vice-President of the

Society, by Dr. Thomas Hodgkin, was read. It was agreed, on the motion of Dr. Hodgkin, seconded by Mr. R. C. Clepham, that a letter of condolence should be sent to Mr. Spence's family. Mr. Knowles referred to the Black Gate excavations. Some months ago, he said, they determined to remove the buildings on the north side of the Black Gate, and to spend 150l. in the opening out of certain features. They had opened out certain features on the north side—the arrow slits, which had been built up, and certain pockets receiving timbers for hoarding. They had opened out an archway, which no doubt formed a passage to the moat. Within the Gate they had been most successful, and had discovered an ancient piece of wall which was quite unique. The keep was erected in 1170, and the Black Gate was erected some three-quarters of a century later. They had opened out the Heron pit. Mr. F. W. Dendy said it was one of the most interesting bits of architecture that could be dealt with in Newcastle, and it was of as much interest to the citizens as it was to the Antiquaries. Giving the derivation of the name Heron pit, or prison, he mentioned that a sheriff at the Castle was called William Heron. They had built a shed to contain their altars, and they wanted to make a complete job of it.—The meeting recommended that the excavations should be continued, and pledged itself to do its best to raise the necessary funds; and the meeting approved of a suggestion that a meeting of inspection should be held on November 29, at which all interested in the subject should be invited to be present.—Mr. A. Meek, of the Armstrong College, Newcastle, read a paper on "The History of Fisheries in Northumberland," and Mr. John Robinson read a note on a British camp discovered at Grindon Hill, Sunderland. The site of the camp, he said, was near Grindon race-course, about two miles from Sunderland. The geological formation was sand, and recently the place had been used as a sand quarry. The workmen had made a perpendicular face in the sand, and had brought to light an ancient British barrow, and unearthed several skeletons buried in regular order. Close to the barrow Mr. Robinson saw the well-defined outline of an ancient British camp. The barrow was on the east side of the camp.

#### METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of the Metropolitan Asylums Board was held at the offices, Victoria Embankment, on Saturday last week.

**North-Western Hospital.**—The Hospitals Committee submitted a scheme prepared by the Engineer-in-Chief for the utilisation of the exhaust steam for the purpose of heating certain portions of this hospital. The scheme was referred to the Works Committee.

**Darent Ash Asylum.**—On the recommendation of the Works Committee, the plans prepared by the Engineer-in-Chief showing the proposed alterations in the laundry of the Training School at Darent Ash Asylum were approved and adopted. The estimated cost is 2,300l. Plans for a new fire-station and new industrial workshops at the same asylum were also approved of, the estimated cost of these being 6,700l.

**Leavesden Asylum.**—Plans were approved of four iron bridges to be erected between the various blocks of this asylum at a cost of some 5,000l.

**OPEN SPACES : PROVINCIAL.**—In the course of her address to a meeting held in Liverpool Town Hall on October 18, Miss Octavia Hill stated that of the required amount, 12,000l., for the purchase and preservation of Ayr Tor and Gowybarrow, on Ullswater Lake, the sum hitherto secured is 9,300l., and that the portion of purchase will cease at the close of the current year.—At the last monthly meeting of the Hills Conservators, held at Great Malvern, Mr. R. W. Raper, a member of the Council of the National Trust, offered to transfer to the conservators the rights he bought last year to quarry stone on the Herefordshire Beacon or British Camp, in order to prevent its further disfigurement. Mr. Raper's generous offer was accepted, with the result that whilst the conservators will not acquire a right of quarrying for themselves, the deed of conveyance will bind them to prevent any quarrying on that part of Camp Hill in the future. The Hills Act of 1884 reserves all right to the gravel and stone to the lords of manors and owners of the soil, and until Mr. Raper's recent purchase that right has been exerted, to the injury of the natural and archaeological features of the land.

#### Correspondence.

##### THE HOVE COMPETITION.

SIR.—The incidents relative to the above-named competition are too well known to need recapitulating.

We do not feel that, in asking you to publish this letter, we are desirous of airing the stereotyped unsuccessful competitor's grievance—it is in the "nature of things" that a considerable number of competitors in an open competition must be unsuccessful, and "beatings" under such circumstances can be taken in a philosophic spirit and interest be felt in the selected designs.

This case is, however, entirely different, in that the whole of the competitors (and we believe there were seventy-one) are finally left stranded on a dead level and quite in the dark as to any valid reasons for the unprecedented position taken up by the assessor.

Judging by the facts so far as they are at present made public, the "Town Council of Hove" may well feel that they have grounds for complaint also.

In the first instance, their scheme of competition was blackballed by the R.I.B.A. owing to the want of a satisfactory undertaking as to an assessor, whereupon the President of the Institute was apparently appointed to act in that position.

The state of the case at this date is that, after the R.I.B.A.'s views have been accepted, the competition has been abortive, the designs being condemned *in toto*, and, so far as the competitors are aware, no advice has been given to the Council as to the proper determination of their pledges contained in the "Conditions of Competition."

As to the competitors, the result is at present to the last degree unreasonable; the designs have been one and all branded as beneath a choice.

There cannot be any doubt that such a result must be as eminently unsatisfactory to the Council as to the competitors. The latter recognise that pledges have been given for the payment of three premiums and a public exhibition of the designs at least, and the former are in the same position as regards the design for the proposed library as before the appointment of an assessor.

We consider that the event will have a damaging effect upon the status of the Institute in the eyes of the profession generally, and more particularly in the eyes of the public, and that as the Institute intervened in the early stage of the competition, so it should also take such steps as may be necessary to ensure a satisfactory issue.

We have refrained from expressing our views for some weeks, hoping that some further statement would be forthcoming from the assessor in explanation of the extremely short and curt note that has so far been communicated to the competitors, and that a settlement would have been arrived at ere this.

We desire to protest most strongly against the assessment of this competition.

J. E. DIXON-SPAIN, A.R.I.B.A.  
CHAS. NICOLAS, A.R.I.B.A.

\*\* We believe the real explanation of the judgment is that all the best designs had infringed the Conditions or Instructions, and were therefore technically ineligible. We have no authority to say this, but that is what we gather from what has reached us. Without undertaking to judge the present question, we may say that we think adherence to the letter of the Instructions is an exceedingly important and even crucial point in reference to the settlement of a competition. An assessor is bound, in our opinion, to eliminate designs which do not conform to the Instructions, which is often far too much laxity on this point.—Ed.

##### SCALE IN BOILERS.

SIR.—With reference to your correspondent's description of an indirect heating apparatus from a range boiler, it would be interesting if he would give particulars of the amount of fuel consumed and the time required to raise the stated quantity of water to the given temperature.

It is mentioned that 68 gallons of water were drawn, starting at 184° and finishing at 117°. The mean temperature of this water is built was therefore 150°, and with the requisite quantity of cold added in order to reduce it to a suitable temperature for bathing purposes, say 105°, the total would only amount to 93 gallons.

To make myself clear, I might state that 25 gallons water at 50°, added to 68 gallons at 150°, would yield 93 gallons at 120°, the difference of 15° being provided for loss of heat in drawing, as this would be found to happen in cold weather.

In other words, it is necessary to run water from a tap at 120° to obtain a hot bath at 105°, and as there are only 93 gallons at this temperature available, not more than three baths of 30 gallons could be given instead of seven, for which 210 gallons water would be needed.

It is found in practice, with plant of this kind, that particular attention should be given to the regulation of the damper, in order to keep the primary water below 212°, thus avoiding waste by boiling it away in steam. With indirect installations it is usual to allow 50 per cent. more



for fuel consumption than with direct ditto, which is a continuous expense, although your correspondent suggests that the only additional outlay is that of the water-jacketed cylinder. Taking into consideration, however, that with the ordinary range boiler the amount of fuel consumed is out of all proportion to the results obtained, which extravagance is increased when adopting the indirect principle, the latter is not recommended except in extreme cases.

Incrustation in boilers and pipes is preventable to a large extent by the use of 2-in. primary circulations, which allow a free and slow movement through the apparatus.

When small pipes are used on more or less powerful boilers the circulation is retarded and consequently the water boils unnecessarily, forming far more deposit than would otherwise be the case.

THOMAS POTTERTON.

SIR,—Referring to Mr. Goold's letter in your issue of October 28, I beg to call your attention to the fact that the idea contained in his letter is covered by my Patent No. 24,760—'04, which you favourably reviewed a few months ago.

R. W. BOYD.  
(ALEX. BOYD & SON.)

#### SAND PERCOLATING INTO A WELL.

SIR,—What is the best method of adopting to prevent finely-divided sandy matter from percolating into a well? In the Bagshot beds a well of 7 ft. in diameter has been sunk to a depth of 100 ft. The water, of which there appears to be a sufficient quantity, is drawn up by a windmill, but the presence of fine sand renders it turbid, and the sand cuts out the plungers of the pumps. The deepening of the well to a strata where the difficulty would not arise is out of the question, as the Bagshot beds extend probably several hundred feet below.

Would a well with a diameter of, say, 15 ft. minimise or overcome the difficulty, by reducing the disturbance caused by pumping, and is there anything that can be applied to the existing well to cure the evil?

The maximum amount of water required is 40,000 gallons per diem. E. S. C.

#### Fifty Years Ago.

From THE Builder of NOVEMBER 3, 1855.

#### THE WATER SUPPLY OF THE LONDON POOR.

In addition to the notes on this subject already given, it may be worth while to mention that, notwithstanding the great benefit caused by the water supply in certain districts, still the scarcity is very great. This is caused by the short time, sometimes only half or three-quarters of an hour per day, during which the water is allowed to run amongst a multitude of people from a single pipe. The butts and cisterns have been either done away with or have never been fixed; so that the poor can only catch water in the insufficient vessels which their miserable homes contain. We believe that amongst the middle and upper classes, where the water supply is adequate, very little water is wasted; and after careful inquiry into the matter amongst many sections of the London poor, the sanitary officers of police, and others, we have a strong conviction that if the poor of the metropolis were furnished with taps of water from the main fixed at convenient places they would be greatly benefited, and the quantity of water which runs to waste in the present arrangement would be lessened.

At any rate, it is necessary that a sufficient quantity of water should be at hand in crowded neighbourhoods for at least three hours in the morning and three hours in the evening of every day.

In many instances the landlords of the unwholesome houses in which the poor live—if it can be so called—pay, instead of for one water service for each house, for one service for three or four houses. This is not just either to the water companies or to the tenants.

A JOULE MEMORIAL, SALE.—Dr. Joule, the Manchester physicist who discovered the mechanical equivalent of heat, spent the last years of his life at Sale. This circumstance has been recognised by the erection of a Joule memorial in the Sale Park and Recreation Ground. The memorial is a bust (executed by Mr. John Cassidy, of Manchester) placed upon a high pedestal in the centre of the park. The pedestal bears the name "Joule" and the dates "1818-1889."



Angle Bracket, Messrs. Waring's Premises.

#### Illustrations.

##### MESSRS. WARING'S PREMISES, OXFORD-STREET.



WE have devoted our plates this week to an illustration of the immense block of building which has been erected in Oxford-street for Messrs. Waring, from the designs of Mr. R. F. Atkinson.

As an addition to London street architecture it is a remarkable building; it is a pity that its bright colour effect of red brick and white stone must before long be dimmed and to a great extent lost. The design shows perhaps a rather too florid style of carved ornament, and we should have preferred to have seen the cornice carried right through instead of being stopped for the central feature. But as a whole it is a bold and striking piece of work, a credit to its architect and to the eminent firm of decorators for whom it has been built.



Lead Waste-Water Head, Messrs. Waring's Premises. Made by Messrs. Geo. Wragge, Ltd.

We give in the text an illustration of the carved bracket which carries the angle bar, and also of one of the huge lead spout heads made by Messrs. G. Wragge. The height of this is 4 ft. 6 in. and the weight about 6½ cwt.; the side and front were cast in one piece and most of the ornament undercut. Rolled iron joists are built into the wall to carry the bends, and pockets inside the heads to receive the joists.

Grey Kenney granite has been used for the ground floor story all round the building, the upper portions being in white Portland stone, with T.L.B. rubbers of a dark cherry colour for the main front, and Fowler's thin red bricks for the side streets. The roofs are slated with green Westwoodland slates, the windows being all filled in with sashes and frames, the first floor windows being casements and all painted white.

The interior of the building has been specially arranged to suit the business of Messrs. Waring, and is planned on a broad basis consistent with the London County Council's requirements. The floors throughout are of reinforced concrete on the "Columbian" system, as also are the roofs and vaults round the whole building. The constructional steelwork is so arranged that the whole weight of the floors is carried on stanchions, thus relieving the brickwork of any actual weight. The whole building is heated on the low pressure hot-water system, and the interior plumbing work will form a special feature.

#### COMPETITIONS.

CENTRAL LIBRARY FOR ST. PANCRAS.—On Monday the Public Libraries Committee of St. Pancras reported having received a letter from the President of the Royal Institute of British Architects, in reply to the communication addressed to him by instruction of the Borough Council, stating that he will be pleased to act as assessor in the competition for the designs for the Central Public Library in the Prince of Wales's-road, and to nominate six architects to submit designs, it being understood that it shall be left to him to draw up the necessary conditions for the competition. The President went on to state that, if the municipal authority would inform him the amount it was proposed to spend on the library, he would name his fee. The Committee have decided to reply that it was intended to spend 20,000, on the building.

LIBRARY, CHESHAM.—In the competition for Chesham Public Library the first premiated design was by Mr. J. W. Smith, 8, Trafalgar-square, Chelsea; the second by Mr. Ernest A. Sudbury, Newcastle-chambers, Nottingham; and the third by Mr. Richard Wyke, Victoria-works, 36, West-street, Gateshead.



BOOKS RECEIVED.

REMENTARY ELECTRICAL ENGINEERING. By H. Alexander, M.B., A.I.E.E. (Crosby Lockwood & Son.)  
OLD AND NEW ARCHITECTURE IN KHIVA, BUKHARA, AND TURKESSTAN.—By O. Olufsen. Copenhagen: Gyldendalske Boghandel. London: Thomas Telford. 15s.)  
KNIGHT'S ANNOTATED MODEL BYELAWS. Seventh Edition. Edited and Revised by L. Casson. (Knight & Co.)  
PRACTICAL BRICKWORK. By Paul N. Hailock. (Cassell & Co.)

TRADE CATALOGUE.

Messrs. CARRICK & RITCHIE, of Edinburgh, send us their catalogue of turbines, water wheels, and water-motors, a pamphlet which is of distinct interest in view of the increasing employment of water as a source of power for the generation of electricity and the operation of pumps and other machinery. Reference to the list of users printed on p. 37 serves to indicate how varied are the uses to which the turbines of this firm have been applied; but, of course, the extent of the industry could only be gauged approximately by considering the number of similar appliances turned out by various other makers in this country. In the earlier pages of the catalogue full particulars are given of mixed-flow turbines for low and medium falls up to 80 ft., and in a special form of construction for falls up to 200 ft. in height; also of impulse turbines of the partial reaction type, particularly suitable for high falls and places where considerable variations of the water supply occur. Open and closed water-wheels on the well-known Pelton principle are described in detail, illustrations being given of such motors ranging from several hundred horse-power down to 0.03 horse-power. Tables stating powers, and prices of the machines form a useful feature of the catalogue, in which the reader will also find information relative to auxiliary apparatus, such as machine governors, sluice valves, and pipes, as well as some practical hints on the installation of water-power plant.

The Student's Column.

STEAM BOILERS AND PIPES.—XVIII. CHIMNEYS (concluded).

IN this, the final article on chimney design, we give a few notes which embody the chief points connected with the building of chimneys on the practical standard. The æsthetic aspect of the question does not come within the scope of the present series of articles.

The Construction of Brick Chimneys.

Originally the foundation for a chimney was which should always be independent of adjacent buildings, is the first and most important detail for consideration, for upon its stability and freedom from unequal settlement depends the security of the entire structure.

On the earth, or rock, upon which the foundation bed is formed, should be firm and dry, and, after the bearing-power of the soil has been tested, careful calculation of the total weight to be supported should be made so that the weight per square foot may be kept within perfectly safe limits. Inquiry should also be made with the object of ascertaining whether the bearing-power of the soil is likely to become impaired by the movement or removal of underground water, both of these being fertile sources of after-trouble.

It is not always possible to avoid building a chimney upon an undesirable site, owing to the previously selected position of the factory or other establishment to be served. In such cases chimneys often have to be erected on the banks of rivers, and upon earth consisting of alluvial material and made loose. In such cases it may be necessary to excavate to a depth of 30 ft. or more in order that firm clay, hard sand, or solid rock may be reached. Sometimes piling may be adopted with advantage, but where unstable soil exists for any great depth below the surface it is far

safer to sink cylinder foundations down to rock or other solid stratum. For full particulars relative to foundation-work the reader is referred to the many excellent treatises on masonry and building construction, published in this country and the United States.

As a general rule, the foundation for a brick chimney should be completed at least one month before the superstructure is commenced, thus allowing time for the concrete slab and the overlying courses of brickwork to harden thoroughly.

The best time to start building is in the early months of summer, so that the entire structure can be completed without interruption and at an easy rate before winter sets in.

A very desirable stipulation to make is that the height built daily shall not exceed 6 ft. In fact, some engineers limit the rate of progress to from 3 ft. to 5 ft. a day.

When a chimney is built too rapidly, and especially when too much mortar is used in the bed-joints, pressure of the wind is very apt to bend the work over towards the leeward side, the deformation so caused being permanent, as moist mortar has practically no elasticity. For this reason no more mortar should be used than is absolutely necessary.

The most satisfactory mortar for the chimney-shell is composed of good lime and clean sand, mixed in the proportions of one part of lime to three parts of sand. Cement mortar is unsuitable owing to its deterioration under the influence of high temperatures, but may be usefully applied in building a few of the courses near the top. Grouting is not to be recommended in any part of the structure.

In boiler chimneys the longitudinal tenacity resisting any forces tending to split the brickwork is of greater importance than transverse tenacity. Hence, there should be three or four courses of stretchers to one course of headers. An undesirable practice, sometimes followed for the sake of appearance, is to adopt a uniform bond for the outer courses of brickwork. The architect should always remember that strength is the first requisite in chimney construction.

Brick chimneys are often reinforced by the addition of steel bands in the bed-joints at vertical intervals of from 3 ft. to 5 ft. Such bands may be of 4-in. by 4-in. flat bars, turned down at the ends into the vertical joints, or of 3-in. by 3-in. angle bars, with a continuous circumference. This is good practice when the walls are more than two bricks thick. Care should be taken to guard against corrosion of the metal by a coat of tar sand or Portland cement grout.

Practice varies considerably with regard to the interior fire-brick lining of chimneys. It is not necessary to carry the lining to more than half the height in the case of chimneys less than 100 ft. high or to more than about 75 ft. in the case of higher chimneys. But the lining is frequently built up to the chimney-top, either parallel or with a slight batter, thus leaving an annular air-space between the outer shell and the inner core wall.

Some engineers consider it well to dispense with the air-space when the lining is not carried to the top, on the ground that the difference of temperature of the portions of the chimney above and below the top of the air-space renders the masonry liable to fracture at the junction.

Care should always be taken to prevent the flue gases from gaining access to the space between the lining and the outer shell. Otherwise it is not impossible that damage may be caused by the ignition of explosive mixtures of air and inflammable gases. This risk may be guarded against by the provision of ventilation-holes in the outer shell.

When the lining is only built part of the way up the chimney the interior of the main shaft should be corbelled over the top of the fire-brick lining, so as to prevent the admission of soot and flue-dust to the annular space.

Many modern chimneys in the United States are provided with linings taken up to the cap, the fire-brick being built in steps of varying thickness, and stayed by brackets projecting at suitable intervals from the outer shell.

The lining should be perfectly independent of the main-shaft, so that it may be free

to expand and contract in accordance with temperature variations.

For the purpose of affording access to the chimney and main flue, an arched opening should be formed in the base of the structure, the most suitable position being opposite the flue arch.

If more than one flue enters the chimney a partition-wall should be built from the bottom to a height equal to at least double the height of the flue. Neglect of this precaution will lead to serious diminution of draught, and in the event of one current being more powerful than the other—which is almost certain to occur—the stronger of the two will seriously retard, and may obliterate, the weaker. In chimneys where a division wall is necessary, two access openings have to be constructed, one at each side of the partition.

The access opening, or openings, may be closed (1) by tightly-fitting double doors of iron or steel, (2) by a thin partition-wall of fire-brick, in continuation of the inner core-wall, and an iron door near the outer surface of the main-shaft, or (3) by filling the opening with two walls, the inner of fire-brick and the outer of ordinary brick. The first of these alternatives is not to be recommended, owing to the difficulty of insuring an airtight joint and the liability of metal to destruction from contact of flame or highly-heated gases. Of the others, the second is the more convenient, because the arch can be opened and reclosed with a minimum amount of trouble and expense, while furnishing a satisfactory guarantee against air leakage.

Provision for access at the foot of the chimney is useful for the purpose of warming up the interior column of air by means of a wood fire when lighting the boiler fires for the first time, or when lighting the fires after the chimney and flues have become cold and damp in consequence of interrupted use in case of repairs or alterations. Means of access are also of convenience in connexion with draught experiments, which are of much value in enabling the architect, or engineer, to compare the efficiency of the chimney from time to time, and to detect air leakage and other causes affecting the efficiency of the boiler plant as a whole.

In the design of chimney caps, the architect has considerable scope for effective treatment, and, at the same time, for the adoption of forms calculated to facilitate the discharge of smoke during the prevalence of high wind. Sometimes, owing to the position of the boiler-house entrance and the arrangement of its surroundings, the chimney draught may be improved by high winds.

Wind from one direction occasionally has the effect of exhausting air from the chimney, and wind from another direction may increase the pressure at the inlet. A boiler plant in which these two conditions intermittently obtain must be looked upon as singularly favoured. It would be very difficult, however, to arrange matters so as to insure their establishment.

The designer should devote himself to the study of chimney-tops with the view of ascertaining the shapes that best conduce to the discharge of gases in all states of the weather.

A strong wind, instead of tending to exhaust the gaseous contents of a chimney, may actually perform the functions of a damper, pressing down the column of smoke and causing it to discharge in a horizontal or a downward direction. Such effects can be minimised by shaping the cap so that the wind impinging upon the structure may be diverted upward. The most suitable form for the attainment of this end is one approaching the outlet with a concave surface.

For a brick top an elegant and effective shape is given by making the outline concave below and above the cornice, thus directing the currents of air away from the opening.

A still better mode of construction is to build the cap hollow, with inlets in the outer wall and outlets at a higher level in the inner wall, so that the upward currents shall produce an induced draught.

Covered tops of conical and pyramidal form that have been applied with considerable advantage have openings arranged so that the wind cannot blow into more than two, leaving the others free for the discharge of gases and smoke. There is no reason why this type of design should not be extended



so as to embody the principle applied in the construction of the uptake cowl which has been applied so successfully to domestic chimneys and to the ventilation of buildings.

In conclusion, a few words must be said upon the subject of lightning protection for chimneys.

Galvanised iron is often used as a conducting material, but copper is far better, and, in the long run, more economical.

Nothing is more important in connexion with a lightning conductor than the absolute security of the joints. Ordinary soldering will not insure permanent electrical connexion, and the use of properly designed joint-boxes is most desirable.

The holdfasts used must provide fully for expansion and contraction, and should be taken down the side of the chimney most exposed to rain.

Instead of terminating the conductor with a single point, it should be connected with a coronal of suitable shape for the chimney-top, and fitted with four or more points, each with a lower shank serving to fix the coronal to the brickwork.

The earth connexion of a lightning conductor is generally a weak point. A common practice is to connect the conductor to a copper or iron plate buried in the earth and surrounded by cinders or coke. The objections to this arrangement are that it is impossible to insure the continuous presence of moisture necessary for safety, and that the connexion of the conductor with the plate generally becomes impaired after being buried for a few years. Thus, for two reasons, the apparatus may become inoperative, while giving to the owner a false sense of security.

The most satisfactory system of earth connexion is that devised by Mr. Killingworth Hedges, M.I.E.E., in which the earthing device consists of a perforated tube fitted at the lower end by a spike for driving into the ground to a sufficient depth, the conductor is dropped in and electrical connexion is made by a brass cap and soldering. A branch pipe is led to the nearest gully into which water is frequently discharged, thus providing the necessary moisture for the earthing device.

#### OBITUARY.

MR. LEHMANN.—We regret to announce the death, on October 27, at Bournemede, Bushey, of Mr. Rudolf Lehmann in his eighty-seventh year. Mr. Lehmann, who was a native of Ottensen, near Hamburg, entered Ingres' studio, won three gold medals in the schools, and thence proceeded to Munich and to Rome, where he passed some years; in 1848 he came to England. In the Royal Academy rooms he exhibited portraits of Browning (1875), Sir Andrew Clark (for the Royal College of Physicians), Mr. Barry Pain, Lady Herries, the late Duchess of Northumberland, Mrs. George Lewis, and Lord Goschen. The King, whose portrait he painted, purchased some while ago Mr. Lehmann's "Roman Serenade." Of other portraits by him we should mention those of the Emperor Frederick, Lord Tennyson, Lord Elington, Sir John Millais, G. F. Watts, A. Menzel, Sir Theodore Martin, Charles Dickens, Charles Reade, Wilkie Collins, James Payn, Bret Harte, Lamartine, and Gérôme; these were exhibited in the New Gallery and the Grosvenor Gallery, to which he also contributed portraits of Miss Lehmann (his mother), Mrs. Humphry Ward, Miss Davies (for Girtton College), Mrs. Lane Fox, and Mrs. Talbot. We should not omit to cite his portrait of the Viscountess Enfield, painted in 1874, to which, as he himself records, he owed much of his earlier fame as a portrait painter. Mr. Lehmann's pictures of another kind comprise his "Undine" (1890); "There is a Reaper whose Name is Death" (1887); and "Crownall Ripples Castle" (1892), which he exhibited at the Royal Academy in the years we quote. Several of his paintings are to be found in Italy and France; his "Madonna" and "Saint Sebastian" were purchased by the State for Paris, and his "Pope Sixtus V. Blessing the Fontaine Marthes," also bought by the French Government, is now, we believe, at Lille. He made a remarkable collection of likenesses in pencil of his more celebrated friends and contemporaries, and in his volume entitled "An Artist's Reminiscences" he relates many interesting anecdotes and episodes associated with his long career.

NEW COURT HOUSE AT ACTON.—The Middlesex County Council has approved of plans prepared by the County Engineer for a new court house at Acton. The cost of the building is estimated at £5,000.

#### GENERAL BUILDING NEWS.

PARISH CHURCH, CHILDWALL, LANGLISHIRE.—On the 17th ult. the foundation-stone of the new north aisle, transept, side chapel, and chancel of the Childwall Parish Church was laid by Mr. George Christopher Clayton. In a cavity of the stone was placed a bottle containing plans showing the church at various stages of its history, one being that of the original church in the XVIIIth century, as it existed in 1767; another plan, dated A.D. 1789, when the tower and spire had been rebuilt; another showing the north extension with galleries, as executed in or about the year 1832; also a set of plans showing the present alterations and improvements now in progress. The new work has been entered upon in consequence of the arches on the north side of the nave, erected in 1832, gradually showing signs of displacement and becoming unsafe. After much consideration, it was decided to rebuild the north aisle with transept and side chapel, and thus improve the church architecturally and bring it into line with modern requirements. The architects are Messrs. J. Francis & S. W. Doyle, the builders being Messrs. Roberts & Robinson, of Liverpool.

TALLCROSS PARK U.F. CHURCH, PARKHEAD, GLASGOW.—This church, just completed, occupies a site on the west side of Drumrother Drive, Parkhead, adjoining the set of halls and offices erected some years ago, and with which it is connected. The church has accommodation for over 800 sitters—630 in the area and 185 in the gallery, which is at the east end of the building. It has a double front to Drumrother Drive, 80 ft. in height. The main entrance is through a projecting porch at the south-east of the building. The other entrance is also through a projecting porch on the north-east side. The work has been carried out from plans by Mr. D. McNaughtan, architect, and measured by Mr. Charles Elder. The following were the contractors for the various works: Mason work, Jas. Gray, Parkhead; brickwork, G. & D. Newton, Maryhill; slater work, A. & D. Mackay, Glasgow; plumber work, John Paterson & Co., Glasgow; plaster work, H. S. Bathgate, Glasgow; heating work, Jas. Combe & Son, Glasgow; electric lighting, Beveridge & Co., Ltd., Glasgow; painter work, Thos. C. Watson, Glasgow.

CHURCH, THORNEY HILL.—The foundation-stone of a new church at Thorney Hill (Hants) was laid a few days ago. The architects are Messrs. Blow & Billerey, of London. The plan of this church has been suggested by the plans of churches of the Greek-Byzantine period, still existing in the vicinity of Athens and elsewhere in Greece. The church is arranged to accommodate sixty persons under a central vaulting with a free circulation all round. The outside dimensions are in length 48 ft., and width 36 ft. The inside height is 25 ft. 6 in. The whole of the inside will be built of Caen stone in regular and level courses; the vaultings will be partly of stone and partly of concrete, faced with plaster. The outside walls will be covered with rough-cast, and the frames and openings of windows and doors of Beer stone. The builder is Mr. Frank Newton, of Hitchin; the stone carving, etc., is placed in the hands of Messrs. Gething & Co., of London.

BAPTIST CHURCH AND SCHOOLS, WAYERVIEW, LIVERPOOL.—The new Baptist church and schools, Waverview, Liverpool, which have recently been erected from designs by Messrs. George Baines & Son, architects, London, on a site surrounded on three sides by wide roads, have just been opened. The church seats 776 adults, the seating being circular on plan, and future extension by galleries is arranged for, to seat over 1,250 adults. The contract amount was £8,693.

WESLEYAN CHURCH, BURNLEY.—A new Wesleyan church, erected in Manchester-road, Burnley, at a cost of 10,000l., was opened on the 26th ult. The design of the building is XVth century Gothic, and a large tower and spire rising to a height of 135 ft. from the ground is one of the chief features. The church consists of nave, two transepts, a chancel and organ chamber, with two vestries and a church parlour to hold 120 people. Messrs. Waddington, Son, & Dunkerley, of Manchester and London, are the architects.

CONGREGATIONAL CHURCH, HILTHEY GREEN.—The memorial-stone was laid recently of a new Congregational church at Hither Green. The building is being erected from the designs of Messrs. W. D. Church & Son, Finsbury, by Mr. E. Tinson, Kensington, and will cost about 5,000l.

WORKHOUSE INFIRMARY, EXETER.—The new Workhouse Infirmary at Exeter was opened on the 18th ult. by Sir Thomas Dyke Acland. Mr. R. M. Challice, architect, prepared the plans for the work.

RE-DEDICATION OF TOWER, ETC., LYNG CHURCH, SOMERSETSHIRE.—The Bishop of the Diocese re-dedicated the tower and bells of Lyng Church on the 27th ult. The exact date of the foundation of the church at Lyng is not known, but up to the year 1837 it was a chapel of the Athelney Abbey, which was swept away by the plundering legislation of Henry VIII. The church was raised to its present position as a vicarage in the year 1848, when the first record was made of the appointment of a vicar by the

abbot and monks. It consists of chancel, nave, north and south porches, and a eastern tower, and it is of a period earlier than the majority of the Somerset churches, the main part being of Perpendicular style. The font is of a very early date, probably about the XIIIth century, and some are disposed to consider it as of earlier Norman, if not of Saxon date. The tower is formed out of the ancient road stones. The medieval bench ends are remarkably fine and wonderfully perfect. On some of the bench ends is depicted a stag hunt. The tower is a very good specimen of the Somerset Perpendicular type, the gargoyles being remarkably fine. The stairs are on the east corner of the south side, and they drive into the interior about half-way up, and they drive into the window of the middle stage. The work of restoration was commenced by Messrs. Henry Spiller & Son, builders, Taunton, in June, 1904, and was completed, so far as the nave and chancel were concerned, in November. In the spring of this year a fresh contract was entered into with Messrs. Spiller & Son for the restoration of 600l. This work consisted of taking down the upper portion of the tower and rebuilding it with the sound old stone where possible, the deficiency being made up with new Han Hill stone. A large portion of the carved pierced tracery at the top and a considerable portion of both the upper and lower pinnacles were in a very bad state of decay, and new stone has been substituted. The tracery which have now been removed. All the joints of the stonework of the whole tower, both inside and outside, have been carefully pointed with cement. The missing tracery in the windows has been replaced with new; the moulded plinth has been restored, and a cement gutter formed around the base. The floor of the tower is entirely new, and all the steps have been carefully repaired. The work has been carried out under the superintendence of Messrs. Samson & Vivian, architects, Taunton and Bridgwater. The work of rehanging the bells was entrusted to Mr. T. Doble, bellhanger, of High-street, Taunton, who has erected a combination cage of English oak and iron for six bells, quarter tuned.—Somerset County Gazette.

PROPOSED RESTORATION OF ANTIQUARIAN, BUNTINGFORD.—The village of Ansty possesses a cruciform church of singular interest to archaeologists, with its unique Norman arches and various styles of Gothic architecture. Unfortunately, it is in a dilapidated condition, especially the tower, the restoration of which means a large outlay of money with as little delay as possible. The restoration requires re-leading, and the windows and west front need thorough renovation. Sir Arthur Blomfield & Son, architects, estimate that a sum of 1,200l. would enable the church to be thoroughly restored.—Hertfordshire Mercury.

WESLEYAN CHURCH, BURNLEY.—A new Wesleyan church has been erected in the North West Ward, Scarborough. The building as it now stands represents only the schools portion of the scheme, but the large hall on the first floor will be used as a chapel until such time as the edifice contemplated can be erected. The new church is of red brick with stone dressings. On the ground floor are a school room, and an infants' room divided from it by a folding partition, whilst grouped round the central entrance hall are three classrooms. From the hall there is a staircase of fireproof construction to the first floor, where in addition to the hall to be used as the chapel there are two vestries and lavatory accommodation. The basement of the building, with a separate entrance from the outside, provides room for storage, kitchen, and heating chamber, and there is also lavatory accommodation. The heating is by low-pressure hot water, and the lighting by incandescent gas. The scheme as at present accomplished has been carried out at a cost of about 2,600l. The architect was Mr. E. A. Tugwell, whose design was selected in competition with local architects, and the contractors were as follows:—Brickwork, Mr. R. Watkinson; carpentry and joinery, Mr. Wm. Atkinson; smiths' work and heating, Messrs. Appleby & Brodger; slating, Mr. Wm. Edgar; plumbing, Messrs. Stephenson Bros.; and painting, Mr. J. J. Carr.

COUNCIL SCHOOL, RICHMOND.—The Mayor of Richmond (Alderman Sir J. Slumpher) has just laid the foundation-stone of the new school in Darrell-road, near the gasworks, New Richmond. The site of the new school is 2½ acres in extent and is situated in the parish of North Sheepen. The building, designed by Mr. E. J. M. Carr, architect, will at first provide for 100 scholars, but when complete will accommodate 200 scholars for double the number. The school is now placed with Messrs. S. N. Soole & Son, Ltd., for a sum of 10,000l. The new school is the opening of a new infant school, which has been added to the existing school at thecombe Church of Egham. The school was recently. The architect is Mr. E. J. M. Carr, Guildford. Mr. Haden, of Guildford, is the







roof to avoid danger from fire. At Holloway all the cells which were lighted by naked gas lights in them have had the gas pipe removed and the electric light installed; a new prison block has been erected and completed to accommodate 101 prisoners, the rodrainage of the prison has been commenced, and the chapel has been improved by (1) the removal of partitions from the floor and of the pulpit and gallery from above the altar; (2) the removal of the organ from the floor of the chapel to the gallery at the opposite end to the altar; (3) the provision of a new pulpit on the floor of the chapel; and (4) the enlargement and reconstruction of the altar space. At Pentonville a new hot-water circulating system has been provided in the deputy-governor's house, and two sets of iron stairs have been fixed outside the hospital to provide escape in case of fire. At Wandsworth in A wing the boiler and heating apparatus has been lowered into a sub-basement and forty-four additional cells have been formed in the basement; the corridor has been opened up and railed fixed around; the ventilation of the ward store has been improved; the old pipes which formerly acted as combined soil and rain-water pipes have been removed from the walls of A and B wings, their breeches pieces have been cut out, and new rain-water pipes have been fixed and made to discharge over open channels; strong galvanised iron-wire gates have been fixed to all openings of food lifts. At Wormwood Scrubs the conversion of the old females' reception and hospital, with extension for males' reception and workshops, has been completed; the drying-chamber in laundry has been reconstructed and enlarged; in the old males' reception the prisoners' private clothes store is being converted into a bookbinders' shop, and a hospital ward for officers is being formed; new baths and fittings as well as slop sinks, have been provided in the hospital, and all the waste pipes have also been renewed. At Aylesbury Convict Prison the restoration of the office and chapel block, as far as destroyed by fire of February 8, 1904, has been completed. At Dartmoor the extension of No. 6 prison has been completed (it contains 180 cells); the reconstruction of the prison drainage has been continued with difficulty, owing to excavations in solid rock; the conversion of the old peat gas-house into commodious workshops has been completed; the old No. 2 A and B halls have been demolished and foundations for a new cell building on the site have been commenced. At Maidstone the following works towards a new convict prison have been carried out:—A new gatehouse, with a gatekeepers' quarter at side, has been erected and an adjoining building has been converted for the accommodation of the civil guard; a wing containing 128 cells and buildings for kitchen, laundry, baths, etc., have been under construction, and a wall has been erected to separate the convict and local prison. At Parkhurst, I.W., the upper prison is under conversion to a criminal lunatic asylum. At Portland the construction of C wing has been completed and the cells occupied; the old sleeping berths on its site have been demolished and A wing has been commenced; the hospital drainage has been improved, and a shed has been erected for an additional steam stone saw. The construction of the permanent establishment for a State reformatory for female inebriates has been completed.

**WATER SUPPLY, LOUGHBOROUGH.**—Progress is now being made with the new dam at Blackbrook by the engineers responsible for the scheme, Messrs. G. & F. W. Hodson, Loughborough and London. The extreme length of the dam is 525 ft., its height to the overflow crest is 65 ft. from the brook level, 93 ft. 6 in. from the bottom of the main trench, and to the top of the parapet 103 ft. The thickness of the dam at the brook level is 65 ft., and at the level of the overflow 15 ft. It is faced on the upstream side with Staffordshire blue brickwork 2 ft. 3 in. thick, banded in a special manner so that there will be no continuous horizontal joints. The downstream side and the parapet walls will all be faced with pre-Cambrian rock obtained from quarries in the neighbourhood. The hearting is of hand-mixed cement concrete, with plums from the excavation and the quarries, which afford stone up to four or five tons in weight. The facing stones are built in as random rubble work. The lip of the overflow will be of Derbyshire Millstone grit. The outlet tunnel is 10 ft. in diameter, connected on the inner side with a cast-iron valve tower 10 ft. in diameter at the bottom, tapering to 8 ft. above the junction, carried up to the level of the parapet roadway and connected with it by a short bridge. The capacity of the reservoir is 506,000,000 gallons, and the top water area 84½ acres. About 40,000 ft. is needed to complete the scheme, and this will bring the total cost of the actual reservoir works to just over 100,000 ft.

Mr. Charles E. Robinson is the resident engineer. **SCOTTISH BUILDING TRADES' FEDERATION.**—On Saturday last week the annual meeting of the Scottish Building Trades' Federation was held in the Palace Hotel, Inverness. The chair was occupied at the business meeting by Mr. William Macdonald, Inverness, President of the Association. The Secretary (Mr. Fred A. Black, solicitor, Inverness) submitted the annual report of the

executive. The report stated that the finances of the Federation were now on even a better footing than when the year began. A new branch had recently been formed at Dingwall. The executive much regretted to have to report that the state of trade throughout the country continued dull and depressed. There was, however, some reason to hope that the tide was now turning. Efforts had been made during the year to secure the re-union of the Glasgow employers who separated from the Federation when the headquarters were removed from Glasgow. On the whole, these efforts, though not successful, had been encouraging, and the Glasgow employers had during the year shown their practical sympathy with the Edinburgh employers. There was reason to hope that during the present year the Glasgow employers would be again induced to throw in their lot with the Scottish Federation. This would undoubtedly add much to the strength of the Federation, and increase the rapidity of its growth. Mr. P. Knox (Edinburgh) was elected President for the ensuing year, and Mr. James Cameron, solicitor, Edinburgh, was appointed secretary. At the close of the business meeting the delegates dined together under the chairmanship of Mr. William Macdonald.

**EDINBURGH ADVERTISEMENT HOARDINGS.**—Sheriff Macdonald has issued his decision dismissing an appeal against Sheriff-Substitute Guy's judgment, finding that the city of Edinburgh had unreasonably refused to grant licences for advertisement hoardings on various sites and gables in Edinburgh to Steedman Limited, advertisement contractors, and the landlords of the sites. His Lordship has ordered the Corporation to grant the licences refused by them.

**HULL BUILDING TRADES FEDERATION.**—The Hull Building Trades Federation, an organisation representing the various employees engaged in the building trade, recently held a public meeting in the St. George's Hall, Story-street, Hull, for the purpose of considering the question of unemployment. Mr. W. Turner (the President of the Federation) was in the chair, and there was an attendance of several hundreds. Councillor Flanagan proposed: "That this meeting of workers protests against the mean, niggardly, and insulting regulations submitted by the Local Government Board to the constituted authorities for the carrying out of the Unemployed Workmen's Act, and considers the same to be a violation of the pledges given by the President of the Board when the Act was under consideration by the House of Commons; and this meeting hereby calls upon the Local District Committee to petition the Local Government Board with a view to the amendment of the regulations as will give extended powers to deal with the unemployed question. Further: This meeting demands that the Hull City Corporation at once proceed with all public improvements for which they have powers, so that the unemployed workmen of this city as far as possible shall be given an opportunity to earn their daily bread." Mr. M. Emmerson seconded the resolution, which was carried after discussion.

A new FRENCH SEASIDE RESORT.—A company has been formed under the title "Société d'Hardelot," to form a new seaside resort at Hardelot, on the coast of France, about six miles south of Boulogne. It is in the neighbourhood of Hardelot Castle, an ancient fortress in which Henry VIII. stayed in 1544; from the illustration sent to us the greater part of it is evidently in ruin; whether any portion of it is still inhabited is uncertain, but it would form one item, no doubt, in the picturesque attractions of the district. The State Forest of Hardelot is open to the public, and contains 20 miles of rides. Lots are being let for chalet building. M. Louis Cordeur, a well-known French architect, is architect to the Société, the secretary of which is M. R. Lefebvre du Prey, Hardelot.

**FURNITURE TRADE IN EGYPT.**—The last issue of the *Journal of the British Chamber of Commerce in Egypt* contained a long article giving many particulars respecting the furniture trade in Egypt, and states that British furniture is growing in favour there, the imports of such having risen from 15,671 ft. in 1900, to 11,526 ft. in 1901, 9,856 ft. in 1902, and 11,008 ft. in 1903, to 26,291 ft. in 1904. After describing the competing imports of Austria, France, Italy, Germany, and other countries, and the work of the local Greek, Italian, and Arab carpenters, the *Journal* goes on to say:—"An attempt was made in Alexandria some two years ago to build up a manufacture of first-rate English and European designed furniture. The scheme, however, did not succeed, owing to the cost of production and the low import duty. Another firm are now opening showrooms in Alexandria for furniture of all kinds, made and shipped by one of the foremost English houses—a distinct move in the right direction. The exportative English furniture the Greeks are the best customers, though the educated Arabs are also becoming buyers. Cheap English furniture made from a common wood and stained to any colour can be ordered through agents from home manufacturers. The agents are supplied with fully illustrated catalogues, from which a very fair idea of the furniture can be obtained, whilst the prices of the

goods are in many instances lower than those charged for the Austrian productions. It would send over as samples even one article of each cheap set." The *Journal* goes on to make several suggestions by which the trade might be increased, and concludes:—"Although it should be unnecessary to do so, we think it advisable to impress upon manufacturers that, owing to the dampness here, it is almost essential that furniture made from any but well-seasoned wood—assuming repeat orders are wanted—in the connexion, too, attention should be paid to such details as the fitting of drawers."

**STEAMER TEAK AND OTHER WOODS.**—According to the report of Mr. Acting-Consul Lytle, the shipments of teak from Bangkok in 1904 amounted to 77,531 tons, valued at \$60,174. As compared with 1903, these figures show an increase of 19,385 tons and 120,498, value respectively, and are 28,450 tons, or 224,553, above the average of the five years 1899-1903. The shipments of teak to the United Kingdom amounted to 1,335 tons. There is a marked falling off in the quality of the logs which have been of late years; this does not mean that the wood itself has deteriorated—the quality of the wood itself is just as good as ever—but the percentage of logs capable of yielding first-class material is much smaller than formerly. This is owing to the average scarcity of good timber in the forests, the result of which is that the forests are forced to work anything they can find, regardless of quality. Prices during the year have fairly risen, hardening towards its close. The local value of Europe squares varied from about 85 to 105, Europe plank 90 to 110, and rough logs of first quality and quality of the past few years 10 to 15 pike. The effect of the rise in the price of teak had hardly made itself felt last year, but latterly the activity in the various naval dockyards of the world has no doubt increased the demand for teak of the better qualities, and prices have risen accordingly. The prospect of the teak trade in Siam in the meantime, as regards prices, are good, and a fair return may be expected, with good demand in most markets, but there is little doubt the trade cannot be maintained on the scale of the past few years, owing to limited supplies. The production of woods other than teak has fallen from 6,341 tons in 1902 to 4,878 tons in 1904, being 4,875 tons and 10,768, below the average of the past few years. These woods are for the most part of an ornamental or medicinal character, but, apart from them, the forests of Siam contain much timber that would prove valuable for building purposes.

**THE BUILDING LINE IN MIDDERSEX.**—The County Council of Middlesex has decided to seek for powers to amend the law as regards the building line on main roads and as to the width of new roads. Steps are to be taken before the Bill is drafted to ascertain the views of the district councils upon the matter.

**THE HOUSING PROBLEM.**—Councillor Nottingham, in moving the approval of the Housing Committee's report at the meeting of the Executive Council on the 24th ult., said the Committee hoped before very long to lay before the Council a scheme with regard to the Bostley Green land that would receive the support of everybody interested in the solution of the housing problem. Passing to the general work of the Committee, the Council would remember that, for reasons which it was unnecessary to mention, the Committee was not able to get to work at once. It had been in active work for two and a half years, and during that time 940 houses had been repaired and rendered habitable.

—714 under the Committee's immediate control and 232 under its direct advice. That was an average of 378 houses per annum, which compared favourably with what was done in the same direction in the three years previous to the appointment of the Committee. At the same time it was not enough, and the Housing Committee agreed with those who complained of delay, which was due to various causes beyond its control. Some people put every obstacle in the way of the reform, and they were not the poorest. These reformers seemed to think that they had a vested interest in human misery and degradation. Every opportunity was given them to do their work, and it was only when they gave up work, and it was only when they would not definitely to understand that the Committee repair their houses properly that the Committee applied for a closing order. With regard to the German visit, the deputation were in general delighted with what they saw. At the same time many of the details were not at all satisfactory. English methods and English ideas. One point which struck the deputation very forcibly was the success with which several German corporations had assisted private enterprise in the construction of workmen's dwellings. The results of the visit were satisfactory, and the deputation were now putting into effect the information they had obtained. The report was adopted.

**THE AUCTIONEERS' INSTITUTE.**—Mr. James Boynton, President of the Auctioneers' Institute of the United Kingdom, opened the winter session of the Institute at 4, Whitehall-court, on the 27th ult. He said that the closing meeting of the



After hearing counsel, his lordship expressed the opinion that it was not a case for an injunction but merely for damages.

Mr. George Gordon Stanham, an architect and surveyor, examined, said he had inspected the premises in question, and in his opinion the defendants' building had in no way affected the light coming to the plaintiffs' premises. He had stood in one of the rooms on the ground floor of



No. 12 and could read easily in any part of it. He had been in all the rooms, and was of opinion that there was sufficient light in them for all ordinary purposes.

Mr. Paul Stanley May, estate agent and valuer, examined, stated that he had the previous afternoon visited No. 12, and had gone into the room on the ground floor. He stood there with his side to the partition, about 13 ft. from the front, and he could quite clearly read a newspaper. In his opinion the light coming to the premises was sufficient for all reasonable and ordinary business purposes. He did not think that the defendants' building had in any way deteriorated the value of plaintiffs' property.

Mr. Norton: I have some more people who have been in the house to read.

His lordship said he did not think it necessary to call them.

Mr. Norton said that that was his case.

In the result his lordship, after having heard Mr. Rowden on behalf of the plaintiffs, in giving judgment said there was no question as to the antiquity of the lights to the plaintiffs' premises. On the site of the defendants' premises there stood a house which was nearly 37 ft. in height, and this had been pulled down and replaced by a building 20 ft. higher than the parapet of the old building. The old premises, however, had a slanting roof going 14 ft. above the parapet and thrown 13 ft. back. In his opinion the only floors that could be affected by the defendants' buildings were the basement, ground, and first floors. The question he had to determine was one purely of fact. The test of the nuisance was not how much light had been taken, but how much was left, and was that enough for the comfortable use and enjoyment of the house according to the ordinary requirements of mankind. The question of the deprivation of light was beyond question. That was not what he had to decide. He regretted that he had little or no evidence from the plaintiffs as to the question really at issue. But the defendants had assisted him on their part of the case by the experiments the experts had made. To his mind it was impossible to come to the conclusion that the plaintiffs had established that which was upon them to prove. Plaintiffs had not established to his mind that the value of their premises had been affected. The result was that the plaintiffs failed, and there would be judgment for the defendants, with costs.

#### ABERYSTWYTH ANCIENT LIGHT DISPUTE.

THE case of Fear v. Morgan came before Mr. Justice Kekewich in the Chancery Division on the 25th and 26th ult., an action brought by the plaintiffs, Mr. and Mrs. T. F. Fear, for an injunction to restrain the defendant, Mrs. M. J. Morgan, from erecting or permitting to remain erected on her land at Aberystwyth, adjacent to the plaintiffs' premises, any wall, building, or structure so as to darken, injure, or obstruct any of the ancient lights of the plaintiffs. The plaintiffs also claimed a mandatory injunction and damages.

It appeared that the plaintiffs were lessees for a term of twenty-one years, from June 30, 1900, of premises No. 16, North-parade, Aberystwyth, consisting of a dwelling house, wine and spirit vaults, and outbuildings in the rear. In part of the plaintiffs' buildings, and looking to the east, were two windows faced by land belonging to the defendant, upon which, where the same adjoined the plaintiffs' land, there formerly stood in front of the windows a wall about 6 ft. 10 in. high. The plaintiffs alleged that these windows were ancient lights, and that in May, 1903, the defendant began to build upon the wall so as to increase its height. Upon plaintiffs threatening proceedings if the work was continued, defendant discontinued it for a time, but afterwards resumed it, bringing the height of the wall up to 16 ft., which the plaintiffs alleged deprived them of a substantial quantity of light, thus diminishing the value of their premises.

The defence was a denial that the plaintiffs' lights were ancient. Defendant also said that her premises and the plaintiffs' were, by a lease of November 24, 1825, devised by the Mayor and Burgesses of Aberystwyth to one Mary Davies for a term of ninety-nine years from June 22, 1812, and that the plaintiffs' premises became vested in one John Watkins for the residue of the term. That in March, 1897, an agreement was entered into between the Corporation and Watkins for a renewal of the lease of the plaintiffs' premises, and that prior to the agreement the Corporation had in view a scheme for the improvement of their house property, including the block of buildings bounded by Portland-street, Terrace-road, North-parade, and Queen's-road, which involved the raising of the buildings at the back of the premises in that block. Defendant said that one of the terms of the agreement was that the buildings at the back of the plaintiffs' premises should be raised, and Watkins surrendered the premises to the Corporation for the purpose of a new lease being granted for a term of seventy-five years, which lease was granted and subsequently assigned to the plaintiffs' lessors. Defendant also alleged that at the date of the surrender by and the grant of the new lease to Watkins, her premises, No. 18, North-parade, were vested in

one Frances Davies for the residue of the term of ninety-nine years, and, to the knowledge of Watkins, Davies applied for a renewal of the lease, and that in March, 1903, an agreement was entered into between the Corporation and Davies for a renewal of the lease, one of the terms of the agreement being that the buildings at the back of the premises should be raised. Defendant further said that in March, 1903, Davies assigned the premises with the benefit of the agreement for renewal to her, and that the Corporation on February 2, 1904, granted a new lease of the premises for a term of seventy-five years, and that the buildings at the back of the premises were raised in accordance with the agreement. Alternatively the defendant pleaded that there had not been any substantial interference with the plaintiffs' light.

Mr. P. O. Lawrence, K.C., and Mr. Dunham appeared for the plaintiffs; and Mr. Stewart Smith, K.C., and Mr. Potts for the defendant.

Mr. Lawrence, in the course of opening the case, said that his lordship's judgment would not only affect this particular property, but also numerous other leases, and the Corporation were really fighting the action on behalf of the defendant, as they wished to know how they stood with regard to their other leases. If the plaintiffs were not entitled to light, then the question would arise whether there was a scheme which affected the plaintiffs. The parties as to that scheme were very vague, and the onus rested upon the defendant to make that scheme out and to show that Watkins was cognisant of it. Further, she must show that the plaintiffs were, under all the circumstances, restrained from prohibiting the heightening of the wall.

No evidence was called for the plaintiffs. Mr. Stewart Smith, on behalf of the defendant, submitted that there was only a restrictive right of light when the lease was granted to Watkins. Even if there had been an indefeasible right of light to those windows there was nothing to show that the indefeasible right of which Watkins was proprietor had not been modified.

In the evidence Mr. Justice Kekewich, after hearing evidence on behalf of the defendant, in giving judgment said the question to be determined was whether what occurred in 1900 in any way altered the position of Watkins or those claiming under him. The important fact was that in 1900 there had been uninterrupted enjoyment of light for twenty years, and, said in his opinion, nothing had occurred since that time to destroy the benefit of that uninterrupted access of light.

Mr. Lawrence: We will take a declaration that, notwithstanding the surrender and the grant of a fresh lease, the plaintiffs, as owners of No. 16, North-parade, are entitled to access of light to their windows.

Mr. Justice Kekewich: Yes.

Mr. Lawrence asked for the costs of the action up to and including that day, which was granted. It was arranged that the question of damages should be referred to the Official Referee.

#### ENGINEERING WORK AND THE WORKMEN'S COMPENSATION ACT.

THE case of Rogers v. the Mayor, etc., of Cardiff came before the Court of Appeal, consisting of the Master of the Rolls and Lords Justices Romer and Mathew, on the 27th ult., on the appeal of the defendants from an award of compensation made by the Cardiff County Court Judge in favour of the applicant under the provisions of the Workmen's Compensation Act, 1897.

It appeared from the statement of Mr. Bailhache, who supported the appeal, that the Corporation of Cardiff were the owners of the electric tramway system in Cardiff, and the applicant was a workman employed by the Corporation in repairing the overhead wires of the system. To enable him to do this work, he was supplied with a tall trolley, having a platform on the top, from which the applicant was enabled to reach the electric wires. This trolley was drawn by a horse from place to place as required. On the day the accident happened the applicant, having repaired the wires at a certain place, was driving the trolley along a street, which followed the line of the tramway, to a place some three-quarters of a mile away, for the purpose of repairing the wires at that place. When he had got about 200 yds. away from the place he had effected the repairs the horse drawing the trolley bolted, and the applicant was thrown out and injured. The claim for compensation was based upon the ground that happened while the applicant was employed "on or in or about engineering work" within section 7 of the Act. The learned counsel contended that the accident did not happen while the applicant was employed "on or in or about engineering work." He submitted that the engineering work was the repair of the electric wires of the tramway system at a particular spot, and that as the accident happened not at or about that particular spot, but while the applicant was proceeding from one place of repair to another, he did not come within the purview of section 7 of the Act.

Mr. Parsons, for the applicant, supported the decision of the learned County Court Judge,

contending that at the time of the client was employed on or about engineering work.

The Master of the Rolls, in giving judgment, said he had come to the conclusion that the question in the case turned on the facts, and that the County Court Judge had found the facts, and that they could point to some misdirection which the County Court Judge to find as he did, and could not interfere. The question in the case was as to engineering work, and it was referring to the engineering work as work taken by the undertakers that they could be held liable for the accident. Engineering work embraced a certain physical area, the expression was the duty being laid limits to the work; and the applicant must be shown to have been employed "on, in, or about" that area. In his opinion there was evidence which showed that the County Court Judge in concluding that the area of the engineering work was co-extensive with the tramway itself. The County Court Judge found the facts that the area as to which the duty of the undertakers extended was the whole area of the tramway, and that the applicant employed by them to do such work as was necessary and obligatory upon them as such undertakers. The whole work of repairing the tramway included the business of inspecting and ascertaining where the defects existed. It was the duty of the applicant to find out defects and remedy them. He thought the County Court Judge had arrived at a proper conclusion without any misdirection, and the appeal failed, and should be dismissed with The Lords Justices concurred.

#### THE WOOD-PAVING LITIGATION.

THE case of Alcott v. the Corporation of Westminster came before Mr. Justice Kennedy and a special jury in the King's Bench Division on the 9th ult., for trial of the defendant's counter-claim, the plaintiff's claim having, after several postponements, been dismissed by Lord Chief Justice.

Mr. McCall, K.C., and Mr. Mark Smith appeared for the defendants in support of the counter-claim; the plaintiff was represented by counsel.

In this case the defendants counter-claimed for the costs of relaying and the expense of the wood pavement caused by the plaintiff's defective paving, and which he was liable to repair under the maintenance clauses contained in the contract.

Mr. McCall said his clients were willing to dispense with the assistance of the jury. The jury had been summoned by the plaintiff, but his solicitor said he could not pay them.

His lordship, after some discussion, agreed to hear the case without the jury.

Mr. McCall said there were three paving contracts entered into between the parties, two in 1901 and the third in 1903. The paving was to be of red gum blocks, and the plaintiff's contract was to maintain it for fifteen years. As the plaintiff failed to do so, and the defendant had had to do the work themselves, they claimed to be repaid by the plaintiff the expenses they had been put to. Under the third contract in 1903 the plaintiff had done no work in Long Acre. That work was done by others, and the difference between the cost of the work done and the cost of the plaintiff formed the remainder of the defendant's claim. The plaintiff alleged that the failure of the paving was caused by the defendant's foundations, the amount of water used in watering, and the stones which were forced into the paving by the defendant.

Mr. James William Bradley, City Engineer at Westminster, having given evidence in support of the counter-claim, Mr. McCall stated that 12,000, on the whole counter-claim would content the defendants.

In the result his lordship, after hearing other evidence, gave judgment for the defendant on the counter-claim for 12,000, and costs.

#### PATENTS OF THE WEEK.

##### APPLICATIONS PUBLISHED.\*

20,973 of 1904.—S. ROBERTSON CARSON and H. R. CAPER: Portable Panelling. This relates to a portable panelling, comprising a dismountable framing with interchangeable parts and interchangeable panels and connections for the parts of the framing, and for the panels of the said parts, being connected together and to the wall by wedge fastenings.

21,094 of 1904.—D. CROWTHER and G. LEAS: WATER TUBE BOILER CO., LTD.: Method of Securing Diaphragms in Double-flow Tubes for Liquid or Gases.

This relates to double-flow tubes and a method of securing the diaphragms in position in position capable of adjustment, by forming the diaphragm in the form of a saw cut along one or both edges in the partition, and opening out to a saw cut in these slits or cuts.

\* All these applications are in the stage of opposition to the grant of Patents upon which can be made.



NOV. 4, 1904.—F. LOHNITZ: *Brake Mechanism of Winches and such like.*

This relates to brake mechanism for winches or such like, and consists in the combination of two sets arranged side by side, crossbars connecting and levers together, means for jointing their ends to the brake, and means for drawing their upper ends together and for forcing them apart.

NOV. 4, 1904.—C. HILLIER and A. HILLIER: *Baths.*

This relates to baths in which the supply of hot and cold water thereto may be simplified in such a manner that the pump by which such operations are carried out may be made as it were a part of the said bath, so as to be quite independent of other fixtures.

NOV. 4, 1904.—F. DE J. CLERE: *Reversible Window Sashes.*

This relates to reversible window sashes, comprising pivots passed through the sides of the sash and through a hole into recesses formed in the sliding blocks, coil springs within the recesses and passed upon the pivots, nuts screwed upon the ends of the pivots, and washers upon the pivots between the springs and nuts.

NOV. 4, 1904.—T. C. LINE and T. N. CASTLE: *Dry Closets and the like.*

This invention relates to dry closets and the like, and has for its object to prevent any accumulation of the earth or other dry material upon the top behind the back of the oscillating reservoir or hopper, such accumulations preventing the free rotation of the hopper.

NOV. 4, 1904.—J. D. PRIOR: *Hot Water Boilers of Kitchen Ranges.*

This relates to the construction of hot water boiler of kitchen ranges, and consists in making the manlid and manhole of the boiler of such a form that the larger manlid can be passed through the manhole and made to take a bearing on the underside of the edge of the manhole, and in making the manlid with an externally screwed boss on its upper side, and the combination of a ring washer, manlid cover plate and a nut for taking on to the externally screwed boss of the manlid.

NOV. 4, 1904.—M. A. ADAM (ERSTE REISSHAFT-FABRIK ACTIEN-GESELLSCHAFT): *Manufacture of Staining or Finishing Media.*

This relates to the process of manufacturing stain or finishing media, consisting of rice rich in gum or other substances containing gum, or chemical mixtures of starch and starchy substances, or ordinary rice mixed with gum, first moderately steamed so as to loosen the tissue, then mixed with substances having an alkaline reaction, so as to disintegrate the proteins, finally treated with a solution of an organic acid, whereupon the product is dried at a temperature under 100° Celsius.

NOV. 4, 1904.—G. C. MARKS (A. KOPPEL): *Safety Devices for Lifts and the like.*

This relates to an automatic safety arresting device for lifts and the like, wherein friction rollers are pressed sideways against a shaft rail when the cable breaks, and under the influence of a spring set into motion and rotated against a stop, provided on the shaft rail, forming the shaft rail a shaped or like channelled steel or iron, and a middle web of which, by the provision of a spring, serves as a rack for the aforementioned.

NOV. 4, 1904.—C. F. E. SWINDEN and A. H. F. PERKINS: *A Device for Opening and Closing Windows.*

This invention relates to a device for opening and closing sliding sash windows, and consists in the combination with a handle adapted to be moved in a plane parallel to that of the sash of slides arranged with said handle and carrying a pair of wheels, and a pair of cord connections each secured at one end to a fixed point and at the other end to the sash, and each passing around one of the pulleys on the slides and around a stationary guide pulley, so that a relatively large movement of the handle in one direction produces a correspondingly small movement of the sash in the opposite direction.

NOV. 4, 1904.—A. STEINER: *Windows.*

This invention relates to a rotatable double window frame, characterised in that the outer and inner window sashes are connected together in a common sash frame, so that the latter may be moved upon pivots to any angle and be firmly held in any fixed window frame.

NOV. 4, 1905.—M. G. WOOD: *Locks.*

This invention relates to a lock, and consists of a method of pivoting the tumbler plates to the bolt, by means of disc-shaped projections upon the tumbler plates, which engage a correspondingly shaped notch in the bolt.

NOV. 4, 1905.—A. MESSERSCHMIDT: *Door Hinges.*

This relates to a door hinge and consists in the combination with the upper wing rigidly holding the socket the hinge pivot of the lower wing,

the socket of which is loosely engaged by the lower portion of the said pivot and closed at its lower end in order to retain a lubricating substance introduced into the said lower wing-socket and to confine smooth swinging or oscillating movement of the door hinge to the lower hinge-portion, &c., to the lower portion of the pivot and to the lower wing-socket.

9,316 of 1905.—J. GREEN: *Wood or other Panelling.*

This relates to wood or other panelling, and consists of forming a series of styles and rails having grooves in their edges to receive the panels, and of rails tenoned at their ends to fit the grooves in the styles, the back flanges of the said grooves being extended to receive the fixing devices so that they will be covered by the panels.

16,306 of 1905.—J. JONES: *Manholes or Inspection Chambers.*

This relates to an inspection chamber, comprising the combination of an iron base and masonry, brickwork or concrete walls, the base being provided with a flange adapted to project into the side walls of the chamber and formed with keys or stops.

15,384 of 1905.—G. HESS: *Elevator or Conveyor Apparatus for the Exterior of Buildings.*

This relates to a conveyor apparatus on buildings, and consists in enabling bodies such as human beings to be lowered and raised externally to the building by means of a travelling cage adapted to be moved up and down by means of a winch or winding apparatus, wheels being arranged on the cage with which it bears against the wall of the building in order to diminish its friction on the building wall and also to facilitate the cage passing over impediments projecting from the wall of the building, also a brake arrangement in effective connexion with the winding apparatus, which allows of the speed of the cage descending by its own weight to be regulated from the building and also from the cage.

15,126 of 1905.—A. H. BAGNOLD and E. D. MCQUEEN: *Door Latches.*

This relates to a door-lock, and consists in the combination with a cylindrical case having a radial extension, of a bolt actuated by one arm in a double-armed lever, the other arm of which lever engages with a rod acted upon by a helical spring surrounding the bolt.

21,212 of 1904.—P. KAMMERER: *Tunnel Construction.*

This relates to a tunnel construction, and consists of a series of members adapted when laid to form a concrete structure, which member consisting of a skeleton frame made of intersecting angle of iron and wire mesh, and a filling and a coating of plastic material, said members being arranged in series, the members of each series having interlocking connexions one with the other.

25,847 of 1904.—C. A. ALLISON (A. SEARLES): *Lifting Jacks and the like.*

This relates to a lifting jack, and consists in the combination of a rack, a standard, a swinging support, and a swinging brace connected to the standard and to the support, together with means for raising the rack.

14,472 of 1905.—C. J. A. HYDE and F. W. HYDE: *Apparatus to Level the Public Footpaths where Vehicle Entrances occur, to be Lowered and Raised as Required.*

This relates to an apparatus for levelling the public footpaths where vehicle entrances occur, and consists in the mode of lowering and raising the front portion of a sectional balanced cover, which is effected by two large and two small flanged rollers being fitted on an axle, the said large flanged rollers running on iron rails placed at base of the said frame for that purpose, the said axle being connected to a lever by a bar running through a hole, made in the back portion of the said frame, the said lever being placed in an iron box into the ground at the rear of the apparatus. When worked forwards the said small rollers are brought into contact with oblique projections, thereby raising the front portion of the said sectional balanced cover and supporting same in its raised position, and when worked backwards the same is lowered.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

Oct. 13.—By SPELMAN (at Norwich).	
Norwich.—St. Mary's-plain, l. p. ....	£230
By MORRIS, MARSHALL, & Co. (at Bishop's Castle).	
Bishop's Castle, Salop.—The Elms, f. p. ....	600
Ten pieces of pasture, 16 a. 2 r. 5 p. f. ....	935
Oct. 17.—By MORRIS, MARSHALL, & Co. (at Newtown).	
Kerry, Montgom.—"Snowfields," also "Upper Green Farm," 151 a. 0 r. 35 p. f. ....	7,350
Oct. 21.—By MORRIS, MARSHALL, & POOLE (at Churchstoke).	
Mainstone, Salop.—Part of the "Tan House Farm," 75 a. 2 r. 24 p. f. ....	3,625
"Boasted House Farm," 20 a. 2 r. 23 p. f. ....	500

Churchstoke, Montgom.—"Cwm Cottage" and four pasture fields, 3 a. 3 r. 12 p. f. ....

October 24.—By DUBERNHAM, TAYSON, & Co. City.—Lombard-st., f.g.r. 500l., reversion in 30 yrs. ....

Alfriston, Sussex.—The Alfriston Training Establishment, 187 acres, f. p. ....

Wrotham, etc., Kent.—"Oldbury" and "Stant's Bottom" Farms, 388 a. 3 r. 21 p. f. ....

Ightham, Kent.—"Borough Green Farm," 84 a. 3 r. 17 p. f. ....

Wrotham, Kent.—"Plain Farm," 64 a. 3 r. 7 p. f. ....

"Palace Farm," 97 a. 2 r. 25 p. f. ....

"Park Farm," 238 a. 1 r. 30 p. f. ....

Ightham, Kent.—A freehold cottage and gdn., w.r. 54, 4s. ....

An enclosure of land, 3 a. 0 r. 32 p. f. ....

A freehold hop garden, 4 a. 1 r. 20 p. ....

A freehold orchard, etc., 6 a. 2 r. 33 p. ....

"Oldbury Cottage" and 5 a. 1 r. 8 p. f. ....

Freehold nursery ground, 3 acres, y.r. 6l. ....

Stansted, Kent.—"Stansted Court Lodge Farm," 355 a. 3 r. 12 p. f. ....

Two freehold enclosures, 5 a. 1 r. 27 p. f. ....

Part of "Thrift Wood," 15 a. 3 r. 11 p. f. ....

Ightham, Kent.—"Lack's Meadow," 2 a. 1 r. 33 p. f. ....

Wrotham, Kent.—"Borough Green Meadow," 10 a. 3 r. 4 p. f. ....

By H. DONALDSON & SONS.

Dalston.—157, Sandringham-rd., ut. 55 yrs., g.r. 6l., e.r. 40l. ....

By PERCIVAL HODSON.

Camden Town.—170, Camden-rd., ut. 30½ yrs., g.r. 6l., e.r. 65l. ....

Winchmore Hill.—Orpington-rd., a freehold building plot ....

By HAMPTON & SONS.

Kennington.—71, Upper Kennington-lane, area 34,200 ft. 2, p. ....

By MAY & THILPOT.

Streatham.—83, Gleneloch-rd., ut. 92 yrs., g.r. 9l., e.r. 52l. ....

By GEO. PRATT.

Penge.—78, Beckenham-rd. (bank premises), f. ....

Forest Hill.—157, Stansted-rd., f. y.r. 28l. ....

By HARRIS STACEY.

Wethersfield, Essex.—"Spicer's Farm," 38 a. 3 r. 19 p. f. ....

Blitchington, Surrey.—"Great Heggie Farm," 8 a. 1 r. 7 p. f. ....

Dorking, Surrey.—Station Approach, a freehold building plot ....

Redhill, Surrey.—Freehold building land, a. ....

3 r. 35 p. ....

Earlswood, Surrey.—Woodlands-av., a freehold building plot ....

Redhill, Surrey.—London-rd., "Woodlands" and 0 a. 3 r. 24 p. f. ....

London-rd., "Thornlands" and 1 a. 0 r. 6 p. f. ....

97 to 103 (odd), London-rd., f. y.r. 115l. ....

Station-rd., "Ocell" and "Faxley" Villas, f. y.r. 80l. ....

1 r. 8 and 5, Station-rd. (s.), f. y.r. 155l. ....

7, Station-rd. (shop and showrooms), f. y.r. 140l. ....

Ladbroke-rd., the station stables, f. y.r. 130l. ....

Station-rd., The South-Eastern Hotel, f. y.r. 130l. ....

11 to 21 (odd), Station-rd. (s.), f. y.r. 325l. ....

22 to 24 and 26, Brighton-rd. (s.), f. y.r. 142l. ....

Brighton-rd., "The Britannia" p.h., f.g.r. 84l., reversion in 30 yrs. ....

28 to 44 (even), Brighton-rd., f. y.r. 208l. ....

1 to 13, Ladbroke-rd. (s.), f. y.r. 26l. ....

"Garden Row" Cottages (nine), f. w.r. 140l. 8s. ....

39 to 51, 57 to 63 (odd), Monnow-rd., f. w.r. 195l. ....

Main-rd., "Nutwood Cottage," f. w.r. 13l. 4s. ....

By WILLIAM THOMSON (at Liverpool).

Wirral, Cheshire.—"Caldy Manor Estate," 600 a. 3 r. 1 p. f. ....

By ORGILL, MARKS, & BARLEY (at Masons' Hall Tavern).

Batham.—High-rd., the "George" p.h., ut. 55 yrs., y.r. 180l., with goodwill, also freehold shop adjoining, y.r. 30l. ....

Wandsworth-road.—No. 392, the "Lord Raglan" p.h., ut. 20 yrs., y.r. 120l., with goodwill ....

Dalston.—Balls Pond-rd., "The Marquis of Salisbury" p.h., a profit rental of 75l. for 25 yrs. with reversion ....

Oct. 25.—By DYER, SON, & HUTTON.

Lee.—3, Baring-rd., ut. 59 yrs., f. 5l. 10s., e.r. 38l. ....

By FLOOD & KING.

Ealing.—Ealing-rd., f.g.r. 4l. 10s., reversion in 84½ yrs. ....

By NICHOLAS, DENYER, & Co.

Bromley, Kent.—London-rd., "Rocklands," f. y.r. 130l. ....

By RIPPON, BOSWELL, & WHITAKER.

Holborn.—Bartlett's-bldgs., f.g.r. 90l., reversion in 27½ yrs. ....

Waltham.—Waltham-rd., f.g.r. 100l., reversion in 8 yrs. ....

Hendon.—Grove-ter., f.g.r. 50l., reversion in 69 yrs. ....

Church-walk, etc., two peppercorn ground rents, reversion in 59½ yrs. ....

Fulham-st., f.g.r. rents 1l. 4s., reversion in 59½ yrs. ....

Church-road, etc., f.g.r. rents 12s., reversion in 59½ yrs. ....

Church-rd., f.g.r. rents 34l. 4s., reversion in 59 yrs. ....

By JOSEPH STOWER.

Maida Vale.—127, Sutherland-av., ut. 73 yrs., g.r. 14l., p. ....

800









## CONTRACTS AND PUBLIC APPOINTMENT.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Unclimbable Iron Fencing and Gate, Gales Hill	Telgumouth U.D.C.	C. F. Gettings, Surveyor, Town Hall, Telgumouth	Nov. 10
Extension of Plant, Whiston-street Generating Station	Borough Electrical Engineer, Cornhill-street, N.	Borough Electrical Engineer, Cornhill-street, N.	Nov. 10
Bridge, Green-lane, Timperley	Bucklow R.D.C.	No. 7, Market-street, Altrincham	Nov. 10
Crossley "Otto" Gas-engine, Warren Farm School	Brighton Guardians	B. Burfield, Clerk, Parochial Office, Brighton	Nov. 10
Road Works, East Howdon	Tynemouth Corporation	J. F. Smille, Borough Surveyor, Tynemouth	Nov. 10
Girders (384 tons of Steel Bridge)	Great Western Railway Co.	Engineer, Paddington Station, London	Nov. 10
Granite (260 tons Broken Guernsey)	Leigh-on-Sea U.D.C.	W. J. Petch, Surveyor, Council Office, Leigh-on-Sea	Nov. 10
Piers (brick), Girders, etc., at Lock	Bradwater Town Council	Borough Surveyor, Municipal Buildings, High-street, Bridgewater	Nov. 10
School, Langley Park	Durham County Education Authority	W. Rushworth, F.R.I.B.A., County Education Office, Durham	Nov. 10
Alterations to No. 63, King-street, Whitehaven	Mr. J. T. Hall	E. Martindale, Architect, Clatour Moor, Whitehaven	Nov. 10
*MATERIALS FOR EXTEN. PRECIPIT. TANKS	Willesden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	Nov. 10
Wrought-iron Bars	East Indian Railway Company	C. W. Young, Secretary, Nicholas-lane, London, E.C.	Nov. 10
Fire-bricks	do.	do.	Nov. 10
Boys' School, Caerphilly	Glamorgan C.C.	Caerphilly Police Station	Nov. 10
School, Oakwood, Pontrhydyfen, near Port Talbot	do.	Port Talbot Police Station	Nov. 10
Galvanised-iron Wagon Shed, Loft, etc., Plympton	Messrs. Shaker & Stephens	W. F. Tollit, Architect and Surveyor, Totnes	Nov. 10
House at Tealampton	Finchley U.D.C.	do.	Nov. 10
Sanding (1-in. Crushed Shingle)	Cannock R.D.C.	E. H. Lister, Council Offices, Finchley	Nov. 10
Widening Bushbury-lane (700 yds.)	Leeds Corporation	H. M. Whitehead, Engineer, Penkridge, Stafford	Nov. 10
Paving and Flagging Streets	Stockport General Purposes Com.	J. Atkinson, Borough Surveyor, Stockport	Nov. 10
1,720 lin. yds. of Wrought-iron Furdles & 9 Pairs Gates	Rhonda U.D.C.	W. J. Jones, Engineer, Public Offices, Pentre, Rhonda	Nov. 10
Improvement of Tylacelyn-road, Penygraig	Stockport Gas, etc. Committee	S. Maunier, Engineer, Gas Works, Stockport	Nov. 10
Gap Bed Lathes	do.	do.	Nov. 10
Planing Machine	Southwark Union	G. D. Stevenson, Architect, 13 and 14, King-street, Chesham	Nov. 10
*DECOR. REPAIRS AT INFIRM. R. DULWICH	Messrs. Lee Bros.	T. Murphy, Clerk, Macroom, Ireland	Nov. 10
Street Lighting	Birmingham Water Committee	44, Broad-street, Birmingham	Nov. 10
Stores	Penge U.D.C.	H. W. Longden, Surveyor, Town Hall, Amsley-road, Amsley	Nov. 10
Paving Flags (3,000 super. yds. Artificial Stone)	Manchester Tramways Committee	J. M. M'Elroy, Tramways Department, 55, Piccadilly, Manchester	Nov. 10
Tramway Tracks	do.	do.	Nov. 10
Electrical Equipment for Cars	Chesham U.D.C.	P. O. Dorman, Surveyor, Council Office, Chesham	Nov. 10
Sewer (704 lin. yds. Stoneware Pipe)	Dowdell Co-operative Society	A. Marks, Architect, 85, Abchurch-lane, London, E.C.	Nov. 10
Shop Premises, Bakehouse, etc., Union-street	Hindley U.D.C.	T. Robey, Clerk, Hindley	Nov. 10
School, Argyle-street, Hindley	Leith School Board	G. Craig, Architect, 85, Duke-street, Leith	Nov. 10
School Additions, Bonington-road	Bristol Sanitary Committee	63, Queen-square, Bristol	Nov. 10
Tools and Stores	Salford Corporation	Borough Engineer, Town Hall, Salford	Nov. 10
Transformer Station, Rectory-street, Frestwich	Leeds Corporation	City Engineer's Office, Municipal-buildings, Leeds	Nov. 10
Cleaning, Painting, etc., Meadow-road Baths	do.	do.	Nov. 10
Concrete Floor, etc., at Union-street Baths	Hornsey Town Council	E. J. Lovegrove, Borough Engineer, 99, Southwood-lane, Highgate	Nov. 10
Alterations at Kirkstall-road Baths	Nuneaton and Chilver's Cotton U.D.C.	F. C. Cook, Waterworks Engineer, Council Offices, Nuneaton	Nov. 10
Roadworks, The Drive, Priory-road	Ilford U.D.C.	H. Shaw, Surveyor, Town Hall, Ilford	Nov. 10
Reservoir (50,000 gals.), in Hennebique Ferro-Concrete	Great Yarmouth Board of Guardians	W. J. Carpenter, Engineer, South Dens-road, Great Yarmouth	Nov. 10
Sewer Main, Oakland's Park-avenue to Top of Drive	Southall Norwood U.D.C.	R. Brown, Engineer and Surveyor, Public Offices, Southall	Nov. 10
Two Steel Lancashire Boilers	do.	do.	Nov. 10
One Shallow Well	Kent Education Committee	C. O. Deig, Architect, Elgin	Nov. 10
Roadworks, Pluckington-place	County Borough of Croydon	Committee's Secretary, Kent Educ. Com., 44, Bedford-row, W.C.	Nov. 10
Drain (Surface Water), South-rosa	Kingston-on-Thames Corporation	Borough Engineer, Town Hall, Croydon	Nov. 10
Premises, Batches-street, Elgin	Wallasey U.D.C.	Borough Surveyor, Municipal Offices, Kingston-on-Thames	Nov. 10
*NEW COUNCIL SCH. PRESTON-NEW-WINGHAM	Waltham Holy Cross U.D.C.	General Manager of Tramways, Sea View-road, Liscard, Cheshire	Nov. 10
*FOUNDS TO STROUD GREEN WELL ENG. RM.	Chiswick U.D.C.	W. T. Streater, Engineer, Town Hall, Waltham Abbey	Nov. 10
*ROAD-MAKING AND LIGHTING WORKS	Metropolitan Asylums Board	J. Pollard, Engineer, 31, Old Queen-street, Westminster, S.W.	Nov. 10
Stores	do.	Office of the Board, Embankment, E.C.	Nov. 10
Stream Covering, Retaining Walls, and Fencing	do.	do.	Nov. 10
Drain (Surface Water) Bedford Park	Light Railways & Tramways Com.	H. T. Wakelam, County Engineer, Middlesex Guildhall, S.W.	Nov. 10
*BOUND. WALL AT W. FEVER HOSPITAL, S.W.	Ashford (Kent) U.D.C.	W. Terrill, Surveyor, 5, North-street, Ashford	Nov. 10
*SEW. TANK, ETC., LEAVESDEN ASYL. WATFORD	Cardiff Corporation	C. H. Priestley, Waterworks Engineer, Town Hall, Cardiff	Nov. 10
*SUR. WATER DRAIN, TAB-PAN, SOLE SWANLEY	do.	do.	Nov. 10
Bridge, Old Oak-lane, Acton	Glasgow Corporation	A. Wilson, Engineer, 45, John-street, Glasgow	Nov. 10
Pipes (Cast-iron Water), etc.	Palmer's Endowed School	T. A. Capron, 2, Orsett-road, Grays	Nov. 10
Lead Service Work	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	Nov. 10
Jobbing Mason's Work	Thames Conservancy	Conservators' Offices, Victoria Embankment, E.C.	Nov. 10
Cast-iron Socket Pipes and Castings	Kingston Guardians	C. Stuart Delfosse, 8, Duke-street, Kingston	Nov. 10
Fire-bricks, Fire-clay Retorts, etc.	Acton U.D.C.	W. Hodson, Gothic Villa, Mill Hill-grove, Acton, W.	Nov. 10
*ALTER. AND ADDS. TO SCHOOL, GRAYS, ESSIX	King's Lynn Guardians	Jarvis & Son, Architects, King's Lynn	Nov. 10
*SORTING OFFICE AT ST. ALBANS	Aberdeen Town Council	W. Dyack, Burgh Surveyor, 41, Union-st., Aberdeen	Nov. 10
*SUPPLY OF MATERIALS AND STORES	do.	do.	Nov. 10
Reservoir for Union Workhouse	Commissioners of H.M. Works, etc.	The Registrar, County Court, Swindon	Nov. 10
*CAST. FOR PAVEMENT COVERS AND FRAMES	Hove Corporation	H. H. Scott, Borough Surveyor, Hove	Nov. 10
Alterations to Boiler House, Union Workhouse	Gt. Southern & Western Ry., Ireland	Storekeeper, General Stores, Inchicore, Dublin	Nov. 10
Sewer (1,970 lin. yds. Brick and Concrete Outfall)	Salford Tramways Committee	General Manager, Tramways Dept., 32, Blackfriars-street, Salford	Nov. 10
Sewers (2,420 lin. yds. Brick and Concrete Oval)	Bromley Borough Council	F. R. Atkinson, Architect, 8, Saville-street, W.	Nov. 10
*NEW COUNTY COURT SWINDON	Bexhill Education Committee	J. Leaning & Sons, 28, John-street, Bedford-row, W.C.	Nov. 10
1,500 cubic yds. of Broken Coombe Rock Flints	Auckland Harbour Board	Harbour Board Offices, Auckland, N.Z.	Nov. 10
Stores	do.	Garside & Pennington, Architects, Pontefract	Nov. 10
Receiving Offices, Mess Rooms, etc., Pendin	Twickenham U.D.C.	Clerk to the Council, Town Hall, Twickenham	Nov. 10
*EREC. OF MUNICIPAL BUILDGS. TWEEDY-RO.	do.	do.	Nov. 10
*FIRST PORTION OF COUNCIL SCHOOL	do.	do.	Nov. 10
Queen-st. Wharf & Ferry Jetty (in reinforced concrete)	do.	do.	Nov. 10
Farmhouse, Fairleigh, Pontefract	do.	do.	Nov. 10
Six Villas at Purton, near Pontefract	do.	do.	Nov. 10
*ERECTION OF FREE LIBRARY	do.	do.	Nov. 10

## PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be left
*CLERK OF THE WORKS	Barnstable Education Committee	Not stated	Nov. 10

Those marked with an asterisk (\*) are advertised in this number.

Competitions.

Contracts, iv. vi. viii. x.

Public Appointments, xiii.

TENDERS.—Continued from page 483.

PLUMPTON.—For new public elementary school for 100 children, for the Middlesex Education Committee.

Mr. G. E. T. Lawrence, architect, Buckingham-street, W.C.	£12,112
W. & S. ...	11,931
W. & S. ...	11,829
J. J. Messon & Co. ...	11,675
W. J. Dickens ...	11,229
A. & B. Hanson ...	10,944
J. Dorey & Co. ...	10,757
Fairhead & Son ...	10,728
H. Knight & Son ...	9,432

PLUMPTON.—For building a new police residence and for the Cumberland County Council. Mr. G. G. Oliver, County Architect, Carlisle:—

J. Lorthian, Plumpton Penrith	£243 3 0
Leagacy, Leagacy	105 9 6
W. J. Unwin & Son, Carlisle	86 2 0
W. Bates, jun., Carlisle	25 10 0
S. Kirk, Carlisle	11 10 0

LONDON.—For alterations, etc., at Commercial-street Police Station, Mr. J. Dixon Butler, Architect, Surveyor of the Metropolitan Police, New Scotland Yard, for Quantities by Messrs. Thurgood, Son, & Childrey, 10, Old Broad-street, London, E.C.4.

W. & S. ...	£8,063
Lawrence & Son ...	£7,386
Harris & Wardrop ...	7,286
Chessum & Sons ...	6,964
H. Lovatt, Ltd. ...	6,950
Gordon & Sons ...	6,885
A. Hood ...	6,799
W. & S. ...	7,599

LONDON.—For extending, for about 325 ft., the joint and in remoter at East Finchley, for the Islington Borough Council, Mr. J. Patten Barber, Borough Engineer, Town Hall, Upper-street, N.:

W. & S. ...	£234 8 4
J. W. Drake ...	187 10 10
C. W. Killing- back & Co. ...	177 10 0
W. & S. ...	241 5 6
H. H. Jackson ...	174 7 6
J. R. Freeman ...	229 11 3
C. & East ...	226 3 4
Finchley ...	211 5 0
Finchley ...	211 5 0

LONDON.—For covering heaters and piping at Brook Shoot, Shooter's Hill, Woolwich, for the Metropolitan Water Board, Mr. W. T. Hatch, Engineer-in-Chief:

W. & S. ...	£847 9 0
W. & S. ...	803 15 7
R. Roman & Co., Ltd. ...	752 11 10
J. & S. ...	690 13 9
W. & S. ...	661 4 10
W. & S. ...	651 8 2
W. & S. ...	633 15 5
W. & S. ...	631 15 8
W. & S. ...	584 17 7
W. & S. ...	576 9 12
W. & S. ...	573 3 10
W. & S. ...	510 2 4
W. & S. ...	502 11 8
W. & S. ...	497 0 0
W. & S. ...	482 12 0
W. & S. ...	441 1 3
W. & S. ...	417 3 3

EDUCATION COMMITTEE TENDERS.

For and Embley, St. Leonard's-road (Heating).

W. & S. ...	£175 0 0
J. Richmond & Co. ...	139 0 0
Palowkar & Son ...	£83 5 0
J. Yettton & Co. ...	79 0 0
Car-street, Lunc-	70 12 0

Cumbrell, N. Cater-street, Heating.

W. & S. ...	£562 0 0
J. Yettton & Co. ...	£423 10 0
W. & S. ...	375 0 0
W. & S. ...	357 0 0
W. & S. ...	350 0 0
W. & S. ...	346 0 0
W. & S. ...	293 0 0

Heath St. John's-road (New Boiler).

W. & S. ...	£242 8 0
W. & S. ...	£145 0 0
W. & S. ...	137 0 0
W. & S. ...	133 10 0

LONDON. For the erection of baths at the corner of Park Hill and Clapham Park-road, for the Wandsworth Borough Council:—

	Amount for original design.		Extra for pipe ducts.		Extra for facing and Portland stone.		Extra for bath tops.		Engineering.		Total amount of estimate. (Alternative design.)	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
G. Wales & Co., Ltd.	5,924	10 0	38	3 0	430	0 0	93	11 0	25	0 0	6,531	4 0
W. & C. Brown	5,300	0 0	18	0 0	505	0 0	85	0 0	11	0 0	6,009	0 0
J. Nicks & Co.	5,474	6 0	33	7 4	271	3 11	91	5 6	1	7 4	5,871	15 5
C. Wall, Ltd.	5,288	0 0	11	0 0	480	0 0	82	0 0	1	2 3	5,862	2 3
Parsons & Townsend	5,370	0 0	13	0 0	370	0 0	85	15 0	5	0 0	5,843	15 0
J. E. Johnson & Son	5,280	0 0	14	0 0	434	0 0	69	0 0	4	0 0	5,801	0 0
Waring White Building Co.	5,218	0 0	11	0 0	442	0 0	109	0 0	1	0 0	5,781	0 0
Holliday & Greenwood	5,177	0 0	12	0 0	457	0 0	58	0 0	—	—	5,704	0 0
F. & H. F. Higgs	5,117	0 0	6	0 0	473	13 0	70	12 6	0	11 0	5,688	2 6
Marriott & Salter	5,100	0 0	11	3 8	457	8 8	97	18 3	1	0 6	5,637	9 1
A. N. Colas	5,131	0 0	13	8 0	383	5 0	65	6 0	1	5 6	5,594	4 6
F. G. Vigor & Co.	5,100	0 0	12	0 0	382	0 0	75	0 0	—	—	5,568	0 0
Read & Wilkinson	4,997	0 0	9	11 10	469	19 0	80	0 0	—	—	5,558	17 4
Pethick Bros.	4,890	0 0	11	0 0	483	0 0	81	9 0	0	17 0	5,540	0 0
C. Ancell	5,029	0 0	10	0 0	417	0 0	61	0 0	—	—	5,519	0 0
Leslie & Co., Ltd.	5,030	0 0	13	0 0	370	0 0	81	0 0	3	0 0	5,465	0 0
F. & H. F. Higgs	4,980	0 0	9	0 0	386	0 0	61	0 0	2	0 0	5,454	0 0
Kirk & Randall	4,900	0 0	11	0 0	449	0 0	60	0 0	0	17 0	5,420	17 0
I. & M. Patrick	4,927	0 0	11	0 0	400	0 0	45	0 0	—	—	5,383	0 0
E. Triggs	4,830	0 0	6	0 0	405	0 0	60	0 0	1	0 0	5,311	0 0
F. G. Minter	4,783	0 0	10	0 0	422	0 0	93	0 0	2	0 0	5,292	0 0
Turtle & Appleton	4,780	0 0	9	10 0	440	0 0	74	0 0	—	—	5,236	0 0
Higgs & Hill	4,774	0 0	12	0 0	406	0 0	85	0 0	1	0 0	5,278	0 0
E. E. Nightingale	4,800	0 0	12	0 0	394	0 0	59	0 0	2	10 0	5,268	0 0
Hibberd Bros., Ltd.	4,770	18 12 3	3	302	8 8	69	4 6	0	6 5	—	5,244	19 6
W. Smith & Co.	4,791	0 0	10	10 0	367	0 0	67	10 0	1	0 0	5,237	0 0
H. Lovatt, Ltd.	4,743	0 0	0	18 9	435	2 5	47	1 1	0	18 3	5,236	0 6
A. J. H. Higgs	4,675	0 0	0	10 2	429	18 3	51	9 0	0	5 4	5,199	15 1
W. Johnson & Co., Ltd.	4,758	0 0	14	0 0	374	0 0	63	0 0	—	—	5,169	0 0
Spencer, Santo, & Co.	4,670	0 0	12	0 0	430	0 0	70	0 0	4	0 0	5,186	0 0
Martin, Wells, & Co., Ltd.	4,790	0 0	11	0 0	394	0 0	53	0 0	—	—	5,160	0 0
Jones Bros.	4,679	0 0	0	10 10	394	0 0	53	0 0	2	0 0	5,137	0 0
L. Whitehead & Co., Ltd.	4,625	0 0	11	0 0	385	0 0	63	0 0	2	0 0	5,086	0 0
W. H. Hyde	4,498	0 0	10	0 0	403	0 0	100	0 0	0	16 0	5,011	16 0
W. Wallis	4,453	0 0	12	4 0	440	17 1	51	12 0	1	10 1	4,959	3 7
Croft Bros., Ltd.	4,490	0 0	7	15 8	429	18 3	51	9 0	1	10 2	4,937	19 0
Wisdom Bros.	4,411	0 0	38	0 0	400	0 0	70	0 0	—	—	4,818	2 0
J. Shelborne & Co.	4,427	0 0	9	3 0	418	0 0	47	0 0	0	17 0	4,902	0 0
E. Wall	4,517	0 0	9	3 7	310	7 1	47	13 2	1	2 0	4,894	3 2
J. Garrett & Son	4,423	0 0	9	11 0	357	0 0	62	0 0	—	—	4,832	11 0
W. J. Fryer & Co.	4,396	0 0	8	16 0	306	0 0	55	0 0	0	11 0	4,766	7 0

Engineering Works.

	Amount for original design.		Additions.		Total. (Alternative design.)	
	£	s. d.	£	s. d.	£	s. d.
W. J. Fryer & Co.	2,075	0 0	745	10 6	2,820	10 6
J. Fraser & Son	1,743	0 0	954	13 0	2,697	13 0
G. Haden & Son	1,342	0 0	965	0 0	2,307	0 0
J. F. Phillips & Son	1,237	0 0	936	0 0	2,173	0 0
Rosser & Russell	1,180	15 0	612	15 0	1,802	10 0
Stubbs Son, & Hall	1,187	15 2	484	18 10	1,672	14 0
Parsons & Townsend	1,165	5 0	385	6 6	1,550	11 6
T. Potter & Sons, Ltd.	1,163	10 0	376	18 0	1,539	8 0
Fraser & Fraser, Ltd.	1,138	14 8	463	18 5	1,602	12 8
Tyler & Freeman	1,111	2 1	700	11 7	1,811	13 8
Forster Bros., Ltd.	1,105	10 10	699	1 0	1,804	9 3
J. E. Boaz & Co.	1,083	11 7	645	2 4	1,728	13 11
G. E. Taylor & Co.	1,083	11 7	635	2 4	1,718	13 11
E. Busby & Co.	1,071	12 4	599	7 10	1,670	2 2
Macdonald & Moncrieff	1,065	0 0	789	0 0	1,854	0 0
J. & F. May	1,055	0 0	600	0 0	1,655	0 0
Z. D. Berry & Sons	1,005	0 0	713	0 0	1,718	0 0
Dargue, Griffiths, & Co.	897	3 8	805	0 0	1,702	3 8
H. Braithwaite & Co., Ltd.	975	0 0	600	0 0	1,574	0 0

LONDON.—For building a wall at High-street, Hornsey, for the Metropolitan Water Board:—

Patman & Totheringham	£708 0 0
J. & C. Willmot & Sons	762 10 6
J. Mowlem & Co., Ltd.	679 0 6
Doewra & Son	647 15 3

LONDON.—For about 4,210 tons of acid steel track rails and fastenings to be used for the reconstruction of the first section of the London County Council's (northern) tramways:—

P. & W. Maclean, Ltd.	£32,813 2 6
Barrow Hematite Steel Company, Ltd.	32,249 5 0
Boileau, Vaughan, & Co., Ltd.	31,131 15 0
Lorain Steel Company, U.S.A.	27,121 10 0

LONDON.—For the supply and erection of three centrifugal pumps and accessories required at the Falconbrook Pumping-station, for the London County Council:—

Richardsons, Westgarth, & Co., Ltd.	£3,075
Gwynnes, Ltd.	3,004
Dreadle & Co.	2,502
J. Cochrane	2,490
Tanges, Ltd.	2,230
J. Simpson & Co., Ltd.	2,175
W. H. Allen, Son, & Co., Ltd.	2,167
Mather & Platt, Ltd., Manchester	1,730

LONDON.—For the reconstruction of Denmark Hill Bridge, for the London County Council:—

W. Moss & Son, Ltd.	£7,999 12 0
J. Strachan	6,490 0 0
Pedretti & Co.	6,218 9 0
Westminster Construction Co., Ltd.	5,535 14 10
A. Thorne	5,394 18 7
Heenan & Froude, Ltd.	5,366 16 2
J. Jackson & Co.	5,334 4 9
S. Kavanagh & Co.	5,285 16 9
Wilkinson Bros.	5,223 0 0
Tibury Contracting and Dredging Co., Ltd.	5,069 19 9
G. Hay & Co.	5,050 9 2
Muirhead, Greig, & Matthews	5,010 2 4
A. Facey & Son	4,961 5 0
H. Woodham & Son	4,959 14 4
Johnson & Langley, Leicester	4,868 5 0

LONDON.—For permanent way (for electric traction), bridge work, road widening, etc., Wood Green and Southgate, for the Light Railways and Tramways Committee of the Middlesex County Council. Mr. H. T. Wakelam, County Engineer, Middlesex Guildhall, Westminster, S.W.:

J. Strachan	£50,700 0 0
C. Wall, Ltd.	44,319 0 0
Mowlem & Co.	42,024 0 0
Grounds & Newton	41,873 0 6
G. Hay & Co.	40,833 13 7
G. Bell	40,235 0 0
T. Adams	39,818 3 2
G. Holloway	39,800 0 0
Pethick Bros.	39,777 0 0
F. Osman	38,500 0 0
Ford Clift	£38,387 0 0
Dick, Kerr, & Co.	38,386 19 2
Co.	37,980 10 0
British Elec- tric Equip- ment Co.	37,488 5 0
Wimpey & Co.	35,884 2 7

PAIGINTON.—For new business premises for Paiginton Co-operative Society, Messrs. Bridgman & Bridgman, architects, of Torquay and Paiginton. Quantities by Mr. Vincent Catermole Brown, of Paiginton:—

Plymouth Co-operative Society	£4,145 4 1
H. & W. Pollard & Co.	3,988 6 2
R. & Yeo & Sons	3,820 8 3
R. Wilkins & Sons	3,688 0 0
H. C. Goss	3,600 0 0
H. C. Jackman	3,611 10 10
R. E. Narracott	3,504 2 6
J. Mumford	3,497 9 0
H. Drew	3,294 0 0
W. E. Blake	3,170 0 0
G. Arscott & Son	3,110 10 5
W. Smardge, Paiginton	3,068 15 0

PENTRE.—For additions and alterations to premises, 191, Gelli-road, Pentre, for Mr. Bird. Messrs. Ivor Jones & P. E. Richards, architects, 18, St. Mary-street, Cardiff:—

Morgan Bros.	£245 10 0
J. Cox, Giffach	£199 11 4
Richard & Rees	£240 0 0
W. E. Williams	£190 0 0
Withdrawn	—



POOLE.—For kerbing, etc., to roads, Branksome Park, for the Town Council. Mr. J. Elford, Borough Engineer and Surveyor, Poole:—

Mr. J. Maidment, Newtown, Poole—	
No. 1 Contract* .....	£230 10 0
No. 3 Contract* .....	107 17 10
No. 4 Contract* .....	201 4 0
No. 5 Contract* .....	135 11 10
Mr. W. P. Saunders, Bournemouth—	
No. 2 Contract* .....	155 2 9

RICHMOND.—For the adaptation of mansion for refreshment purposes and shelter, Marble-hill, for the London County Council:—

H. Haynes .....	£1,705 0	Marrison & Harvey .....	£1,172 10
E. Proctor & Son .....	1,690 0	T. J. W. Jesson .....	1,160 0
Frank & Simons, Ltd. ....	1,554 0	Eldridge & Son .....	1,134 0
Higgs & Hill, Ltd. ....	1,184 0	Spiers & Pond, Ltd. ....	1,120 0
T. G. Sharplington .....	1,478 0	H. C. Payne .....	1,038 0
J. A. Richards .....	1,395 0	J. W. Brooking .....	910 0
Victoria Sanitary Engineering Co. ....	1,319 0	J. Christie, London* .....	767 0
J. Barker & Co., Ltd. ....	1,317 0		

SCALBY (Yorks).—For extension of cast-iron water mains, etc., for the Urban District Council. Mr. W. H. Scott, Engineer and Surveyor, Wharfedale-villa, Newby, near Scarborough:—

E. Percy .....	£312	T. Smith .....	£196
Hunter & Smith .....	220	T. C. Dill, Scarborough* ..	190
R. Clough .....	218	E. & W. H. Haley .....	129

[The last-named Tender was not given in full.]

SHEPPERTON.—For new public elementary school for 430 children, for the Middlesex Education Committee. Mr. H. G. Gifford, architect, The Gulldhall, Westminster, S.W.:—

J. Ward & Son .....	£5,568	J. Barker & Co. ....	£5,128
Patman & Fotheringham .....	5,450	Wisdom Bros. ....	5,040
Treasure & Son .....	5,409	P. Gough & Co. ....	4,981
F. G. Minter .....	5,379	W. Lawrence & Son .....	4,974
Passridge & Son .....	5,365	Palmer & Son .....	4,820
W. Blackburn .....	5,300	J. Dorry & Co. ....	4,799
C. F. Kearley .....	5,253	W. J. Renshaw .....	4,765
A. & B. Hanson .....	5,202		

SOBORTON.—For main-laying, for Gosport Waterworks Company. Mr. E. T. Hildred, engineer, 1, High-street, Gosport:—

P. & S. ....	£1,000	(I. Dean & Co. ....	£5,212 4 0
Hardy & Atkinson .....	8,226 2 8	R. C. Brebner & Co. ....	5,107 0 0
W. Moss & Sons, Ltd. ....	7,740 15 1	R. H. P. Neal, Ltd. ....	5,085 0 0
E. Nuttall & Co. ....	7,442 9 6	A. E. Osen-ton .....	5,026 16 0
Jenkins & Son .....	6,848 3 1	W. Hill & Co. ....	4,964 7 0
Jones & Son .....	6,722 0 0	J. A. Ewart .....	4,762 3 7
J. Hunt .....	6,594 13 10	W. Pickthall & Co. ....	4,762 12 1
Rowell & Sons .....	6,358 0 10	Stone, Farley, & Co. ....	4,725 5 1
J. Riley .....	6,312 11 11	W. L. Wallis & Co. ....	4,590 0 0
G. Bell .....	6,081 0 0	P. Osman .....	4,541 1 11
Cunningham, Forbes, & Co. ....	5,930 9 8	Whyte & Co. ....	4,346 12 7
J. Croad .....	5,900 10 2	Davies, Ball, & Co. ....	4,346 12 7
J. W. Dean, Ltd. ....	5,743 14 9	A. Streeter & Co. ....	4,058 0 0
Wright & Son .....	5,600 12 2	H. Ashley .....	3,879 18 6
A. E. Nunn .....	5,490 8 3	J. H. Vick-ers, Nott-ingham* ..	3,767 11 10
Smith & Co. ....	5,483 14 1		

SOUTHAMPTON. For alterations, etc., to the Evans-Working Men's Club, Northam, Southampton. Messrs. Lemon & Blizard, architects, Castle-lane, Southampton. Quantities by Mr. J. H. Blizard:—

A. Payne .....	£1,028 0 0	J. Nichol .....	£928 0 0
Jenkins & Sons, Ltd. ....	904 0 0	Dyer & Sons .....	913 0 0
H. Stevens & Co. ....	981 0 0	Golding & Ashurst .....	900 0 0
Exors. of the late W. Franklin .....	975 0 0	G. R. Long .....	895 0 0
H. Lawrence .....	932 16 8	Ryland Bros. ....	895 0 0
		A. E. Jukes & Son .....	888 0 0

[All of Southampton.]

[Architects' estimate, 2935.]

SOUTHAMPTON.—For laying 12-in. and 9-in. sewers in rear of Guildford, Rochester, and Victoria streets, etc., Northam, for the Corporation. Mr. J. A. Crowther, Borough Engineer:—

H. Lawrence .....	£1,095 0	F. Osman .....	£739 10
R. Richards .....	921 15	J. Douglas* .....	721 0

[All of Southampton.]

SOUTHAMPTON.—For constructing roof covering to destructor furnaces at Portsmouth Sewage Farm, for the Corporation. Mr. J. A. Crowther, Borough Engineer:—

J. Hitchen & Son, Ltd. ....	£472 18 7	Jenkins & Co. ....	£367 1 7
Westwood & Wrights .....	460 0 0	Sons, Ltd. ....	364 0 0
H. J. Hood .....	460 0 0	Jukes, Coulson, Dyer & Sons .....	357 0 6
Exors. of W. Franklin .....	104 0 0	H. Douglas .....	339 12 11
G. Napier & Sons, Ltd. ....	396 0 1	H. Lawrence, Southampton* ..	295 0 0
F. Osman .....	374 0 0		

THURLES (Ireland).—For erecting a dispensary residence and out-offices, etc., for the Thurles Board of Guardians. Mr. J. P. Wren, architect:—

Mackey & Son .....	£1,466 0 0	B. Cussen .....	£1,157 0 0
J. Ormondo .....	1,390 0 0	P. Grant .....	1,041 7 5
M. Maher .....	1,285 0 0	J. Lambie .....	970 0 0
W. Leashy, Thurles* .....	1,219 0 0		

TODMORDEN.—For 1,100 yds. of wrought-iron fencing and gates, for the Town Council:—

E. J. Raybould & Co., Ltd., Worthington ..	£260 3 11
--	-----------

TONYPANDY.—For alterations and additions to business premises, No. 17, Dunraven-street, for Messrs. Kinsey & Co. Messrs. Ivor Jones & T. E. Richards, architects and surveyors, 18, St. Mary-street, Cardiff. Quantities by the architects:—

E. Jones .....	£788 0	Alban Richards, Cardiff* .....	£645 0
G. Couzens .....	655 0	J. Cox .....	633 18

† Amended and accepted.

WALLASEY.—For 400 tons of 4-in. granite curb setts, for the Urban District Council. Mr. W. H. Travers, Engineer and Surveyor, Public Offices, Egremont, Cheshire:—

Brundritt & Co., Runcorn, Cheshire .....	£1 1 9
--	--------

WORTHING (Sussex).—For the erection of five dwelling-houses, North-road. Mr. G. J. Hagger, P.A.S.L., architect and surveyor, Worthing:—

J. A. East .....	£1,980	H. Herbert .....	£1,510
A. Crane .....	1,600	A. Parsons* .....	1,500

YNYSBOTH.—For nine houses at Ynysoeth, near Aberystwyth, for the Miners' Homes Land and Building Co., Ltd. Messrs. Ivor Jones & T. E. Richards, architects, 18, St. Mary-street, Cardiff:—

Knox & Wells .....	£2,802 0	J. Howells .....	£1,665 0
W. Hames .....	1,845 0	C. Nicholls, Parys & Davies .....	1,539 0
	1,972 10	Aberystwyth* ..	

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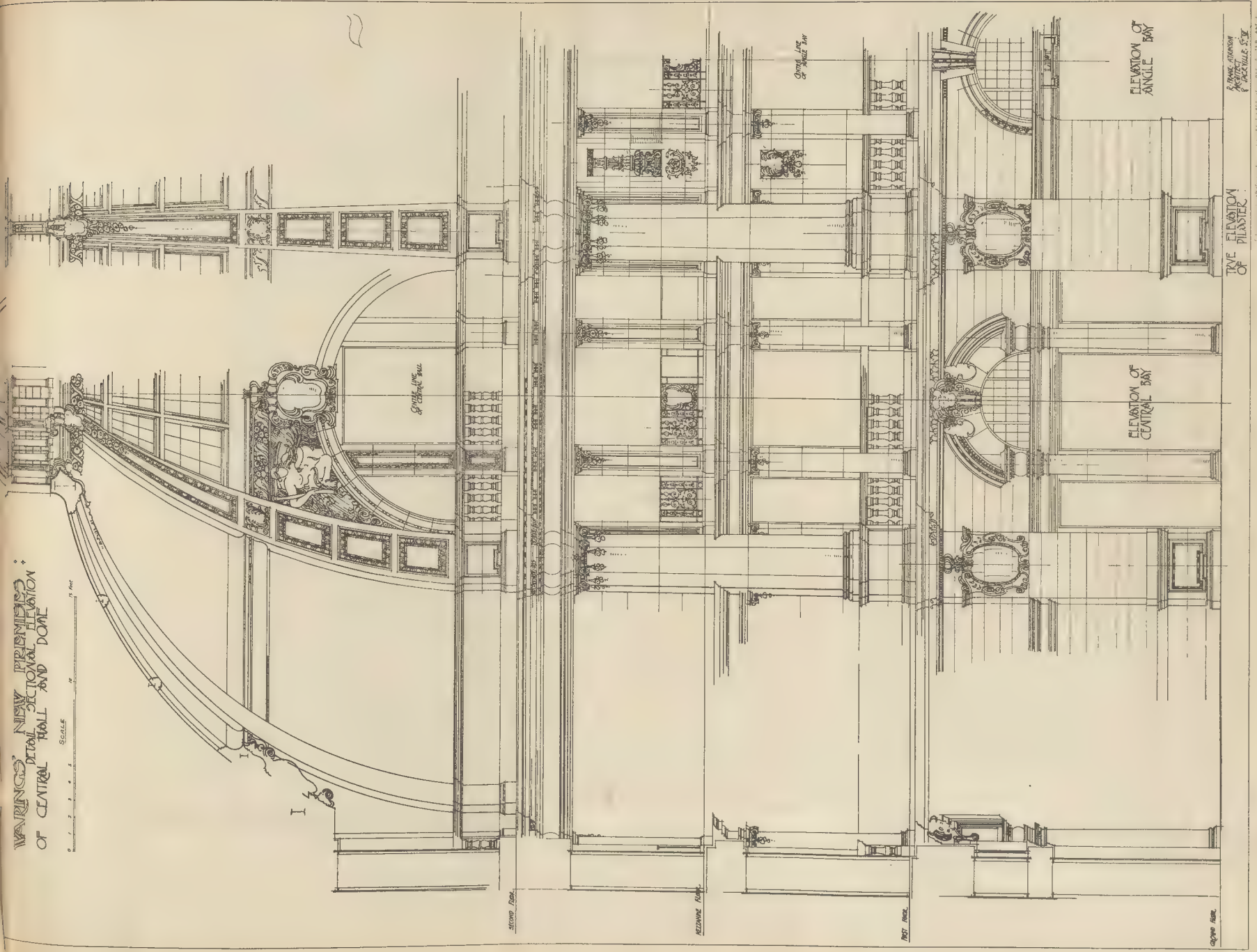






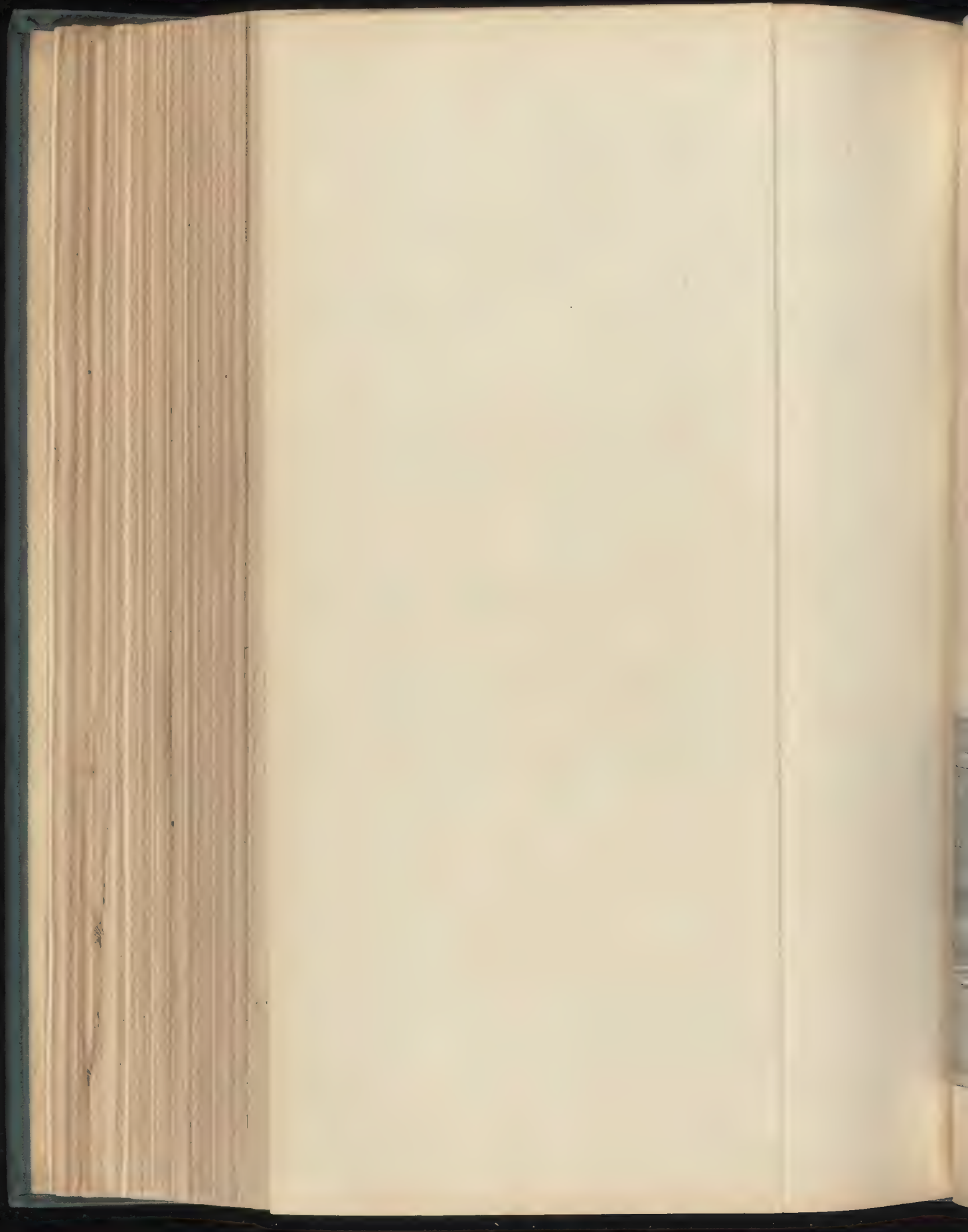
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# The Builder.

VOL. LXXXIX.—No. 3275.

NOVEMBER 11, 1905.

## ILLUSTRATIONS.

New Spire, St. George's Church, Bickley.....	Mr. Ernest Newton, Architect.
Blythburgh Church, Suffolk (Interior and Exterior).....	From Photographs.
New Public Baths, Old Kent-road.....	Mr. E. Harding Payne, A.R.I.B.A., Architect.
Memorial Tablet, County Hall, Northampton.....	By Mr. Nelson Dawson.
Chancel Screen, Lanreath Church, Cornwall.....	Drawn by Mr. W. L. Stephens.


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### The Church of Blythburgh.

O long ago as the time of the Domesday survey Blythburgh had a church of some importance, for there were then attached to it two carucates of land, with nine villeins and four bordarii. Abundant evidence could be given of the considerable importance of the place, with its weekly market, three annual fairs, unrestricted ship-building and fishing rights, and many other privileges, in Norman and subsequent days; but it would be undesirable in a mere sketch account of its noble church.

Henry I. gave the tithes of Blythburgh to the abbot and canons of the Austin house of St. Osyth, Essex. Here the abbey established a cell or priory a little distance to the north-east of the parish church. Of this priory there are some small remains incorporated in a cottage; and others standing in a garden, but with these we have now no concern. In establishing themselves at Blythburgh, the canons received much assistance from the thaverings, who were then lords of the manor. The priory had no convent rights of its own; it was in most respects a mere dependency of St. Osyth, and had to accept its priors at the joint nomination of the mother house and of the thaverings and their successors. The priory had but a slender income, and its

numbers were always small. Sometimes there were only three canons resident beside the prior, and we believe they never exceeded a total of five. So poor was the house that the Bishop of Norwich, when visiting in the XVth century, found that there was no chapter-house, and he had to hold his visitation in a chapel of the conventual church. The priory was considerably in debt, and they had not even sufficient voices or numbers to have a sung mass. All this is briefly stated in the interests of historic truth; for it is constantly reiterated in the usual run of guide-books, following the mistake of Suckling, that the splendid church of Blythburgh, of XVth century date, was the work, or mainly the work, of the "monks" of the priory. The facts, as well as the architectural evidences, are all the other way; indeed it is highly improbable that the canons of either the mother house of St. Osyth or of the priory cell contributed in any way to its erection.

"Few ecclesiastical structures in this kingdom possess a juster claim to unqualified admiration than Blythburgh Church, a fabric splendid amidst decay and desolation." Thus wrote Mr. Suckling in his admirable but unfinished history of Suffolk, published in 1848. Stately and beautiful, however, as this church is, as an exceptionally fine example of the later development of the style usually known as Perpendicular, and improved as its condition is since the days of Suckling, there is certainly one conspicuous point about it that detracts from unqualified admiration

—we refer to the inferior character of the western tower as compared with the rest of the church, and its lack of due proportion. There can be little doubt, we think, that the grand scheme of rebuilding this church, begun about 1450, included a new west tower on similar lines, but that lack of wealthy benefactors and the setting-in of a decay in commerce, and the building of the fine church of Wälborswick close to the open sea, prevented this last stage of the rebuilding scheme being carried out. The tower parapet and a few other features were added or renewed at the time of the general scheme. The appearance of the tower suffers much from the loss of the tracery of the bell-chamber windows.

The north and west walls of the north aisle of the present church show abundant traces of the re-using of both Norman and Early English moulded stones among the flints of which the fabric mainly consists. This points to the fact that a Norman church, with extensions and alterations during Henry III.'s reign, stood here until the XVth century. Probably one of the first considerable alterations to the old fabric, as it was in the XIIIth century, was the erection, towards the end of the XIVth century, of a substantial tower, excellent of its kind, but showing no wealth of treatment, and obviously designed to carry a spire, and without that complement it somewhat lacks in dignity. Perhaps the XVth century re-builders considered the tower sufficiently stately, when spire-crowned, to obviate any urgent necessity



of rebuilding. But the spire disappeared in a terrific storm in the midst of Elizabeth's reign. This often misquoted and wrongly-dated passage as to the tempest is taken from Stow's *Annals* (1615), p. 681:—

"On Sunday the 4 of August (1577) between the houres of nine and ten of the clocke in the forenoone, whilst the minister was reading of the second lesson in the parish church of Blyborough a Towne in Suffolke a strange and terrible tempest of lighteninge and thunder strake through the wall of the same church into the ground almost a yard deepe, drave downe all the people on that side above twenty persons, then renting the wall up to the Revestrie, cleft the dore and returning to the steeple rent the timber, brake the chimes, and fled towards Bongeys six miles off. The people that were stricken downe were found grooving more than halfe an houre after, whereof a man more than fortie yeares, and a boy of fifteene yeares old were found starke dead, the others were scorched."

In Gardner's *History of Dunwich and Blythburgh* (1754) an entry from the parish registers is cited to the effect that "the spire-part of the steeple" was thrown down and the standing parts of the tower greatly rent. Unfortunately the early registers and a great store of valuable documents and pre-Reformation churchwarden accounts were stolen out of this church or destroyed in the latter half of last century. It seems almost certain that the spire was of lead-covered timber: Though Suffolk possesses very few spires, there were old ones of this description not far from Blythburgh, namely, a graceful lofty one at Middleton, and one of smaller dimensions at Yoxford, and a third at Sibton, pulled down in 1817.

The church, dedicated to the Holy Trinity, consists—in addition to the tower—of chancel with side chapels, nave with side aisles and great clearstory, and south porch. The dimensions of this church are curiously varied, as given in two or three printed accounts. Measurements taken recently give the length of the church, from the east end of the chancel to the tower ordinary, as 128 ft., and its width 54 ft. 4 in. Each aisle is 16 ft. wide, and the nave 22 ft. 4 in. The length of the chancel aisles—continuous with those of the nave—is 36 ft., the chancel projecting 10 ft. 10 in. further east. The plan consists of a continuous stretch of eight bays, of which the two last to the east, together with the extension just noted of the sacrum, form the chancel and its chapels by the intervention of lofty screens. The material of the church, as in the great church of Southwold, and of the ruined great churches of Walberswick and Covehithe, is of shore pebbles set in singularly hard mortar and having an outer surface of split or dressed flints. The quoins and window and door frames, and general dressings of the buttresses, plinths, and battlements are of a white freestone, and are almost certainly sea-borne from Caen.

Viewed from the interior, the long stretch of arcades, with well-moulded capitals at a height of 13 ft. 6 in., surmounted on each side by a splendid line of eighteen two-light, pointed, traceried clearstory windows, is singularly imposing. The tracery of the great east window was renewed about twenty years ago, but on the old lines. The windows on the north and south sides of the sacrum are bricked up; that on the south

is of three lights, and that on the north of two lights. There are some slight indications that the great work of XVth century rebuilding was begun at the extreme east end. The probable order of operations was (1) the building of the sacrum clear of the old chancel, which was left standing meanwhile; (2) the building of the south aisle and porch outside the old fabric; and (3) the pulling down of the old church and rebuilding the nave and north aisle, using up much of the old material. Many of the flints and pebbles used on the north side are more irregular than the finer-dressed ones on the south, and the working in of old Norman and Early English dressed stone on that side has been already noticed.

Several wills, cited by Gardner, help us in the establishing of dates. John Greyse, by will of 1442, gave twenty marks to the fabric of the chancel of the church of Blythburgh, provided it was settled to build a new one. The work was probably begun soon after this date. In the years 1453-4 there were several bequests to the chancel building. In 1462 John Aleyn left 40s. towards glazing the south window of the new chancel, which may, of course, have been plainly glazed or finished before that date. At any rate, the will evidence is to the effect that the new work was not begun until after 1442, and it was probably quite finished within about twenty years at the most. In 1450 John Hopton founded a chantry for one chaplain, to the honour of St. Margaret, in the north chancel chapel. The Lady chapel was on the opposite side of the chancel.

The renewed church was probably not consecrated until all was complete. The late Professor Middleton, in his interesting illustrated paper contributed to the Society of Antiquaries in 1882 on the subject of exterior and interior consecration-crosses, drew particular attention to Blythburgh. He noticed the two quatrefoiled crosses of freestone inlaid with flints on the outer buttresses of the chancel at the east end, 4 ft. 6 in. from the ground, one on each side. On one of them he observed slight indications of the application of paint, which can still be traced. He considered—and in this he was doubtless correct—that the blank centre stone amid the large lettering below the east window was thus left on purpose for marking at the time of consecration; and he also considered that there were sufficient blank stones left in other places on the north and south walls for the marking of the requisite number.

Below the east window is a line of boldly executed capital letters, each crowned, executed in flush-work—that is, in freestone, level with the wall surface and filled up with dressed flints. They were evidently executed by the same hands, or after like designs, as the inscription over the west tower window of Southwold Church; only in that case they are plain to read—*St. Edmundus ora pro nobis*. The letters at Blythburgh, though in good preservation, have hitherto defied explanation. An ingenious and elaborate effort to explain them was made by Sir R. Gowers a few years ago, in Vol. XI. of the *Journal of the Suffolk Archaeological Institute*; but in certain respects this attempt is clearly faulty.

There are six letters on each side of the central space. The first two are A. N. and probably Sir R. Gowers' suggestion that they stand for *Ad Nominis*. The rest of the letters must likely stand for various saints.

The open parapet of the porch on the south side of the church is of great beauty and interest. The porch is an exceptionally fine specimen of East Anglian flint work of the XVth century. It had a par. so. and a. g. roof, but this groining was more than a century ago; it was done in 1806. The groining was, however, perfect when Gardner wrote in the XVIIIth century. He gives a drawing of the central boss, on which was an inscription asking for prayers for the soul of John Masin and Katharine his wife. There is a fine north. window opposite the porch; the hood-mould has good terminals representing a lion and a griffin. Another particular feature of the exterior of the church are the small entrances into the north and south chapels of the chancel. In each case the doorway is under the half arch of a flying buttress.

The octagonal font, introduced to the east of the tower archway, stands on two high octagon steps, and has been a fine example among the many beautiful ones of the XVth century that East Anglia possess; but it was much damaged by the fall of the spire in 1577. An inscription round the margin of the upper step asks for prayers for the soul of John and Katharine Masin (the donors), who caused this font to be made. The continuation of it is illegible.

It occasionally strikes the curious visitor to Blythburgh church that there is almost too much window space and excess of light; but, of course, in former days the whole was filled with coloured glass, when the general effect would be very different. The great Parian cross-clast of Suffolk, William Dowling, in his campaign of desecration, did not personally visit Blythburgh, but he sent his lieutenant on April 9, 1644. The report in Dowling's journal is:—"There was twenty superstitious pictures; one on the outside of the church, two crosses, one on the porch, another on the steps, and twenty cherubims to be taken down in the church and chancel; and I hauled down three orate pro animabus, and gave order to take down about 200 pictures within eight days." The stallwork, with the numerous saints of the Hopton chantry, doubtless escaped in this manner, but through the presence at Blythburgh of influential descendants of the family. In one of the windows of the Hopton Chantry and in several other windows of both aisles are fragments of old coloured glass, chiefly heraldic, but some full figures, notably of St. Peter in the upper tracery.

The roofs of Holy Trinity, Blythburgh, must have originally formed one of the chief glories. The lean-to roofs of the aisles were put into good order during the 1882-4 restoration, and are now destitute of any colouring. They have some good tracery in the spandrels of the corbels, but very little, we believe, is original. The nave and chancel roofs, at a continuous level, must have

presented a singularly beautiful and harmonious scheme of colouring; indeed, they are beautiful now in all their decay and patching. The particular characteristic of the Suffolk church roofs of the XVth century is that they were high-pitched, even when rising from clearstory walls, as at Southwold; but Blythburgh is an exception, having a nearly flat roof, supported by 10 great tie-beams. This roof, running in an unbroken length from the tower to the east wall, consists of nine bays, with an extra half bay at the east end. Each bay is divided up, after the usual plan of these low-pitched roofs, by ten plain rafters, with a moulded ridgebeam and longitudinal purlins. The beauty of the roof arises from the general skill of the artist-painter, and from the introduction of large well-carved angels with brilliantly painted and gilded outspread wings, holding shields of arms. Two of these angels are introduced, on each side (east and west) of elaborately carved circular bosses, at each junction of the ridge with the tie-beams. The scheme of the general painting is as follows:—Firstly, all the woodwork was painted pure white; secondly, the panelling or boarding between the rafters was painted in sets of three—red, grey, and white—repeated the whole length; thirdly, the principal timbers were decorated with wavy lines of red, brown, and green; and fourthly, the spaces between the rafters were painted alternately in the upper and lower compartments of each bay with red LHC's, with red and green floriations, and with green heart-shaped flowers containing the red monogram letter for *Christus*. Other shields of arms were fixed at the junctions of the purlins and principal timbers. There has been much grievous decay of this once fine roof, and a chest full of fallen fragments, including a large angel, has been preserved through the care of Mrs. Hatcher, for some years the faithful custodian of the church. It is to be hoped that such fragments will some day be restored to their original position, and steps taken to preserve the roof from further decay; but to attempt any general repainting of this roof would simply mean the destruction of this evidence of the degree of skill in colour possessed by our East Anglian forefathers. Mr. G. E. Fox fortunately made some accurate and beautiful drawings of this nave roof about a quarter of a century ago, before the process of decay had gone so far as at present. These drawings were exhibited at the recent Church History Exhibition at St. Albans.

Over a screen of the vestry recently formed in the old Lady Chapel stands the quaint wooden figure of a XVth century *Jack o' the Clock*, which now, by the pulling of a string, strikes a bell to signal the clergyman entering the choir. There is another more famous example at Southwold church. These are usually spoken of as the only two examples left of such figures in our churches; but this is a mistake, for a third one, in good preservation, can be seen on the top of the fine rood-screen of the church of Minehead, Somerset. This Blythburgh figure used to be attached to the dial of a clock at the west end of the nave under the tower, the chimes of which were broken in the storm of 1577.

In 1808 the small bell on which it used to strike was still in position, and bore the inscription—*Set Petre salva me*.

The exceptional wealth of old woodwork in this church is one of its great attractions. One piece of church furniture, undoubtedly coeval with the XVth century church, is the double wooden lectern of simple good design. It is somewhat dilapidated, but sufficiently substantial to be used for the reading of the Lessons; it is to be hoped that no effort will be made to "restore" it. This lectern, being double, could not have been a Gospel lectern for use in the Mass; it must have been a choir lectern to hold the large books for antiphonal singing. Interesting as this lectern is—it was engraved in Suckling's *History of Suffolk*, and has appeared in other books—it is not so unique or exceptional as is generally represented. There is another double wooden lectern in East Anglia of XVth century date, in better preservation and of decidedly superior design—we allude to the one in the church of Shipdham, Norfolk. The Shipdham example is, however, of somewhat later date, being probably of the reign of Henry VII.

Blythburgh is also fortunate, amidst all its decay, in having preserved another interesting piece of church furniture also coeval with the present church, in the shape of a substantial tall alms box, constructed to stand against a wall, with three traceried panels in front; both wood and iron work are in fairly good condition. This box, like the lectern, has been several times engraved.

The screens that run across the church, both nave and aisles, where the rood-loft used to be, now present a fairly perfect (though not over-restored)

appearance; but they have of late years undergone much rearrangement and patching, part of the rich screens of the north chapel having been moved to help to fill up. When we look at the lithographic plate in Suckling's book (1848) of the then original arrangement of the fittings of the Hopton chantry, showing its west and south screens and the effectively-designed returned stalls in their due position, it certainly seems a thousand pities that they should ever have been dragged up and made to serve as choir stalls for the centre part of the church. The details of the carving and of the rather roughly-executed series of saints (ten of which faced each other, and eight looked east in the old arrangement) were suitable enough for the more confined space of the chantry, but look meagre in their present extended position.

A school was for a long time held in the old Hopton chantry. The stalls were used as school desks, and the holes cut in the bookboards for the inkpots are still to be noticed. The small wooden figures that now form continuous lines in front of the stalls are accompanied by emblems; these emblems are mutilated in places, and scarcely sufficiently definite in one or two cases to make the identification certain; but the following appear to be the names of those represented:—On the south side, beginning at the east end—(1) St. Luke, with doctor's cap and book; (2) St. Andrew, with his cross; (3) St. Philip, with the waves; (4) St. Bartholomew, with flaying knife; (5) St. Matthias, with axe and book; (6) St. Joseph, with adze; (7) St. John Baptist, with *Agnus Dei* on book; (8) St. John the Evangelist, with serpent coming out of the chalice; and (9) St. Stephen, with stones. On the north side are:



Sloth.



Hypocrisy.

Carved Bench-end Finales, Blythburgh.



(1) St. Thomas, with staff; (2) St. Matthew, with purse and book; (3) St. James the Less, with fuller's club; (4) St. Jude, with boat; (5) St. James the Great, with staff and book; (6) St. Paul, with sword; (7) St. Peter, with the keys; (8) Our Lord, with *orbis mundi* in left hand and the right raised in blessing; and (9) St. Etheldreda. On the ends of these stalls are the arms of Swillington quartering Roos, which bearings John Hopton, the founder of the chantry, added to his paternal shield in the right of his mother.

The most interesting and exceptional of all the old woodwork in Blythburgh church is the array of old oak seats in the nave, which are coeval with the present church. The finials of many of the bench ends are most remarkable, and consist of human figures, many of a somewhat grotesque though speaking character. A set of seven were undoubtedly intended to represent the Seven Deadly Sins; they are boldly conceived, and represented with some skill and ingenuity. One of them has been sawn off at some comparatively recent period, probably because it represented one of the deadly sins with too much realism. We give illustrations of two of those remaining. The set of The Seasons, though a more attractive subject, is less original. These old oak seats were originally backless.

There is a fairly good Jacobean pulpit in the nave, which used to have a fine sounding-board.

As to monuments, this church used to be rich in brasses. The matrices, or indents, of twenty-one such figures and inscriptions were noted here in 1823; sixteen were counted during a recent visit.

In the old traditionary history of Blythburgh, Anna, King of the East Angles, whose daughters devoted themselves to the founding of religious houses, fought for many years against Penda, the pagan King of Mercia, is said to have fallen in battle at Bulcham in this parish, together with his son Ferminus, in the year 654. They were buried in the old Saxon church of Blythburgh, but their bones were afterwards removed to Bury St. Edmunds. A plain table tomb in the north aisle used to be pointed out as the sepulchre of Prince Ferminus; but it is really of XVth century date, and used to bear a brass effigy; it probably commemorates the last of the Swillingtons who was lord of this manor temp. Henry IV. Between the chancel and the Hopton chantry is a handsome arched tomb of Purbeck marble, also of XVth century date. This used to be pointed out as the tomb of King Anna, but it is known to be the monument of Sir John Hopton, the founder of the chantry, who died in 1489.

This church—a very costly one to maintain and with a miserably small endowment—was for a long period shamefully neglected. In 1785 some useful work was done, for the water spoutings on the north side have heads bearing that date. A considerable work of useful restoration and repair was carried out in 1882-4, under the direction of Street. A great gale in March, nine years ago, carried off one of the large angel pinnacles from the porch and did much damage. Soon after that

the beautiful porch showed signs of collapse and had to be shored up with timbers. A much-needed further scheme of repair is now about to be set on foot, on sound lines, which is eminently worthy of the support of archaeologists and lovers of the architecture of the past.

## NOTES.

**SIR W. RICHMOND** writes The Government and Archaeology a trenchant letter in Thursday's *Times* on the manner in which the English Government, unlike any other civilised Government in the world, leaves great archaeological explorations, like those carried out by Dr. Evans in Crete, without the slightest offer of assistance from public funds. He puts the question—

"Has any Government a right to ignore the progress (by not giving to its pioneers out of a revenue, anyhow, something) of knowledge of times, in date long past, but which, by the intelligence, enterprise, and self-sacrifice of a single man, is being unearthed?"

Sir W. Richmond's protest is emphasised by a study of the list of Birthday Honours published in the same issue of the *Times*, in which art, archaeology, and literature are absolutely ignored.

**THE** deputation to the Prime Minister in regard to the unemployed persons in the East End of London, on Monday last, was the natural result of the Act passed by the Government last session. That Act has been regarded popularly as recognising the principle that the State is bound to find employment for workmen in want of employment. We must say that the Government can hardly complain of the impression, for the real basis of the Act was to give work under public control at private expense. It is clear that the question demands careful consideration. No workman out of employment need starve, for relief at the hands of the guardians is always to be obtained in proper cases. But the difficulty is that the Act of last session recognises relief other than that of the poor law; in other words, help to those who are not actually so destitute as to be obliged to go to the workhouse. It is clear, however, that the question must be carefully worked out, so that if there is to be a change in the matter of poor relief there shall be no indiscriminate relief, and, as far as possible, no weakening of the principles of thrift. As we have more than once pointed out, incompetent and careless workmen must not be kept at the expense of capable and thrifty men.

**COUNTY COUNCIL** **AS STATED** in the annual address of the Chairman of the London County Council, negotiations have been brought to a successful conclusion with the North Metropolitan Tramways Company for the surrender of their lease, but we fear that the cost of the premature determination must be regarded as a dead loss to the ratepayers. In stating the total cost of electrifying the northern system at something between four and five millions, the Chairman thought the public might feel assured of satisfactory financial results; a hopeful forecast of somewhat dubious character. As

for the convenience and utility of the transformation there cannot be too many opinions, and the ultimate value of the lines would be vastly increased in connexion with the southern system. Kingsway. We see by the minutes of last week's meeting that the Highway Committee propose that work should be commenced immediately upon the electrification of the first section of the lines, 2½ miles in length, at an estimated outlay of 803,000*l.*, which, however, is not inclusive of all charges. The section in question comprises various streets in Clerkenwell, St. Luke's, Shoreditch, Dalston, Stoke Newington, Whitechapel, and Poplar, and by dealing with this portion of the lines first it will be practicable to run services with a minimum interference with the services on other routes. It is distinctly to the advantage of the metropolis that the County Council system of tramways should be completed. The only things to regret are that the value of money seems to be a minor consideration, and that the Kingsway subway has been ingeniously contrived so that the head-work is insufficient to admit the standard double-decked cars of the Council. This will result in serious inconvenience when spontaneous communication is sanctioned, or in heavy expenditure for new stock of the single-deck type.

**TRACTION ENGINE** **THE** case of *The Mayor, etc., and the Corporation of Chichester v. Foster* may furnish food for thought to Corporations which are anxious nowadays to multiply their duties and functions. The Corporation were the owners of the water system of Chichester, and, of course, also the road authorities, and they brought an action against the defendant in respect of damage to their water mains by a traction engine. There was no negligence on the part of the defendant in either the construction or use of this traction engine, the weight of which, some ten tons, was the cause of the damage. The water mains had been laid some thirty years ago; their condition was good, but they were not laid in the manner adopted at the present time, being cast in such a manner that at one side of the elliptical tube the metal was thinner than at the other, and they were laid 20 in. below the crown of the road, without cement or other special preparation. The County Court judge had found that the road was sufficiently maintained by the ordinary traffic to be expected in the district, and upon this finding of fact the Divisional Court upheld his judgment, and the Corporation, therefore, recovered from the defendant the damages they had sustained. This case turned on the finding of fact above stated, but in the case of *Attorney-General v. Scott*, upon which we commented in our issue of July 15, this fact was found the other way. In the case under discussion it is to be observed that the County Court judge had seemed to be of the opinion that the road authorities need not reconstruct their water system in order to sustain the exceptional pressure of these locomotives, which, he said, had only of recent years become common, but it is noteworthy that long ago as 1865 the Legislation



the Locomotives Act, 1865, contemplated these engines weighing fourteen tons, and the Divisional Court expressed the opinion that there is a duty on the road authorities to keep the roads up-to-date. The owners of traction engines still use them to a certain extent at their own risk, that is to say, the later legislation has left unrepealed the provisions of the earlier Acts reserving the right of public bodies and private individuals to take proceedings when a nuisance has been created by the use of locomotives, but as their use becomes more customary it will be increasingly difficult to prove a nuisance.

In the case of London County Council v. Schewzik a point of importance under the London Building Act, 1894, has been decided, dealing with a question which has been the cause of some doubt, and which was referred to in our Note on the case of London County Council v. Illuminated Advertisements Company (May 21, 1904). Over the door of a building in Stepney, known as the Russian Vapour Baths, was erected an iron framework, projecting 4 ft. 6 in. from the building, covered with zinc and with leaded glass in the front and sides with letters indicating the nature of the building. This was fixed to the building 11 ft. above the pavement by bolts at the bottom and two stay-rods at the top, which stay-rods went right through the wall. It projected beyond the general building line. The question was whether this constituted "a structure" or "projection" within the meaning of the London Building Act, and the Court decided that it did not. As in the case of London County Council v. Illuminated Advertisements Company, the Court came to the conclusion that on the question of fact this did not come within the meaning of section 22, subsect. 1, of the London Building Act, which provides "No building or structure shall without the consent in writing of the Council be erected beyond the general line of buildings in any street"; but in this case the information was also laid under section 73, subsect. 8, which provides:—

"Except in so far as is permitted by this section in the case of shop fronts and projecting windows, and with the exception of water pipes and their appurtenances, copings, string courses, window dressings, and other like architectural decorations, no projection shall extend beyond the general line of buildings in any street, except with the permission of the Council after consulting the local authority."

In the Illuminated Advertisements case this section was not included in the information, but the Court intimated that had it been before them they would have inclined to the opinion that the structure then in question was a "projection" within the meaning of this section had the point not otherwise been decided in a former case by a Court of concurrent jurisdiction. The case thus referred to is Hall v. London County Council, in which this section was construed as applying only to projections forming part of the building itself, and not applicable to lamps, signs or structures overhanging the public way, as to which, by section 164, power is given to the authorities to make by-laws. The majority of the judges who have

decided the last two cases have expressed considerable doubt as to whether Hall v. London County Council has been rightly decided, and the Lord Chief Justice intimated that the opinion of the Court of Appeal might well be sought on the question.

**A REMARKABLE** fire, due to the ignition of petrol—the spirit used for motor vehicles—formed the subject of a Coroner's inquest, held by Dr. F. J. Waldo, J.P., under the City of London Fire Inquests Act. The occurrence is of direct interest to our readers, because of the danger to buildings which is threatened by the transport through crowded streets of material, characterised by Captain Thomson, Chief Inspector of Explosives, as being "more dangerous than gunpowder." In the case to which we refer, the flames shot up to a height of from 20 ft. to 30 ft., burning spirit ran along the street, and the adjacent buildings had to be protected by tarpaulins. Notwithstanding some extraordinary discrepancy in the evidence as to the presence of a tail lamp on the steam lorry employed, we fully agree with the jury that the fire was due to an improper light of this kind. It is also manifest that the spirit could not have obtained access to the flame of the lamp if the storage cans had been in proper condition. Suggestions were made by some witnesses that the boiler fire could not ignite the spirit in case of leakage. This position is obviously untenable. In our opinion it is perfectly ridiculous to attempt the transport of explosives in any vehicle containing a fire, and equally absurd to do so at hours when the use of a lighted lamp becomes necessary. Owing to a technical point, the spirit does not come within the provisions of the Petroleum Acts, an omission that ought to be rectified without delay.

**THE Gas Light and Coke Company** have recently completed the fitting of Broad-street railway station (North London Railway) with a new gas installation on the incandescent system. Gas advocates are jubilant over the substantial economy which has been effected at the Victoria station of the London, Brighton and South Coast Railway by the substitution of incandescent gas lighting for electric lighting, and are vigorously advertising the success of the Victoria installation. Of late years most railway directors have found it necessary to observe the strictest economy to ensure that even a moderate dividend shall be paid to the shareholders; and it is not, therefore, surprising that the fact that the lighting of railway stations can be effected sufficiently well for all business purposes with incandescent gaslight at a very low cost is inducing them to adopt gas rather than electricity as an illuminant. So far as the lighting of Broad-street station is concerned, we admit that the lighting is now much better than it was when luminous flames were in use, but we do not care for the clear glass shades, which do not protect the eye from the glare of the mantle. Those forms of lamp which conceal the mantle and diffuse the light, such as the

spherical "Humphrey" gas lamp, are far more pleasing and effective. A certain proportion of light is lost, but the protection from eye irritation more than compensates for that. Many lighting experts, both electricians and gas engineers, appear to mistake bedazzlement for illumination.

**ONE** of the most important examples of concrete-steel construction hitherto completed in this country is afforded by the new bridge over the Stour, replacing a timber structure, which was inadequate for the purposes of the electric tramway system recently established between Bournemouth and Christchurch. The structure would more appropriately be termed a viaduct, as it crosses the river by a series of nine principal arches, the longest having a span of 41 ft., and the total length of the bridge being 350 ft. The whole of the work is executed in concrete-steel on the Hennebique system, from designs prepared by Mr. L. G. Mouchel, of Westminster, for Mr. F. W. Lacey, the Borough Engineer of Bournemouth. The river piers between the arch ribs consist of isolated columns of square cross-section, connected at the top by transverse ribs, and the arch ribs are surmounted by spandrel walls in which openings are formed so as to avoid unnecessary weight, at the same time giving an appearance of lightness to the entire structure. The road platform, which receives support along the centre line from the intermediate columns, is carried by longitudinal and transverse girders, and affords ample space for two lines of tramway track. To the uninitiated it may seem that the construction is somewhat too light for heavy traffic, but we have no doubt that the proportions and disposition of the reinforcement are such as to provide fully for all strains likely to be encountered. It is to be feared that bridges thus constructed can hardly equal in picturesque character some of the timber ones which they would replace; but they may be designed so as to have an aesthetic quality of their own.

**THE** trustees of Sir John Cass's Foundation have resolved to sell the freehold property, No. 32, Botolph-lane, and No. 10, Love-lane, which has latterly served as the Billingsgate, Tower, Dowgate, Bridge, and Candlewick Ward Schools. The XVIIth century house, of which the large paved forecourt is entered through Fenn's gateway in Botolph-lane, Eastcheap, is one of the four or five in London which, it is said, were inhabited by Wren when occupied in rebuilding churches and other edifices after the Great Fire. As we published in our number of May 28 last year a drawing of the house, with some particulars of its history and structure, we need say here only that it presents many features of uncommon interest as an example of a residence in the City in olden times. The charity was founded under the testamentary dispositions of Sir John Cass, alderman of Portsoken Ward, who died in 1718. In 1893-4 the Charity Commissioners made a scheme for the allocation of the endowment

Structures in Advance of Building Line.

Tuckton Bridge, Christchurch.

Lighting Railway Stations.

Sir John Cass's Foundation, and Wren's House, Botolph-lane.



funds, which had so increased in value as to yield a yearly income of 6,500*l.*, which it is calculated will ultimately amount to nearly 30,000*l.* as the leases expire. One part of the Commissioners' scheme provided for the establishment in Aldgate of a Technical Day School and Institute, which was opened, in Jewry-street, in July, 1902, and it was afterwards arranged that the Ward schools we speak of should be removed to the new buildings in Jewry-street, for which Mr. A. W. Cooksey's designs were chosen in a limited competition.

#### The Gladstone Monument.

THE monument to Gladstone, unveiled last Saturday at the junction of the Strand and Aldwych, is a fine work as a general conception. It consists of a podium from the centre of which rises a massive stele bearing the figure of Gladstone, gowned, and with a fine expression of energy in the head. At the four angles of the pedestal are grouped life-size symbolical figures, representing respectively Brotherhood, Education, Aspiration, and Courage. Brotherhood, represented by a woman with two small boys, was, if we remember right, exhibited at the Academy; it is perhaps the best of the four; Aspiration, a seated figure gazing upwards, is fine also; Courage, a woman preparing to behead a snake with a scimitar, is a little too violent in action for the situation, and moreover the intended act is one that one can hardly imagine carried out in a seated position; it almost implies springing to the feet. The angle groups seem to us to want a little closer connexion with the centre, which might have been obtained by a modification of the architectural treatment; as a composition, the four figures do not blend sufficiently with the whole mass. The architectural details are correct but commonplace; whether they are the sculptor's, or whether any architect has had a hand in it, we are not aware. But something better than this might have been done with the architectural portion of the work.

#### Messrs. Agnew's Exhibition.

THE small but select exhibition of works of old masters at Messrs. Agnew's gallery (the eleventh annual exhibition held on behalf of the Artists' General Benevolent Institution) includes as its central and most important work the beautiful "Venus and Cupid" by Velasquez, originally painted for the Royal Palace at Madrid, and which at a later date came into the possession of that too notorious person Godoy, who was called the "Prince of the Peace" (not, we think, "Prince of Peace," as stated in the catalogue) and earned a contemptuous reference in the First Canto of "Childe Harold." The picture, showing a splendidly modelled nude figure reclined, with her back to the spectator, on a blue-green drapery, and looking at the reflection of her own face in a mirror held up by a Cupid, is of special value not only for its artistic power but for the fact that a picture of this ideal class by Velasquez is a rarity. Both Sir Martin Conway and Mr. Storey, in letters to the *Times*, urge strongly that

this picture should be secured for the National Gallery, and we wish it might be, but have little hope of it. On each side of it are two portrait groups of children by Reynolds and Romney respectively—the former a well-known picture. Among the other works exhibited are a fine portrait by Nattier; three by Largillière, hard in style as compared with Nattier, but the half length of the Comte de Richebourg is a powerful thing; a large wooded landscape by Crome (like another we mentioned last week, strongly recalling Troyon); a very fine Morland, "The Benevolent Sportsman," noticeable for the composition of figures and landscape (the other Morland which hangs as a pendant is not equal to this one); Romney's rather academic full-length of Mrs. Scott Jackson, and Lawrence's theatrical but very effective portrait of Jane, Duchess of Gordon, in a white dress with the high waist of the period, partially draped with a red-lined cloak. There are other fine works in the collection.

#### The Leicester Galleries.

At the Leicester Galleries a three-fold exhibition was opened to private view on Saturday last. One room is occupied by 83 sketches and studies in water-colour by the great and veteran French landscape-painter, M. Harpignies, now aged 86, and painting as finely as ever. Any collection of sketches and studies by such an artist would be of interest, but we must dissent entirely (if only on the principle that "good wine needs no bush") from the statement in the preface to the catalogue that "no assemblage of his work in oils could reveal so intimately the power and individuality of the painter"; an absurd exaggeration to make in favour of a collection much of which consists of slight and rapid studies of landscape composition; and this habit of prefacing catalogues of exhibitions with a kind of literary puff is irritating to the visitor, and more likely to repel than to enlist his sympathies. Why cannot we be left to form our own judgment, instead of having that of some one we do not know thrust upon us? And why are we to have it explained to us that M. Harpignies is no follower of Corot? Who, with any perception of style, ever supposed he was? The real interest of the present collection is as a series of studies and memoranda for landscape composition. Many of them are studies of composition only, merely heightened by a little colour here and there; others, such as "Effet d'Orage" (28) and "La Loire en avant de St. Maurice" (39) are powerful and remarkable records of colour and light effect. Among those specially remarkable and interesting as composition may be mentioned Nos. 16; 29; 52, where the rounded mass of trees contrasts with the horizontal lines of the land; 55, "Château de Clisson and Bridge"; 66, "Souvenir de l'Isle St. Honorat," a curious tangle of windblown tree-stems, almost Japanese in feeling; and 74, "Souvenir d'Auvergne," a dark mass of forest country treated with very powerful effect. Of Mr. Arthur Burdington's watercolour drawings, in another room, those we like best are the few which deal with stretches of country,

such as "On Rye Marshes," where the flower-garden scenes and foregrounds, which form the majority of the exhibits are rather superficial in style and execution. The third element at the Leicester Galleries is a small exhibition of silver-smith's work by Prince Karaschewitch, in the centre of the Harpignies room. For the larger objects—knives, spoons, etc., made up as it were out of natural forms of leaves, we have no approbation; they are in an artistic sense absolutely wrong. The smaller works—brooches and clasps with flower and leaf forms treated *à jour*, are very pretty, and natural foliage forms can be more suitably used in small objects of mere ornament.

#### The Goupil Gallery.

THE autumn exhibition at the Goupil Gallery consists in the outer room a very good collection of oil paintings. Among these is a landscape by Mr. Bertram Priestman, "Floods in Suffolk" (2) of exceptionally fine quality of colour. M. Le Sidaner's "Summer in the Garden" (3) is a relief from his usual programme of buildings seen through a mist, and has a real look of sunshine; unlike M. Rodolphe's "Sunny Afternoon" (4), a charming little landscape, but "sunny" is just what it is not. Among others are several good works by M. José Weiss, of which "Trees by the Seine" (40) is the finest; an example of Cazin (16); a fine sketch by M. Harpignies (19); M. Le Sidaner's "La Rue Royale," one of his novel type of twilight effects in a street, and his unusual sea-piece, "Entering the Harbour" (23), which has fine qualities of light and colour. In the inner room is a collection of works in oil, water-colour, and black and white, by Mr. J. C. W. Cossaar, one of the younger artists of the modern Dutch School. He treats architectural subjects a good deal; his two water-colour drawings from Scarborough Castle (34 and 39) are very powerful in effect, but wanting in texture and colour; they are more like brown monochrome drawings in which everything is sacrificed to an effect of mass and shadow. The same with the large drawing of a ship in dock, "The Hermina" (36); the general drawing of the ship is good, but the whole thing is too deficient in substance. The barge in "On the Amstel" (29), a monochrome drawing, is a good boat study, and on the whole the black and white works, sketchy and sketchy as many of them are, are the best part of the show; the artist has evidently keen observation of nature and power of rapid and forcible delineation; but colour is not his strong point.

#### Picture-dealers' Exhibitions.

It is of course understood and obvious that the collections of pictures specially arranged for exhibition at the establishments of well-known dealers in works of art are exhibitions mainly for the purpose of selling pictures. No blame to them for that; the pictures are as well worth seeing with whatever object they are brought together. But when a definite catalogue is printed, and people who are supposed to be "critics" are invited to review the exhibition and draw public attention to it, we do think that the managers are



bound to keep the pictures together for the stated time of the exhibition. In reviewing last week the exhibition at Messrs. Tooth's Gallery we drew special attention to a beautiful little work by Faustin-Latour. One of our readers writes only three or four days later, specially to see that picture, and found it had been sold and removed. That is hardly treating either the public or the critics fairly.

The Annual Conversazione of the Architectural Association was held on Thursday evening last week at the Association house in Tufon-street, and was one of the best arranged and most successful that we remember. The three stories of the central octagon compartment, the upper two of which are open galleries, are extremely effective for this kind of gathering; reminding one, as a visitor remarked, of Dante's successive "circles" (in the *Paradiso*, of course); the only drawback is that during the musical performances those who cannot get into the front position in the galleries are apt to talk behind and disturb the enjoyment of the listeners in front. All could hear well enough if they chose, for the place is excellent for sound; but many people will not listen to music unless they can see the performers; and we should suggest that on future occasions it might be better to make the entertainments which appeal to the ear rather less continuous; limit them to (say) two special sections of the time at disposal, and invite silence during the third. At a "conversazione" people will converse, and it is better to have a time for listening and a time for conversing, and not leave the two pleasures to clash. The Highgate orchestra of ladies and gentlemen played an instrumental selection first, which included a serenade by Mozart of intensely Mozartian type; and the succeeding selection of vocal music brought out some of the musical talent existing among members of the Association and their families; Mrs. H. P. G. Maule's singing of two songs (one of them Sullivan's well-known "Orpheus") being specially admirable; and Mr. Herbert Passmore recited with great spirit Kipling's fine ballad "East and West," a little too long perhaps for the occasion, except for those who knew the poem and waited for the great point at the close. The large meeting-room contained refreshment for the mind as well as for the body, in the shape of a large and fine collection of water-colour drawings by architects, among whom Mr. Ernest George and Mr. Henderson were two of the most important contributors. The drawings showing the work of the Architectural School were exhibited in the upper gallery, and show a great deal of most promising work. Photographs illustrating the excursion to Lisieux and the week-end visit to Cambridge were also on view. The galleries were hung with tapestries, exhibited by Messrs. Hewetson, Milner, & Jackson, Messrs. William Morris & Co., and Messrs. Liberty. The latter firm also had some excellent samples of silver ware and "Celtic" garden ornaments. The Bromsgrove Guild lent for the occasion some articles of jewellery; Mr. John

H. M. Bonnor sent an interesting collection of enamels; and Messrs. Martin Van Straaten & Co. some Dutch tiles and old tapestries; a plaster ceiling for Kimsley Castle, by Mr. L. A. Shuffrey was shown; Messrs. White, Allom, & Co. were represented by an excellent selection of carvings; and a display of cretonne and chintz from the private collection of Mr. G. P. Baker was also on view.

# THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

## OPENING MEETING OF NEW SESSION.

The first general meeting of the Royal Institute of British Architects for the seventy-first session was held on Monday at No. 9, Conduit-street, Regent-street, W., Mr. John Belcher, A.R.A., President, in the chair.

## Deceased Members.

The minutes having been taken as read, Mr. Alex. Graham (Hon. Secretary) said it was always a melancholy duty at the opening meeting of a new and hopeful session to bring forward the names of members who had passed away since their last gathering. Since June there had been many gaps in the ranks of the Institute, deserving more than passing comment. The first name was that of Alfred Waterhouse, who passed away on August 22, after a distinguished career, full of honour to himself and the recipient of many tokens of respect and admiration for his works as an architect. It was not within his province to speak at any great length of the distinguished career of their late lamented colleague, but he was glad of an opportunity of saying a few words with regard to his remarkable personality, his grace and charm of manner, which never seemed to fail him in his dealings with his fellow-men; his great kindness and generosity to those who were associated with him in his daily work and to others who sought his advice in many matters connected with the building arts, of which he was a thorough master; and lastly, a lifelong loyalty to the Institute in its aims, aspirations, and operations. A letter of sympathy and regret had already been sent to the family of the deceased gentleman on behalf of the Council, and it would be very pleasant to them as a body to send a letter of heartfelt sympathy to Mrs. Waterhouse and her family, expressing their appreciation of Mr. Waterhouse's high work—of the many monuments of architectural art which he had left behind him, and the great and valuable services he gave to the Institute during a long and prosperous career. He (the speaker) put this before them as a formal resolution, and he was sure that no words of his could add to the sense of what they had lost in the death of Alfred Waterhouse—a distinguished architect and a good friend.

The motion was then agreed to in silence, and Mr. Graham added that they would one and all hold in pleasant memory the name of Alfred Waterhouse.

Mr. Graham, continuing, said that there was another name familiar to all of them which he had to mention, i.e., Charles Forster Hayward, who passed away on July 5. Mr. Hayward spent the last few years of his life in that charming retreat he made for himself at the Old Guest Hall at Lingfield, in Surrey, and it was at this pleasant place that many of his friends had enjoyed, not only a hearty welcome, but great hospitality on several occasions. Mr. Hayward's career was an active one, but our knowledge of him was mostly in connexion with his duties as district surveyor, an office which he held for many years, having passed the qualifying examination as far back as 1857. Some forty years ago Mr. Hayward, in conjunction with John P. Seddon, acted as Hon. Secretary of the Institute, at a time when the Institute was in its youth, and when a great deal of work was done, with very satisfactory results. He thought they would all desire to send Mrs. Hayward and the family an expression of their sympathy and an acknowledgment of the services Mr. Hayward rendered to the Institute in bygone days, with an

appreciation of his work and merit during a long and active career.

The motion was then agreed to.

Mr. Graham also announced the names of other deceased members, i.e.:—Charles Henry Howell, elected Associate 1848, Fellow 1861; Joseph Wood, elected Fellow 1902; Thomas Edward Knightley, elected Associate 1856, Fellow 1860; James Weir, elected Associate 1874, Fellow 1882; Charles Grayson Maylard, elected Associate 1874; Henry George Luff, elected Associate 1864, Fellow 1901; Lord Montagu, of Beaulieu, elected Hon. Associate 1878; Johan Louis Using, of Copenhagen, Hon. Corresponding Member, elected 1897; and Guisappi Sacconi, of Rome, Hon. Corresponding Member, elected 1887.

Lastly, there was the name of a man familiar to them all, i.e., Charles Lucas, Hon. Corresponding Member, of Paris, whose cheery presence in London from time to time they all remembered. M. Lucas took an interest in the work of architects in all countries, and was always ready to give information to those in quest of it, not only in relation to Paris, but to the architecture of every part of France. No one who had come in contact with M. Lucas could ever forget him.

Mr. Graham, in conclusion, said he hoped it would be a long time before such a list would have to be presented to the Institute.

Sir William Emerson asked if it would not be well to send a letter of sympathy to the family of M. Lucas.

The Chairman replied that the Council had already done so.

Members attending for the first time since their election were then formally admitted by the Chairman, the admissions including Mr. Goscombe John, A.R.A., Associate.

## District Surveyors.

The Secretary (Mr. W. J. Locke) announced that the Institute statutory examinations were held on November 19 and 20, when eighteen candidates were examined, and the following passed, and had been granted by the Council certificates of competency to act as district surveyors under the London Building Act, i.e.:—

Albert Anthony Fillyer.  
Edgar Walsh Knight.  
Edwin Palmer.  
Harry Tom Boden Spencer.  
Alexander Lionel Woodward.

The following candidate has been granted a certificate of competency to act as building surveyor under local authorities, viz., Mr. William John Stainton.

Mr. Locke also announced the names of candidates nominated for membership, the list comprising sixteen Fellows and twenty Associates.

## President's Address.

The President then delivered the following address:—

"Colleagues, ladies, and gentlemen.—The confidence and goodwill of my brother architects—to which I am indebted for this second opportunity of addressing you at the opening of a new session—is a source of no small encouragement to me, in view of the difficulties likely to attend upon my position as President during the period upon which we are now entering. I am very grateful for the courtesy and consideration which have been so generously extended to me on all hands, for the help and support of the members of Council, and for the ever-ready assistance of our Secretary (Mr. Locke) and the general staff, to whose patience and zeal in the official and clerical work of the Institute we owe more than its members generally are perhaps aware of.

The general appreciation of the President's 'At Homes' has been so plainly evidenced that I am proposing to continue these pleasant reunions during the coming session. The readiness with which our friends, the painters and sculptors, have responded to our invitation has added greatly to the popularity of the 'At Homes,' which have, I hope, served the good purpose of drawing us all more closely together.

Looking back upon the year that is past I may, without fear of contradiction, report to you a great advance in the position of this Institute, in its influence and power, and may with equal confidence prognosticate a still greater advance in the coming year, owing to the special circumstances of the



time. Our numbers have gone up very much, owing, partly no doubt, to the determination of the Institute to close its doors against all who have not passed a qualifying examination. Our losses have been numerous, too, many of the elder men whose labours in the past have done so much to make the Institute what it is, having passed from among us.

#### The Late Mr. Waterhouse.

The latest loss we have to deplore is that of our distinguished former President, Mr. Alfred Waterhouse, R.A., veritably one of the giants of our days. This is not the occasion for me to dilate upon Mr. Waterhouse's marvellous powers of work, as the vast buildings which remain testify thereto. But it may fairly be claimed for him that he developed a phase of art—consistently followed to the last—as peculiarly his own as that of the brothers Adam was characteristic of them in another direction. Entering upon his career just when the tide of Gothic revival was at the flood, he held his youthful lark on a course distinctly his own, making the strong reactionary currents of the time subserve the needs of modern domestic architecture. To his practical and orderly mind the regular and symmetrical classical plan commended itself as no other did, and it was on this that he won his first competition, the Manchester Assize Courts. The history of his life will assuredly be found to be fruitful both in instruction and encouragement for those who love their art. Sympathetic letters have been received at the Institute from Continental architects and others testifying to the great esteem in which he was held abroad as well as in England.

#### Public Works.

The public works to which I referred in my address a year ago are rapidly approaching completion, and in the City the Old Bailey buildings are progressing well. The excellence of Mr. Mountford's plan is more and more evident as it is developed, and the building, both externally and internally, fully expresses its purpose. The work is broad in treatment, and will no doubt prove impressive in character when completed. The pulling down of a large portion of the Regent-street Quadrant has been the occasion of considerable anxiety, the more so because buildings recently erected on other Crown property near by exhibit a total disregard for their surroundings, and, indeed, for any general scheme such as that devised by Nash, to which Regent-street owes its peculiar character and value. The present officials, however, recognising the mistake made in the past, have determined to use their powers to retain a uniform treatment of the quadrant at least. The need for such uniform treatment was so strongly felt by architects that had it not become known that Mr. Norman Shaw had been engaged upon a design of a façade for all the buildings in the quadrant there would, I feel sure, have been a general outcry. I have reason to believe now that, thanks to the wisdom of the authorities and the compliance of the London County Council, to whose architect we owe much, in respect of such portions as are under their control, there will be achieved a memorable work and a noble termination to Regent-street worthy of a great city.

The proposed new Wesleyan Hall in Westminster gave rise to an important competition, for which many fine designs were submitted. The choice of the assessors in the end fell upon Messrs. Lanchester & Rickards, but there were others who ran these gentlemen very close. The design of Messrs. Cross & Mallows in particular presented many delightful features.

Cardiff, where again Messrs. Lanchester & Rickards are very much in evidence, claims a good deal of our attention at the present time. Its Town Hall and Law Courts promise to be amongst the most successful buildings of our day. Simple in plan, convenient in arrangement, fine in scale, decorated with just the proper amount of ornament, they will combine with the new University Buildings by Mr. Caroe, the Library and Museum by Mr. Seward, and a small but excellent building by Mr. Wills to form a remarkable group—situated in beautiful park-like grounds—of which Cardiff may well be proud. By the far-seeing liberality of the authorities, the architects of the municipal buildings have been enabled to avail

themselves of the assistance of some of our best sculptors in giving force and expression to the buildings.

#### Proposed New Home for the Institute.

I must pass over many other important works which are either in course of erection or in contemplation to speak of a matter which touches us very closely—the question, viz., of a new official home for this Institute. Owing to the increase of official work, the growth of the library, and the need of more space for the exhibition of students' drawings and the display of our many treasures, the premises which we now occupy are daily proving more inadequate to the demands made upon them, and, as they cannot be extended, we have been compelled to look elsewhere. After many fruitless inquiries and attempts, the Council hope to be able to recommend the acquisition of a fine freehold site which has been found in Portland-place. I need scarcely say that this important matter has been most carefully considered by a Special Committee of Past-Presidents, as well as by the Council and the Finance Committee, both in respect of the expediency of such a step and in respect of ways and means. The proposal adopted will be laid before you in due course. I must confess I shall be highly gratified if, when the International Congress assembles next year, I am able to point out the site referred to as marking the future home of this Institute.

#### The Architects' Benevolent Society.

There is another matter which touches us closely, or ought to. Having increased in numbers and prosperity, the Institute is called to face increasing responsibility towards those (both members and others) who from no fault of their own may have need of help. Ours is a precarious and ever-shifting profession, with some fat years, perhaps, but many lean ones. It is hard when some who have done good and well-known work suddenly find themselves stranded by unforeseen troubles or unusual circumstances.

Gentlemen, I am distressed to inform you that the small amount of the subscriptions to the Architectural Benevolent Society is totally inadequate to meet the deserving cases which should be relieved. It should be understood that the cases dealt with are scattered throughout the country, and they have increased, but the subscriptions have not. I feel sure that I have only to remind all newly-elected members and others who have not yet subscribed to this deserving cause, and they will do so at once, so that funds may be in the hands of the Committee, who, I assure you, spare no pains in their loyal efforts to relieve their distressed comrades.

#### Competitions.

The policy of the Institute continues to be directed towards the training and advancement of its members and the benefit of the community at large. Every assistance has been rendered to public bodies who have sought for information or advice, and it is now the almost universal custom to request your President to nominate an assessor in competitions. In such competitions I note that the regulations issued by the Institute are generally adopted; but it would be greatly to the advantage of all parties concerned if, whenever it is proposed to introduce a variation or insert a special clause, such variation or special clause were first supervised by the assessor. The latter is bound to insist upon the conditions laid down, and any vagueness or uncertainty in technical details—often to the lay mind of no seeming importance—is apt to prove exceedingly unfair to competitors.

It is of great importance also that public bodies, while reserving to themselves the right of confirming the assessor's decision, should be very slow to override or pass it by. Only a man of considerable practical experience and training in architectural work can lay his finger upon the impracticability or carefully masked faults which mar the designs of so large a proportion of competitors; and to think that it is sufficient for a layman or any body of laymen to know 'what they like,' to use an expression often heard in such matters, is almost to set a premium upon work which is showy but intrinsically bad. It is the duty of this

Institute to lead the way in discerning and approving all that is good and pure in architecture, and to recognise, and so far as possible reward, those qualities which ensure the best results.

#### Registration of Architects.

The want of discrimination shown in official and other circles, particularly in the provinces, lends much, for a point to the demand for the registration of architects as being one way at least of counteracting the injustice so often done to competent men. The Committee appointed by the general body to consider the principle of registration has now reported, and gone so far as to suggest a form of Bill in Parliament. There is, however, considerable diversity of opinion still, and it is scarcely possible that the Bill should pass into law. Yet some remedy must be found for the present evils; we cannot be indifferent to the interests of the many men upon whom existing conditions are so hard. Your new Registration Committee has therefore already appointed a Sub-Committee to examine impartially into the whole question. This Committee, which is composed of men holding diverse, even opposite, views, is to receive and consider the evidence of those, whether members of the Institute or not, who may be either in favour of or opposed to compulsory registration, or who have suggestions of any kind which may help the Committee to formulate a scheme which they can recommend. And any of the members in the provinces who may wish to offer suggestions or furnish evidence should communicate with the Secretary as soon as possible. The work of the Committee need not occupy any great length of time, but what is done must be thorough, and we must arrive at a final solution of the question. Should the Committee find it desirable to promote a Bill in Parliament, we must not risk failure or defeat by presenting one which, owing to the opposition it arouses, has no chance of passing.

The coming year will mark as epoch in the history of this Institute, for it is close only those who have qualified for the ranks of the Associates will be elected to full membership. Ample provision will be made for the needs of those who wish to qualify, and all the necessary educational facilities will be complete.

#### Architectural Education.

The Institute intends to take up the question of education on the basis laid down by the Board of Architectural Education, and to give it its full support, and I am glad to be able to announce that this being so I have received an intimation from some twelve well-known architects that they are now willing to join the Institute and work with us in a variety of every means in their power to meet the important question of architectural education.

The new Board of Architectural Education, formed for this purpose has, after long deliberation, issued a report which has been approved by the Council and by all the educational bodies interested. The aims and methods proposed for adoption were admirably set out at one of our meetings by Mr. Reginald Blomfield, A.R.A., one of the Hon. Secretaries. The Board is constituted on a very broad basis, its advisory members, for instance, including representatives of the Royal Academy, the Universities of Oxford, Cambridge, and London, the Board of Education, the London County Council, the University College, King's College, the Universities of Liverpool and Manchester, the University College, Cardiff, the Architects' Association Day School, and the Architectural Schools of important centres in the country. All these have consented to the proposed scheme, and the co-ordination of the work in the several schools is agreed upon. The importance of the advance thus accomplished can hardly be overstated.

A certain definite standard and right method of architectural training being established, it follows that in due course the Board's certificate will form a valuable asset in the portfolio of the future architect. However desirable it may be to the style and title of architect, it does not seem possible for us to do more at present than undertake to certify that the men who pass through the Board's curriculum are



obtain the certificate are acquainted with the essentials of our art and possess certain definite qualifications. The test thus imposed will be a valuable one, not only in the interests of the public, but also of the students themselves. The latter for the most part recognise their obligation to fit themselves for their work, but the natural impatience or perhaps conceit of youth leads some to think that for them at any rate there may be a short cut to success and fame, forgetting the old adage, "There is no royal road to learning." Then the question arises, ought not those who have submitted to an arduous course of training and passed severe tests to be distinguished in some special manner? This is a matter to be taken into consideration. In future those who possess a certificate of the Board of Education will certainly be exempted from some of the Institute examinations, though the final examination for membership, and that probably in a modified form, may be reserved; and we may, I think, be sure that the growing power of this Institute as the representative body will bring to its members, according to their grade, whether Fellow or Associate, not only increasing kudos, but an ever-larger share of the greatest and best work that may be called for in our art.

#### *The Architectural Education of the Public.*

The education of the public in the elementary principles of architecture claims our attention at the present time. I know that this idea is regarded by some as Utopian, but, at any rate, there is abundant evidence that people generally take more interest in the subject than they used to. A recently published handbook, by Martin Buckmaster, though too archaeological in character, is yet evidence of a demand for information and instruction of a popular rather than technical character. A Committee was appointed last session to consider whether anything could be done in this direction, and they came to the conclusion that certain proposals laid before them were not only practicable but capable of an extensive application. A standard work, issued by the Institute, and directed not so much to the training of the professional student as to furnish information which might with advantage form a part of every educated person's intellectual equipment, would prove of use, not only to the public generally, but also to school teachers and others interested in education.

#### *The International Conference of Architects.*

This question, 'the education of the public,' together with that of a diploma for architects, and the best methods to be adopted in the laying-out of cities, will engage the attention of the International Congress which is to meet in London in the third week of July in next year. This will be the seventh such Congress, and the first held in London. On previous occasions, for the most part, the Congress has been aided by a State subvention, for foreign Governments are alive to the importance of such events from the point of view of the national interests. Our system of government not allowing of such support, we are thrown back, for the success of the Congress, almost entirely on our own enterprise and *esprit de corps*. An earnest appeal is therefore made to all members of the profession in this country to lend a generous aid in this matter, not so much by special donations—though the Executive Committee are by no means too proud to accept them—as by enrolling themselves members of the Congress, whether they see their way to taking part in it personally or not. If the profession generally give the Committee their support, the Committee will see to it that the Congress is not merely a success, but not in anywise inferior in dignity and interest to any that have preceded it. Other countries have heartily welcomed and eagerly entertained the delegates sent to them, and we must be no less generous in the reception of our foreign *confrères*, the delegates and others who are to honour us with their presence. The Institute is contributing £1,000; the balance, a pretty heavy one, must be supplied by subscription. A series of visits and entertainments is being arranged, and the Committee are drawing up what they hope will prove a very attractive programme. When the time comes helpers will be welcomed. In particular the Committee are

anxious to enlist the services of any members of the Institute who may be conversant with one or more foreign languages. Three or four gentlemen have already promised their services. We are looking forward to this Congress as an opportunity of ventilating many interesting questions, and of learning something of the principles and practice adopted in other lands. We must, however, in comparing foreign methods with our own, take into account the patronage that the State in so many cases extends to the arts, and to architecture especially, abroad.

Hitherto, as I have before pointed out, foreigners have taken but little account of our native architecture. It is only of late years, with increasing facilities of travel and, I may add, the improved relations with other countries which our gracious King and patron has done so much to foster, that discovery is being made of the many magnificent buildings scattered over the British Isles, many of them possessing a distinction and character not found elsewhere.

#### *English Domestic Architecture.*

In the sphere of domestic architecture particularly we can boast of much that excels anything else of the sort in Europe. From the mansion of the wealthy landowner situated in its own park to the homely cottage of the village labourer or artisan standing in a well-kept garden, often hidden behind the trim hedge of some picturesque lane, our rural landscape possesses a beauty and interest that cannot be surpassed. The atmosphere of peaceful repose in which our country towns and villages so often seem to be bathed—the effect of that reticence and love of seclusion which mark our countrymen—is a surprise, indeed a revelation, to those who have only seen life under other conditions, and possesses irresistible charms and attractions for many who visit us from other lands. We ourselves have not shown due appreciation of these beauties of our native land. Not only are we, as a nation, fond of travel, but we are wont to extol everything that is foreign and depreciate everything that is our own. Foreigners, naturally enough, have taken us at our own valuation. It has been so in every department of art. Not until a man's work has been approved and commended by other nations is he recognised here as worthy of any honour. I anticipate that the International Congress will go far to open the eyes of the public to much in their own land that they have not hitherto valued at its true worth. Let us make every effort to welcome our colleagues heartily and to do them all the honour we can, and thus contribute to draw closer the bonds of international esteem and friendship which knit us to them.

#### *Street Architecture.*

I make no apology for bringing before you once again the question of our street architecture in its hygienic aspect. The appearance of our public thoroughfares is commonly regarded as a mere matter of taste, and is not believed to have any bearing upon the health or morals of the people. In my address last year I laid before you reasons for thinking otherwise, and I again press the matter upon your attention, because the proposals laid before Parliament by the Traffic Commission will, if adopted, afford a splendid opportunity for the application of better principles than have hitherto prevailed in this respect. The formation of new main avenues and the widening of important thoroughfares to provide greater facilities for locomotion and transport imply new building frontages. Let the façades which are thus to be in the public eye, as it were, for many long years to come, be under proper control from the very first. The owners of land bordering on a public thoroughfare ought not to be at liberty to indulge an ill-regulated fancy for what is bad and false in architecture or vulgar and showy in appearance. Let there be a control set upon private caprice that our street architecture may be marked by that restraint, that unobtrusive simplicity, the result of serious and dignified thought, which may tend to produce like thought in the minds of those who look upon it.

The formation and widening of main arteries in great cities has another aspect. The work no doubt is primarily undertaken

to provide for the ever-increasing demands of the traffic; but incidentally it assists materially in bringing a proper air-supply to the crowded centre. The extension of the tramway system is driving from the suburbs many of the wealthier class who in the past have resided in suburban houses standing in many acres of land. These grounds are now being acquired by the speculating builder, who is busy running up small houses crowded together into the minimum space permitted by the Building Act. Thus the supply of air to the central parts is being blocked in every direction by a zone of over-built suburbs, and the danger in case of an epidemic of a malignant character is increased most seriously.

In some countries—for instance Germany and the United States—State interference has been invoked to regulate the 'extension of cities,' and I am glad to note that the authorities are seriously considering the advisability of similar legislation in respect of the suburbs of London. The attention of the public has been somewhat diverted from this larger subject to what is relatively a minor detail, viz., the character of the small villa residences referred to; but the interest taken in the so-called 'garden cities' is evidence of an awakening to the importance of a graduated increase of air-space in proportion as the buildings recede from the centre of the city. As Sir James Crichton-Browne said at the Sanitary Congress, 'it is desirable that we should obtain control of the builder and prevent the indefinite and unguided growth of the suburbs. We should then construct great leafy avenues, fine broad thoroughfares, stretching away into the immense ocean of beautiful air in the country.'

The laying-out of such avenues and thoroughfares is not entirely and solely a matter for the engineer and borough surveyor. The architect, and in certain cases the painter and sculptor, might with great public advantage be called in to collaborate with them. It is not the best way in such a matter to take an Ordnance map and rule a straight line from one point to another. Yet such is, in essence, the course frequently adopted; and should any important building or object of interest come in the way, the engineer's motto is too often like George Stephenson's in respect of the cow that somebody suggested might trespass on his new railway: 'So much the worse for the cow,' he is reported to have said.

There is a great deal to be determined in connexion with a new thoroughfare than the most direct route, the necessary gradients, the sanitary and hygienic requirements, etc.; there are artistic possibilities to be taken, as it were, into the public service, such as the opening up of suitable vistas, the bringing into prominence or the screening of existing buildings, the slight turning from the straight line to heighten the effect, or provide places for carriages to stand out of the line of traffic. These and other expedients which have been adopted in some foreign cities with admirable results—as pointed out recently by Mr. John W. Simpson in his interesting paper on 'the Laying-out of Cities'—all fall within the proper function of the architect. So also, I venture to think, do the methods to be adopted in crossing squares and open spaces, and devices for lessening the points of collision from cross traffic, to which he referred.

With reference to divergence from the straight line, I may point out that though the method of straight lines and uniform buildings possesses many merits, and should be rigorously insisted on wherever a dignified approach is demanded, or a stately and official requirements render it obviously advisable, yet to be effective this style of treatment must be limited and kept within due proportion to the purpose. Otherwise it ceases to be impressive. Mere repetition spells monotony, and a long straight street is appalling to the pedestrian, so that a break in the line of axis, such as a square or open space, is welcomed as a relief. It is often possible to introduce such features into a scheme with admirable effect and without breaking the line of route. These are some of the special considerations which would naturally be referred to the architect when associated with the engineer in the laying-out of new streets. The authorities need to be awakened to the fact that these



matters have a commercial aspect which appeals to the practical mind. Art pays when properly handled: not anything and everything that is labelled art; not the art which vaunts itself, but rather that which is concealed; the art which influences, controls, and satisfies by its sense of fitness; the art which for instance, concentrates effects or subordinate parts in their relation to the whole; which seizes opportunities, or even difficulties, and turns them to effective account. In such wise can art bring enhanced value to schemes which would otherwise be merely utilitarian, and blank utilitarianism is apt to be disfigured by a brutal directness which is repulsive, or a bare and naked plight which is vulgar.

In the absence of a Minister of Fine Art with duly qualified advisers an Art Commission similar to that which has been established in New York has been suggested. The Commission referred to has jurisdiction over all designs of municipal buildings, bridges, approaches, gates, fences, lamps, the lines, grades, and plotting of public ways and grounds, arches, structures, and approaches, and other similar matters. It must be admitted that such powers as are here indicated can only safely be placed in the best and most capable hands; for, alas, what frauds, if not crimes, are perpetrated in the name of art!

#### Increasing Employment of the Architect.

False art has made many mistrust all art, and caused them to shut their eyes to the real value and influence of that which is genuine. I believe, however, there is a better time coming. It is noteworthy as one passes through the country what an increasingly large proportion of the smaller class of houses have evidently been designed by architects. The builder is discovering that an architect's design is not an expensive and unnecessary luxury, but that the initial outlay is more than repaid, if not in the actual building of the house—and this often happens—at any rate in the improved letting which results.

I cannot help remarking, too, upon the advantage which accrues to the architect himself in the process of studying and designing small houses. It certainly is not very remunerative work, but it has its compensating rewards. Any real advance must no doubt begin in small things before there can be a true appreciation of greater work. As the true qualities of architecture should be equally seen in small as in large buildings, they may perhaps be more easily grasped and understood by way of the less complicated problems.

Increasing knowledge will add to the number of those who appreciate and desire good work, and their sensitiveness in matters of taste will incite the producers to higher efforts, so that by action and reaction our native art will approach a higher level. Let us seek not merely to fan the growing interest in our art, but also to awaken a clear perception of its true qualities. It will not be long, I venture to prophesy, before public opinion will declare itself definitely and decidedly, insisting upon grace and refinement both in our public buildings and our important thoroughfares. Given such an opportunity, we may feel confident that our national architecture will not fail under the test, but will reflect the highest and noblest qualities of our race."

In the discussion which followed,

Sir John Thornycroft said it gave him much pleasure to be asked to propose a vote of thanks to the President for his address, which was of great interest. It touched on so many points, and so broadly, that it must have aroused thoughts as to the propriety of things which had not previously occurred to them. There was one topic on which he should like to make a few remarks. He was glad to know that our roadways were within the province of the architect ("Are they?"), but he felt that the architect was sometimes inclined to encroach on what should be the thoroughfare. In London we were widening our roads as far as we could, but he knew of many places—Euston-road, for instance—where the houses originally were set back to a given line, which now, unfortunately, had been departed from, the houses having been brought nearer to the

centre of the road. He felt it was no good having handsome buildings if no space was left in which to see them. A point not alluded to in the address was protection from fire. There had been one or two occasions when London had been in danger, such as when all the resources of the fire brigade had been engaged in dealing with a large area of fire. If such fires had spread a little more it was difficult to tell what would have happened. He thought that, not only for the sake of health, but on the ground of safety from fire, there should be green avenues through the centre of London, which would be most agreeable, and which would add to the amenity of our city. There was another point: the horse was rapidly disappearing from London, and new conditions were arising. When we were confined to horse traction through a town a hill was a great difficulty; but in the case of mechanical propulsion in a city where there was great cross traffic, such as in London—at Park-lane, for instance—it had been proposed by one of our eminent engineers that one line of traffic should go over the other, and he (the speaker) supported the idea. If the inclination of the road was not beyond a certain amount, that amount might be defined as an amount which was limited to propelling vehicles at the speed required—a moderate inclination in the road was no imperfection at all if they did not have to put a brake on. If they had a hill so adapted as to give the propelling power downhill, they would then about double the power necessary to get up, but it was only for half the time, so the consumption of power was the same, and they got this advantage—i.e., that the one stream of traffic crossed the other without inconvenience and without stoppage. We might depend on it that the day was coming when we should travel through cities much more rapidly, and the increase of space necessary to give good routes for rapid transit would really make large parts of a rather larger town in effect much nearer together.

Sir Arthur Rucker, Principal of the University of London, in seconding the vote of thanks, said he could only hope that it was a sign of the growing closeness of the relations between the University and the Institute that he had again been asked to take part in their proceedings. Only twice in his life had he had anything to do with the design of a great building; once recently, and once when he was comparatively young and unknown—i.e., at the time of the designing of Yorkshire College, when he met the late Mr. Waterhouse, and found him one of the kindest of men, who was ready to take a hint from one many years his junior. As to the President's address, the point which had interested him most was the reference to the completion of the scheme of education on which the Institute had been busy for several years. He could bear personal testimony to the fact that every detail of the scheme had been considered most fully and thoroughly, and he could congratulate them heartily on having brought it to a conclusion. He hoped it would be a great success, and that it might be regarded by everybody as the course through which the would-be architect must go. He was spending the greater part of his time in trying to co-ordinate various divergent interests of various societies and institutions, and it was a pleasure to know that in the case of architecture a scheme had been devised which had united divergent opinions, and that not only had the consent of the Institute been obtained, but that about a dozen eminent architects who did not previously belong to the Institute were now in harmony with it. That was a great work to have accomplished, and he was glad that the Institute had become more closely connected with the University. They were now associated by a threefold cord: they had given representation to the University itself; they had brought in University College, which next year would be part of the University; and they had brought in King's College, with whom the University was at present negotiating. He was aware that the relation of architectural education to University education was delicate, and that there were difficult questions to be dealt with; but, whoever the

body who conducted the education, or the institute which controlled it might be, he for one believed that the main lines on which he laid down by the great masters of the art to which education was intended to lead. He was glad to find that such a great Institute was providing the means for educating the architects of the future. He thoroughly sympathized with Sir John Thornycroft as to the way in which they were all compelled to take an interest in architecture. He remembered a speech by the late Bishop Creighton, at one of their dinners he thought, when the bishop said that architecture was the most democratic of all the arts, for it was literally into the market-place; that it was before everybody; and that the rich and the poor alike enjoy it. He would not attempt to quote the felicitous phrases in which the bishop elaborated the theme, but it was a speech they might all remember. Rich or poor, humble or noble, whatever our line in life might be, we have a great deal to the architect, and he falls in his task we failed to obtain something which life might otherwise have given us. In conclusion, he wished every person to the great educational scheme which the Institute had devised.

The vote of thanks having been very heartily agreed to,

The Chairman briefly replied, remarking that, though Sir John Thornycroft and other naval architects may have made things extremely uncomfortable on sea, yet architects would do all they could to make houses and buildings comfortable. He thanked Sir A. Rucker for his valuable remarks on education and his compliments on what had been done. He could assure him that the Institute would do its best to co-operate with him and others in the matter of education of architects.

The Chairman announced that the next meeting will be held on Monday, November 20, when Mr. Denell, of the Waring-Gibbs Building Company, will read a paper on "American Methods of Erecting Buildings," illustrated by lantern slides.

The meeting then terminated.

#### MAGAZINES AND REVIEWS

In the *Art Journal* Mr. E. F. Reynolds examines his essay on Byzantine craftsmanship, illustrated by reproductions of various mosaics from St. Mark's (why is it called "St. Mark" under two of these and "San Marco" under the third?), and a fine page illustration of two contrasted capitals, from Ravenna and St. Sophia. The paper contains the matter of a good deal of careful observation as to the manner in which decorative detail and veneering are finished in St. Mark's and elsewhere. He recognises two methods of treating the marble veneer—one by simply joining together two sawn slabs with the grain reversed; the other by separating them by narrow projecting beads of white marble, sometimes worked with a moulding or carved ornament; in this case the grain was often not reversed. Mr. Reynolds, speaking in reference to the characteristic black line on the top of the Byzantine capital in so many buildings, mentions two or three possible reasons for this—that it served to give a better bearing; that it arose in some cases from the use of columns from more ancient buildings, which required an adjustment of their height. We believe the latter to have been the originating cause, followed afterwards from habit and precedent. Miss H. Ellen Browning contributes an article on the important collection of Canaletto's at Castle Howard. Among the objects illustrated in connexion with an article on "Art Handwork and Manufacture" the trowel, designed by Mr. E. Spencer and executed by the Artificers Guild, for laying the foundation stone of the new Memorial Hall at Eton, is a really original and interesting piece of work; it is of steel damascened with silver in long nearly parallel lines from heel to point; the ornament is very suitable and expressive, and the handle of a good workmanlike design. The frontispiece to the number represents the new mural picture by Mr. Abbey at the Royal Exchange, illustrating the judgment of Lord Mayor Bittleson in 1484, for putting an end to the quarrels of the Skimmers' and



Fishmongers' Companies, ordering each Company to invite the other to dinner in alternate years; a custom still kept up.

The *Christmas Art Annual*, published with the *Art Journal*, is devoted to the life and works of Mr. Frank Dicksee. The illustrations remind us of some charming works, portraits especially, which we had nearly forgotten, and also of the important picture "Evangeline," illustrating the departure of the evicted villagers from Grand Pré, as narrated in Longfellow's poem. The picture is both well composed and pathetic; though we may remark *en passant* that those who have read Parkman's history of the affair will now that these "simple Acadian farmers" who were turned out of their homes were by no means worth the sentiment that has been depended on them, being really a most dismal and double-dealing set, whom the English Government had treated with great and long forbearance before being finally compelled to take decisive measures. It is impossible to take all Mr. Dicksee's art very seriously, and it is rather a matter of surprise to us that an artist who could once produce such an intensely pathetic picture as "The Confession" (illustrated in the *Annual*) should now seem to have occurred to that level. One would hardly believe this to be by the same painter as "The Two Crows" and some others which are essentially what are called "popular" art. "The Confession" is quite beyond the "popular" level.

The *Burlington Magazine* commences with a short article on "German Art and German Character," pointing out the businesslike manner in which the Germans set about collecting and arranging works in their art museums, as contrasted with the feeble indifference and slipshodness of English methods, and the parsimony of our Government. The Germans now possess at Berlin many pictures which have been sold in recent years from English private collections.

One of the pictures now at Berlin were sold over the Hammer in London at ridiculously low prices, but it rarely occurs to those responsible for the National Gallery that attendance at the sales is, or should be, an important part of their duty. That fact is fully recognised at Berlin. Few, if any, pictures of importance come to the market in London without the knowledge of the Berlin authorities, and London dealers have learned by bitter experience that, while the authorities of our own National Gallery will hardly take the trouble to go round the corner to look at a picture, a telegram to Berlin will bring over an official of that Museum at a few hours' notice. We need say that every picture now in the Kaiser-Museum ought to have been bought for the National Gallery or some public collection in England; there are hints even to the purchasing power of the nation. But when we find that in many cases the pictures are by masters who are represented less worthily or not at all in the National Gallery, it will be admitted that those responsible for that Gallery have something to answer for.

Of modern German art the writer (and we agree with him) does not think very much, and is of opinion the Germans are hampered in their art by trying after "a pompous exotic eclecticism" instead of being content with being frankly German. There may be some truth in this; but Menzel, who is quoted as being typically German, is of all really gifted modern artists one of those who has not signally failed to produce beauty; his art is all exceedingly clever execution and nothing beyond it. "Mantegna as a Mystic" is a good and thoughtful article by Roger Fry. Mr. Lawrence Weaver, in the third of his articles on "English Architectural Leadwork" deals with, and illustrates the time and interesting examples of lead ornaments treated with decorative design in relief. Mr. Clouston writes an interesting article on "Keyboard Instruments in Relation to Furniture," giving a slight historical sketch, with some illustrations of the history of the decorative treatment of the harpsichord and pianoforte. He speaks rightly and not too strongly as to the terrible ugliness of the Victorian piano (and those "made in Germany" are just as bad), with its swollen legs; but there is one point to be considered on the other side, viz.: that the rather thin and fine legs which some designers of artistic pianos are now adopting are really of quite suitable supports for an instrument of such great weight as a modern grand piano, and are not best fitted to stand the strain on them when the instrument has to be dragged along the floor, as often happens. What we really want is solid supports of a better design than the Victorian type. The

improvement of piano design is a good deal interfered with, or at least not encouraged, by the fact that the musical people, who buy a piano for the sake of first-rate tone and mechanism, are in most cases indifferent to the appearance of the instrument so long as its musical quality is all right; and as the piano-makers cater mainly for the musical world, there is not much demand for better exterior design. Indeed we have generally found that where there is a piano very artistically designed and finished it is little played upon, and is regarded as a decorative piece of furniture rather than as a musical instrument. There is not likely to be much general improvement until musical people evince some interest in the style and design of their piano as well as in its tone.

In the *Art Workers' Quarterly* we have the pleasure of meeting Mr. Lawrence Weaver again on his favourite subject of leadwork, this time in relation to spout-heads. We quite agree with him in denouncing milled lead for decorative work. Amid the multifarious contents of this periodical it is rather difficult to select anything for special remark; but it is full of good examples and suggestions, arranged in a rather mingled manner. Among a good many illustrations of works done by students in the "National Competition" we notice a copper tobacco-jar of refined design, by Miss Christine Stockton; a design for a "Print Cabinet in Fumed Oak," by Mr. W. T. Clayton, with a very good arrangement of the supports (as shown by the plan), both practical and effective; a modelled design for the back of a hand-mirror, by Mr. W. Banbury; and a clever and original design for a circular open metal grille, formed by a mystical bird with its outer wing-feathers extended into separate bars which fill up the space, by Mr. A. A. Dawe. Mr. James Guthrie contributes an article, "A Comparison of Hand-press Printing" with machine printing; but such an idea in these days is Utopian, except for special editions of limited number for those who wish to gratify a special feeling. We quite agree that it is a fascinating idea to treat the printing of books as a manual art on the same footing (for example) as the printing of etchings; but books, after all, are produced to be read, and economic conditions put it out of the question that the hand should, in the present day, compete with the machine in book-producing; it would be putting the secondary before the primary object of a book.

*Public Works* is full of interesting and valuable matter, which we should have noticed at greater length and more in detail but that it only came into our hands late in the present week, leaving no time to go adequately into the principal subjects treated of. Among these are "The Irrigation System of the Godavari Deltas" in the Madras Presidency, by the superintending engineer, Mr. J. C. Larmine; a very full article, profusely illustrated with diagrams; "Electrically-driven Pumping for Small Water Supplies"; "Phenomena of the Ebullition of Water," a theoretical study by a French mining engineer, M. Wickersheimer; and "Ferroconcrete Pipes." The extensive notes at the end on "Some World's Works, in Progress and Projected," contain a great amount of information as to what is going on in the way of practical work in various parts of the world. Although this is primarily an engineer's rather than an architect's journal, we recommend it to the attention of architects; they will find much in it that should be both of interest and of value to them.

The *Architektonische Rundschau* illustrates no notable building; we may mention a street front in Berlin by Professor Messel which shows a very bold and rather effective treatment in a series of solid vertical brick piers carried up from the pavement to the cornice, with a kind of suggestion of a capital at the top, the windows, with stone mullions and decorative carved panels between the stories, being hung, as it were, between the brick piers. Contrasting with this ultra-modern front is the Rathaus at Weissenburg, by Professor Weysser of Munich—a high-gabled front in mediæval style and with a very picturesque arrangement of windows, but the whole rather too much like an imitation of an ancient building. Professor Conrad Sutter contributes an illustrated article under the

title "Der Garten ein Kunstwerk," but English garden artists have nothing to learn from it.

The only illustration of buildings worth special mention in the *Berliner Architekturwelt* is the jail at Pankow, by Herr Mönich, of Steglitz; which is a clever attempt to impart architectural character to a building of this class, and shows some novelty in the method of combination of stone and brick. Two lofty electric light standards for the Berlin streets, one by Herr L. Hoffmann (Berlin), the other by Herr E. Högg (Bremen), are worth attention, and both in fitness and refinement of design are better than anything of the kind that has been put up in London.

*Art and Architecture*, the Journal of Institute of Architects of New South Wales, has assumed quite the proportions and character of a high-class art-journal, chiefly but not exclusively concerned with architectural subjects. The illustrations to an article on "Sydney Domestic Architecture" seem to show that a certain degree of American influence, derived probably from the American illustrated journals, is making itself felt in this part of Australia. Mr. Alfred Milson's house (Mr. J. W. Manson, architect), of which a separate plate is given, might pass for a modern American villa—which is almost equivalent to saying that it is picturesque and original. The defect in the article is the want of plans of the houses, a deficiency which one would not expect in the journal of an architectural society. The Bank of Australasia, Sydney, of which a view of the interior is given, is in fact by an American architect, Mr. E. Raht, an honorary member of the New South Wales Institute. Mr. Eversard Digby contributes an article on "Property in Architects' Plans," evidently suggested by the recent attention drawn to the subject in England. He upholds the English view of the subject, and hopes that the House of Lords may yet be approached with success and induced to listen to reason, and to the evidence which English courts of law refuse to listen to. We may congratulate the New South Wales Institute on the excellence of their publication, which we shall hope to see more of.

We may call attention to a French architectural periodical of which some numbers have been sent to us, *Les Concours Publics d'Architecture*. It is issued monthly, and is a portfolio of illustrations of designs submitted in important public architectural competitions. There is no letterpress, except a few notes on competitions impending, but it contains a number of good illustrations of important designs by French architects.

The *Quarterly Review* is a very strong number, containing several weighty articles on important subjects, but none of them such as it comes within our province to comment on.

In the *Monthly Review* Mr. Herbert Ives writes a short article on the always interesting subject "William Blake at Felperham." Most of the facts mentioned in it are known, but the younger generation of readers may as well be reminded of them. Among the satirical couplets in regard to his patron Hayley, with which Blake relieved his mind after the breach between them, he omits (as did Gilchrist) the most cutting and characteristic one, possibly for reasons of propriety; it is given in Mr. Swinburne's "Study" on Blake, but we cannot venture to quote it here. An article by Miss Sophia Beale gives an account of some "Punic Sculpture at Carthage," sarcophagi with sculptured figures discovered two or three years ago; an illustration of one of them is given; a draped figure showing wings depending from the hips and crossed in front of the lower part of the figure. It appears to be a beautiful piece of work, as far as can be judged from a small illustration.

In the *National Review* Professor Boyd Dawkins writes a strongly worded and argued warning in regard to "Our Supply of Admiralty Coal," a subject which concerns all professions, for a great deal of the welfare and position of England depends on it. Professor Dawkins expresses the same opinion that we briefly expressed some little time ago, that it is suicidal to allow so much of this material, of finite quantity and indispensable to our fleet, to be sold to foreign governments or to be worked, as part of it is now, by a so-called English but really German syndicate.



in our very midst. We quote the paragraph in which Professor Dawkins sums up his suggestions:—

"A practical measure that will meet both these evils is the imposition of a tax, more or less heavy, on the export of Admiralty coal to foreign ports, for the use of our rivals, as a munition of war. This might be so adjusted as not to fall on the foreign depots of our Mercantile Marine. It, as is likely, this would not prevent its use by foreign navies, the results of the tax might be employed in the purchase of estates with untouched seams estimated by Sir W. T. Lewis to contain 22,000,000 tons of Admiralty coal. This would form a reserve in the hands of Government, when the Admiralty coal in the market is approaching exhaustion. These areas would stand to the Navy in the place of arsenals. They should not be administered by the Admiralty, because the sea lords have already too much on their hands to act as good landlords. For working purposes they might be leased in the ordinary way, with special stipulations as to Admiralty coal. It is probable that the restricted output would benefit rather than injure the South Welsh coal trade. It would, at all events, put an end to the existing practice of selling the birthright of the nation for a mess of pottage" at a price far below its intrinsic value. There may be other means of restricting the output, which it is the business of Parliament to find out.

Even if a restricted export does affect the trade interests of South Wales, the immediate future, the injury is as nothing compared with the security of our sea power, on which all our trade is based."

In *Blackwood* Sir Herbert Maxwell, in a long article full of statistics on "British Woodlands: as they are and as they ought to be," draws attention to another neglected source of national wealth and well-being, in the absence of the systematic cultivation of timber-growing. His statement as to our relative proportion of timber-growing land in comparison with other countries is startling. It stands thus:

Country.	Proportion of Timber-growing Area. Per cent.
Sweden .....	44
Russia .....	36
Austria .....	32.6
Germany .....	25.8
France .....	17.7
England .....	3.9

The reader who wishes to estimate the probable amount of actual wealth we are throwing away by neglecting the cultivation of timber should follow Sir Herbert Maxwell's statistics, and the quotation which he gives from the Report of the United States Secretary for Argentina on the subject, to realise the enormous returns in actual money which may ultimately be secured from planting of which the initial cost is comparatively trifling.

The *Century* contains three articles of considerable interest to our readers. Under the general title "The Historic Palaces of Paris" the description and illustration of the "Hôtel de Prince Eugène" (now the German Embassy), Eugène de Beauharnais that is, Josephine's son and Napoléon's stepson. It has some fine interiors, and "The Honor Bedroom," Queen Hortense's chamber at one time, shows the illustration of a truly monumental columned and canopied bed of the Empire style. There is an amusing correspondence with Napoléon in regard to Eugène's lavishness of expenditure on the house (all which was to come out of the Imperial pocket), and his carelessness in letting architects and decorators spend what they liked, without getting a specification and an estimate beforehand; there was a bill of a million and a half of francs for which the Emperor declared he could not see the value of more than 200,000; "there are immense sums thrown out of the window."

Put more attention and knowledge into the business of my Civil List in Italy; architects are everywhere the same." It appears that the million and a half was paid nevertheless, though it is very likely that Napoléon was right as to much of the extravagance in this instance, at all events. Mr. Copley Greene furnishes an article on the recent remarkable discovery of Egyptian relics in the tomb of Queen Tii in the Valley of the Kings, by Mr. Theodore Davis, acting for the museum at Cairo. The gilded chair illustrated, and called "Empire style," is really remarkably like the French Empire furniture in general style and appearance. Many other objects of great interest are illustrated, and thus brought into popular knowledge. The third article referred to is that on "The Panama Canal," a review of the past and the possible (we may hope now the probable) future of the scheme, by Mr. W. Barclay Parsons, an engineer and member of the Isthmian Canal Commission of 1904-5.

In *Scribner*, under "The Field of Art," the question "Is there an Academic movement in American art?" is discussed by Mr. W. Walton. The writer's chief pre-occupation seems to be to sneer at all Academies, the English Royal Academy of course especially; the Ecole des Beaux-Arts and the Villa Medici coming in for the rest of the criticism. We should say that American architecture is rather decidedly Academic already, and is also an example of some of the advantages of Academic study, while American sculpture and painting has not yet risen to the Academic level, and had better attain it before beginning to scoff at Academies.

*Harper* contains a pleasant article by Mr. W. D. Howells on "A Fortnight in Bath,"—apparently a first visit on the part of the American novelist. The same issue contains the second instalment of Mr. Rhys's essay on "King Henry VI.," with Mr. Abbey's illustrations. These latter are superior to those in the last number; the figures of King Lewis and Warwick, where the King questions him as to whether Edward is his true king, are very true and characteristic.

In the *Cornhill* Sir E. Maunde Thompson narrates the history of "The Creation of the British Museum," in an article which will be of general interest, especially as so many of us know really next to nothing as to the manner in which that wonderful institution grew up.

To the *Gentleman's Magazine* Mr. Arthur L. Salmon contributes an article on "The Old Western Seaports," such as Poole, Bridport, Lyme Regis, Teignmouth, etc. It is curious to read now that Teignmouth sent seven ships and 120 men to the Siege of Calais, and Dartmouth thirty-one ships and 757 men. One does not quite understand why the author omits any mention of Milford Haven, which, on the authority of Shakespeare in *Cymbeline*, was evidently a port in Elizabeth's time.

The *Antiquary* contains three very interesting articles: one purely archaeological, on the excavations at Castle Hill, Burton-in-Lonsdale, by Mr. Herbert M. White; one mainly picturesque, "An Ancient Sea-Coast Village in Sussex—Dimchurch," by Mr. L. G. Sieveking; and one combining picturesqueness with history, that by Mr. E. W. Donner on the old house with the beautiful name of "Phyllis Court," so familiar to the frequenters of Henley Regatta. We have only space to mention them.

The monthly publication called *House and Garden*, which reaches us from Philadelphia, U.S.A., is an excellent though small periodical, well written and well illustrated. The first article in the November number is on the subject of "Inexpensive Methods of Fire-proofing," particularly as applicable to ordinary dwelling houses; methods which, though not all of them what would be demanded for a public building, go a long way to make a house fire-resisting. A view of "A Concrete Chapel, ornamented with Marble Mosaic," goes far to show that such a building may be rendered picturesque in general aspect, if one cannot expect much refinement in detail. A historical article on "The Château de Brissac," by Mr. V. Hussey Walsh, gives an interesting account of the ancient mansion, accompanied by some fine illustrations; "A Window in the Drawing Room," with its deep panelled embrasure and picturesquely treated glazing, is a very remarkable bit of interior architecture. The Château as it now stands is an early XVIIIth century building.

The *Church Builder* (quarterly) contains a history and illustrations of the little church of Cudworth recently restored, and Mr. Micklethwaite's Chapter XV. of "Occasional Notes on Church Furniture and Arrangement," treating of Chancel Screens. A good deal of the writing and arguing on these subjects of church furniture looks like "ancient history" now, except to a limited set of people; but from Mr. Micklethwaite's point of view he is right, and at all events we agree with him as to the fallacy of the "vista" superstition, in an architectural sense.

HOSPITAL ADDITIONS, WALTON.—Additional buildings are being erected in connexion with the Walton Cottage Hospital. The work is being carried out from plans prepared by Mr. A. E. Gough, architect.

## WORKS BY MR. HENRY HOLIDAY.

At his house at Branch Hill, Hampshire, Mr. Henry Holiday has collected a number of his works, and on the 3rd, 4th, and 5th they were on private view preparatory to their exhibition at Dresden, Munich, Berlin, and other German towns. They include works in various media, bearing witness to Mr. Holiday's versatility. Perhaps the most interesting is the large and well-known picture, "Dante and Beatrice," which generally hangs in the Walker Art Gallery, Liverpool. With reference to this picture, Mr. Holiday said that when painting it he made a special study of contemporary documents at the libraries in Florence in order to get the surrounding houses and the Ponte Vecchio correct. The figures on the bridge are shown in course of erection with scaffolding up, as Mr. Holiday calculated that in 1294, the supposed date of the incident depicted, they would be just in course of re-erection after being destroyed by fire.

Another important piece is the painted and gilded plaster statue, "Sleep," represented by the figure of a young girl reclining on a couch. The attitude is singularly graceful, and the modelling of the delicate half-draped figure excellent. Very good, also, is "Aspasia," a classical composition, with figures and the Acropolis in the distance, for which Mr. Holiday made a special restoration. Several interesting works on "opus sectile" were included; a very suitable method of decoration for public buildings or restaurants, and not as well-known as its merits deserve. In ordinary tile decoration the design is simply painted on ordinary square tiles and burnt in. In "opus sectile," however, every mass of one tint is cut out of a separate tile of that tint, the lines and light shading being only painted on and burnt in. The method is somewhat similar to that of mosaic glass work.

A small but spirited model of a house and rider for a projected Panathenaic procession and many other interesting works in enamel, stained-glass, etc., help to form a collection of work of great interest to all those who may have the opportunity of seeing it.

## AN AUSTRALIAN ARCHITECT ON EUROPEAN ARCHITECTURE.

In the latest issue of the *Journal of Proceedings* of the Royal Victorian Institute of Architects is a paper by Mr. Francis J. Smart, Vice-President, giving under the title "An Architect's Holiday," some of his impressions of architecture in the old world, as seen by the eye of an Australian architect, visiting Europe for the first time. The greater part of this we repeat. "It is my intention this evening to bring before the members of our Institute a few of the points of interest that stand out as landmarks when one looks back at the many incidents of a twelve months' holiday travel in the old world. Many impressions, indeed, even important ones cannot always be recalled, and, on the other hand, trivial incidents bulk largely in the picture of one's memory. I can remember with great pleasure, quite disproportionate to its importance, I had, after climbing up a long winding staircase at Ely Cathedral to the roof over the narthex, on coming across an old Norman windlass, with its own wheel and shaped fellows, just as it had been left by the workmen of the XIIIth century. The mind suddenly becomes more active, and one has a record indelibly stamped into one's life. I can remember the joy at the first rose which grew in my garden when a child; it made such a deep impression that I can recall the flower and its surroundings as if it were only yesterday.

On an architect's holiday there are many impressions that crowd and confuse the mind, and others which are stored up for future recurring pleasure. An architect appears to travel with a strong desire to absorb everything old, capture something new, rub shoulders with the best work, and seek an inspiration from the very atmosphere that surrounds the sacred proportions of noble buildings. A fellow passenger who was visiting Scotland for a holiday to be devoted to deer stalking was



almost to be pitted when looked upon from an architect's point of view. But such is the diversity of life.

It is a good and pleasant thing for an architect when his inclinations and interests are lying along the same path. Only in such a case, I believe, can he be successful in his profession. The buildings are naturally an architect's companions in all lands, their language is Volapük, amidst the babel of foreign tongues, and they are constantly provoking a critical state of his mind. It would perhaps be better, if perfect rest were desirable, to pass into some secluded spot in the country, and do nothing, and let it well.

Columbo, with its constant temperature of about 90 deg. in the shade, its bustle of strange people in their daily work, its tropical scenery, and its goody hotels, opens one's eyes suddenly and fully to the fact that there are wonderful contrasts between the nations of the British Empire, and one's first experience gives genuine delight like unto that of children. The people exhibit a great amount of artistic feeling. It strikes me as strange that even the country-road way is a work of art when compared with our crude blue and red-sided box, and the deck or that draws the cart is ornamented with curved lines in a manner that gives a very pleasing effect to the whole turn-out.

The oft-told tale of London and its life has so impressed one that when we are landed suddenly in its bustle we feel quite at home. Its streets seem to a great extent familiar to us; but it requires many days before we can grasp the enormous size of the city. It necessarily lacks general design and grouping of great buildings. It is spread over a large area, and, roughly speaking, one portion is more or less a repetition of another. The average run of the streets strikes one as being monotonous and commonplace, and one really must search for the interesting buildings. If ever a proper guide-book was required, it is in London. It could be written by an architect, who would understand what was wanted for the architect and others interested in architecture. The middle and early part of the last century are answerable for the miles upon miles of the most commonplace architecture. If our Collins-street was transferred to almost any part of London it would make a noticeable feature, and the architecture would be above the average in its most important thoroughfares, the average design being better. Someone said some years ago that London only wanted three things to make it perfect—(1) new streets, (2) new buildings, and (3) a new firmament. Nos. 1 and 2 are certainly being realised, as fine streets have been cut through densely populated parts and narrow streets widened at enormous cost, and, strange to say, the people have been repulsed to a great extent by the abatement of the smoke evil.

Not only Cathedral was the first great Gothic structure I saw after leaving London, and spent two days of the greatest pleasure looking over it. I climbed its towers and sat on its roofs, and round to the great towers at the intersection of the transepts. The timber roof of the nave, which has a beautiful piece of colour decoration, has a somewhat temporary look. Although the design, the nave, chancel, and Lady chapel and all the details are charming. The effect of great loftiness is increased by the great aisles, and has a noble effect. When the old Norman tower fell the aisles to both sides and transepts were removed, and the nave floods with light the full width of the building, with its great open space in the centre. In all the other cathedrals visited I was never more impressed than by this bold management. It has been adopted in modern form in many designs of modern churches where required to bring the congregation in a compact body close to the preacher.

The striking peculiarity of the English cathedrals is their great length in proportion to their width, which adds to the effect by giving a mysterious, endless look, with an artistic light and deep shades playing through the form. I also visited Peterborough, Lincoln, and York. Lincoln is a great cathedral, and the view as one enters the great gateway, when the towers are seen

standing solid against the sky above the west front, is never to be forgotten. Unrestrained delight seized us, and we entered and wandered through the beautiful building.

Within a stone's-throw of the Cathedral we visited the old fortress, keep, and prisons, which have been the scene of many a fight, and one's mind becomes very active, especially when told by the guard that the last two hanged on that scaffold (which is raised on a round tower) were hanged for stealing a sheep! If the law was comprehensive in those days, perhaps some of the architects, or, at any rate, builders who worked without architects, would be hanged for the crimes they had committed.

Edinburgh is one of the most picturesque cities in the British Isles, and it has a very solid and substantial appearance. Prince's-street, the main thoroughfare, is certainly equal to all one has heard of it, with its Gothic monument—designed by a carpenter, every Scotchman tells you, and you don't believe it. With the buildings on one side and the gardens on the other, there is a free and open effect in the very centre of the city. This plan might well be applied to our proposed Federal capital. Holyrood and Rosalind Chapel were interesting, more from the historical point of view. I visited the great Forth Bridge, and stood under the first span, and felt the importance of this engineering work.

In Paris I found a new art in its swaddling clothes—a movement that apparently came from Germany, but had left its hallmark in the gay city. Jewellery and silverware, fabric and pottery were affecting a curved and wavy form and rejecting the straight line. In the Exhibition of 1900 much of the furniture was designed in this manner; for instance, bookcases without a straight line, except the shelves on which the books stood, no doubt a very painful compromise to utility by the designers. I visited the newly-built Castle Beranger,\* designed by M. Hector Guimard in the new style, and have several views taken from the architect's work on this building. This art is an effort by an individual or a clique to develop a new style, and such attempts have always proved more or less a failure. The development of a style must be gradual and on definite lines, the process of refinement going on from time to time by the elimination of the bad and collecting and using the good. The keynote of this new decoration is a very subtle curve, and perhaps the only thing new is in the application of this curve wherever practicable. The form has infinite variety, and is ever changing and mysterious, and is never part of a circle. The Greeks made use of it in their mouldings to a limited extent. In the Castle Beranger it is found everywhere—on the floors, the walls, and the ironwork—and it becomes tiresome; you have been asked to make a solid meal off honey when a taste of the article would be perhaps quite enough. How pleasing the scroll design when used in jewellery and small articles, and how cruel when applied with a free hand to the interior of a house! In Melbourne it has found its way to many a building, and in almost every shop some article bears the stamp of the curve. Properly speaking, it is a fashion, and will die out as quickly as it has risen. The rush of the Exhibition, with all its wonders, occupied many weeks, but the only points that may be dwelt upon now are:—The great and small palaces and the Bridge of Alexander III., which are the permanent legacies of the Exhibition, and are fine works, more seriously designed than the various pavilions and buildings of more or less temporary character.

A trip to Amiens for three days gave me the opportunity of seeing the beautiful Cathedral and a typical French town. If I were asked what was the most interesting journey taken during my tour, I would say, 'The train journey over the Swiss Alps. The grandeur of the trip and the comfort of the train could not be surpassed. Pictures of Switzerland never seem to exaggerate, but always fail to impress one with the magnificence of the scenery. And as to the scenery of the lakes, and, especially of Lucerne, it is in keeping with the mountains, and lakes are jewels in the rugged setting of mountain and snow.'

\* Probably a mistake for 'D'Erlanger.'—ED.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 2,466*l.* for various purposes; Camberwell Borough Council 2,410*l.* for housing purposes; Chelsea Guardians 1,250*l.* for poor law purposes; Hammersmith Borough Council 13,700*l.* for electric light installation; Poplar Borough Council 3,075*l.* for paving and channelling works; Stoke Newington Borough Council 2,900*l.* for paving works; and Fulham Borough Council 25,000*l.* for electric light installation; and sanction to Woolwich Borough Council to borrowing 991*l.* for electric light installation and street lighting.

**Bandstand Shelter, Finsbury Park.**—The Parks and Open Spaces Committee recommended that 640*l.* be expended for the erection of a new bandstand shelter in Finsbury Park, and in the course of a discussion which ensued Mr. Radford said it did not follow that because more money was spent on a bandstand that it was a better structure. Every sovereign spent on a bandstand beyond a certain amount might be a separate outrage on taste. He was rather afraid that architects and builders had not hit upon the best design for these structures. What were wanted were structures of a simple character.

An amendment to refer the matter back was carried.

**Refreshment House and Shelter, Marble Hill.**—The Parks and Open Spaces Committee recommended that the tender of Mr. J. Christie of 767*l.* for the adaptation of the mansion at Marble Hill for refreshment purposes and shelter be accepted. The full list of tenders was given in our last issue; the highest tender was 1,795*l.*, and the estimated cost was 1,565*l.* A discussion took place on the recommendation, and attention was specially drawn to the difference between the lowest tender and the amount of the estimate, and the Chairman of the Works Committee was asked whether his committee had had the work offered them at the estimate and whether they had refused.

Mr. Torrance, Chairman of the committee, replied that, in accordance with the invariable custom of the committee to refuse work which had to be carried out at considerable distance from the central works, they had, without knowing the estimate or the character of the work, declined to entertain it.

The recommendation was agreed to.

**Sites for Tramways Car-sheds and Sub-stations.**—The Highways Committee reported as follows:—

"That application be made to Parliament in the session of 1906 for authority to make unrestricted use of the undermentioned sites acquired, or proposed to be acquired, by the Council, for the erection of tramways buildings, namely:—

On the north side of the Thames:—Sub-stations: i. Shoreditch (Old-street) sub-station; ii. Limehouse (Burdeitt-road) sub-station; iii. Midway-park (Woodville-road) sub-station; iv. Holloway (Wartles-road) sub-station; v. Holloway (Manor-gardens) sub-station; vi. "Angel," Islington (Pentonville-road) sub-station; vii. "Angel," Islington (High-street) sub-station; viii. Camden-town (Arlington-road) sub-station; ix. Clapton (Lea-bridge-road) sub-station; x. Hackney (Mare-street) sub-station. Car-sheds: xi. Poplar (Leven-road) car-shed and approaches; xii. Stamford-hill car-shed; xiii. Hampsstead (Cresy-shed) car-shed; xiv. Bow (Wellington-road) car-shed; xv. Holloway (Parkhurst-road) car-shed; xvi. Holloway (Manor-gardens) car-shed; xvii. Hackney (Mare-street) car-shed; xviii. Hammersmith car-shed.

On the south side of the Thames:—Sub-stations: xix. Battersea (Queen's-road) sub-station; xx. Wandsworth (East-hill) sub-station; xxi. Sireatham sub-station. Car-sheds: xxii. Wandsworth (New-road) car-shed; xxiii. Balham car-shed; xxiv. Abbey-wood car-shed."

The Council, having transacted other business, adjourned.

**LONDON TRAFFIC BOARD.**—It is stated that the Government intends introducing a Bill to establish a Traffic Board on the lines laid down by the Royal Commission. The Commissioners, it will be recalled, in recommending the establishment of such a Board, pointed out that its most important function would be the preliminary examination, before consideration by Parliament, of Bills seeking statutory powers for the construction or extension of works affecting the means of locomotion and transport in "Greater London."



## APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

**Lines of Frontage, Projections, and Width of Way.**  
**Lewisham.**—One-story shops on part of the forecourts of Nos. 103, 105, and 107, Brownhill-road, Lewisham (Messrs. Norfolk & Prior for Mrs. Steines).—Consent.

**Dulwich.**—Oriel windows and porches in front of four houses on the east side and four houses on the west side of Turney-road, Dulwich (Mr. G. A. Lansdown for Mr. H. J. Williams).—Consent.

**Hammersmith.**—A classroom addition on the east side of Oaklands Congregational Church, Uxbridge-road, Hammersmith (Mr. S. Powell for the committee of the church).—Consent.

**Lewisham.**—An iron and glass porch in front of No. 73, Burt-cath-hill, Lewisham, Stocker & Roberts for Mr. F. W. Zuhorst).—Consent.

**Lewisham.**—Iron and glass porches in front of houses on the north-east and south-west sides of Chadleigh-road, Brockley (Messrs. J. W. Heath & Sons).—Consent.

**St. Pancras, West.**—The retention of a projecting shop front at No. 28, Arlington-road, St. Pancras (Mr. J. H. Hignell for Mr. P. Natus).—Consent.

**Strand.**—A projecting flue on the eastern side of the Savoy Hotel extension to project in Savoy-buildings (Messrs. Colcutt & Hamp for the Savoy Hotel, Ltd.).—Consent.

**Marylebone, East.**—An oriel window and turret at the corner of Mill-hill-place and Wimpole-street, St. Marylebone (Mr. W. Wallace for Messrs. Debenhams, Ltd.).—Consent.

**Norwood.**—Buildings on the west side of Brixton-hill, between Acre-lane and Hayter-road, Norwood (Messrs. Gush, Phillips, Walters, & Williams for Mr. R. A. Johnston & Miss C. S. T. Johnston).—Refused.

**Fulham.**—Buildings on the eastern side of Fulham Palace-road, abutting also upon the southern side of Childerley-street, Fulham (Mr. F. C. Cole for the trustees of the Fulham Waste Land and Lygon Almshouses Charities).—Refused.

**Drizion.**—An iron sign upon the forecourt of No. 205, Clapham-road, Brixton (the Granville Motor Engineering Company).—Refused.

**Chelsea.**—A building at the rear of No. 449, Fulham-road, Chelsea, to abut upon Gunter-grove (Mr. W. F. Haradall).—Refused.

**Dulwich.**—The retention of porches to Nos. 7, 8, 10, 11, and 12, Rushin-walk, Herne-hill (Mr. A. M. Deacon for Mr. R. E. Maye).—Refused.

**Greenwich.**—A building on the southern side of Eastcombe-avenue, Greenwich, to abut also upon the eastern side of Wyndcliff-road (Messrs. Beadell, Wood, & Co., for the Norwich Union Life Insurance Society and Mr. F. R. Barrett).—Refused.

**Hamstead.**—Buildings on the west side of Belle Vue-crescent, Finchley-road, Hamstead (Messrs. Brown & Barrow for the trustees of the Burgess Estate).—Refused.

**Marylebone, East.**—An iron and glass covered way at No. 38, Finchley-road, St. Marylebone (Messrs. Ritchie & Co. for Mrs. Lupton).—Refused.

**Westminster.**—An iron and glass canopy and electric lamp in front of No. 87, Victoria-street, Westminster (Messrs. Griffin & Woollard for Messrs. J. B. Martin, G. Hastings, & H. Welbey).—Refused.

**Hackney, North.**—Retention of a temporary wood and iron covered way at the entrance to No. 97, Stamford-hill, Hackney (Mr. F. Tate for Mrs. L. Tite).—Refused.

**Lines of Frontage and Construction.**  
**Islington, North.**—An iron and glass covered way at the entrance to the Islington Infirmary, Highgate-hill, Islington (Mr. W. Smith for the Guardians of the Poor of the Parish of St. Mary, Islington).—Consent.

**Space at Rear.**  
**Kensington, South.**—Buildings on part of the open space at the rear of Nos. 164 to 172 (even numbers only) inclusive, Earl's-court-road, Kensington (Mr. W. G. Hunt).—Consent.

**Haggerston.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on Lot 11, Goldsmith's-row, Haggerston (Mr. F. B. Healy).—Consent.

**Wandsworth.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of three buildings on the western side of Tooting High-street, at the corner of Selkirk-road, Wandsworth (Mr. J. C. Radford for Mr. C. S. Merrett).—Consent.

**Paddington, South.**—An addition to No. 9, Southwick-place, Hyde-park (Mr. R. S. Ellis).—Consent.

**Brixton.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a house on the north-western side of

Atherfold-street, Clapham (Mr. V. Vagnolini for Mr. W. P. Goosay).—Refused.

**Means of Escape at Top of High Buildings.**  
**Holborn.**—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the top story of "Craven House," Kingsway (Mr. H. Tanner, junr., for Messrs. J. Mitchell & Co.).—Consent.

**City of London.**—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the sixth (top) story of Nos. 110 and 111, Fleet-street, City (Messrs. Smee & Honchin for Messrs. Cook & Sons).—Consent.

**Cubical Extent.**  
**Rotherhithe.**—An addition to No. 247, Rotherhithe-street, Rotherhithe, such building and addition to exceed in extent 250,000, but not 450,000 cubic feet, and to be used only for silver and lead refining (Messrs. M. T. Shaw & Co., Ltd., for Messrs. H. J. Enthoven & Sons, Ltd.).—Consent.

**Buildings for the Supply of Electricity.**  
**Fulham.**—For iron, brick, and concrete additions to the generating station, Townmead-road, Fulham (Mr. A. J. Fuller for the Fulham Borough Council).—Consent.

**Paddington, North.**—A sub-station on a site at the rear of Nos. 5 and 6, Blomfield-road, abutting upon Portsdown-road, Paddington (Mr. S. Highfield for the Metropolitan Electric Supply Company, Ltd.).—Consent.

**Lines of Frontage, Width of Way, Space at Rear, etc.**

**St. George, Hanover-square.**—Residential flats on the site of Gloucester House, to abut upon Piccadilly at Park-lane, St. George, Hanover-square (Messrs. Colcutt & Hamp for Mr. J. J. Duveen).—Consent.

**St. George, Hanover-square.**—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the fifth and sixth stories of residential flats on the site of Gloucester House, to abut upon Piccadilly and Park-lane, St. George, Hanover-square (Messrs. Colcutt & Hamp for Mr. J. J. Duveen).—Consent.

**Woolwich.**—The formation or laying-out of a new street for foot traffic only at the rear of houses on the east side of Godfrey-street, Woolwich (Messrs. F. C. Henesy & S. A. Douglass).—Refused.

The recommendations marked † are contrary to the views of the local authority.

## ARCHITECTURAL SOCIETIES.

**GLASGOW ARCHITECTURAL ASSOCIATION.**—At a meeting of the Glasgow Architectural Association on the 1st inst., Mr. Robert F. Sherar, a delegate from the Edinburgh Association, gave a lecture on "Linear Perspective." After tracing the history of the science from the conventional representations of the ancient Egyptians to the finished realism of the Middle Ages, he said that the researches of the scientists as such had been practically exhausted by Dr. Brook Taylor and successive writers in the XVIIIth century; but it was always possible to improve on the methods of stating facts and of teaching how to apply the theory to practice. He thought that illustrating perspective as he did that night by photography would be something new to them. He referred to the confusion of ideas expressed by the term "picture plane," and discussed a few questions arising perennially from this confusion, among which was the question of vertical parallel lines converging towards a vanishing point. He then described the elementary conditions on which the science depended, and distinguished between the perspective appearance of objects as we see them and the perspective images as they drew them on paper. He showed two photographs of the same building from the same spot—the one on the right-hand side of the photographic plate, and the other on the left-hand side—which were quite different in the perspective lines, and explained that they were both equally correct records of the perspective appearance as they saw it, but records only. In dealing with the distance a spectator should be from the object in order to produce an agreeable result, he showed three photographs of the east end of Princes-street showing the Calton Hill in the distance, and said he had often heard it remarked that photography did not give correct perspective, distant hills, etc., always coming out too small. The first photograph showed the Calton Hill about a quarter of the height of the buildings; the second showed it the same height; and the third showed it twice the height.

This, he said, depended on the position of the objects to be represented. The choice of the particular point of view, whether by photography or other means, having gone so far in describing the object of the subject, he then showed what he considered the best method of applying the theory to practice by working out an example in charcoal lines.—*Continued.*

**LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.**—From an advance proof of the Report of the Council of the Society for 1905, was 174, nearly 1,000 Members, seventy-two Members, and nine Associates, as against a year previous of 155 at the date of the last Report, allowing an increase of nineteen. The Council refer with deep regret to the decease of Francis W. Bedford, who was for many years a zealous member and Hon. Secy. of the Society. During the year 1905, there have been nine general and seven Council meetings, compared with nine general and eighteen Council meetings in the year previous. Classes on "The Nature and Properties of Building Materials" have again been held in the Society's rooms under the direction of Mr. C. Healy; and it is stated that the School of Architecture under the auspices of the Society, in conjunction with the Leeds Institute and the Leeds University, is proving of great advantage to the Associates in preparing them for the subject required for the R.I.B.A. examinations. At the meeting (2nd inst.) at which the Report was read, the following prize-winners were announced:—Silver medal and President's prize of 5l. 5s. for measured drawings—Mr. W. Whitehead; construction—Mr. W. P. Rylatt; essay prize—Mr. W. P. Rylatt; sketching—1st, Mr. W. Whitehead and Mr. W. J. Freeman; 2nd, Mr. W. J. Greaves; design—1st, Mr. W. P. Rylatt; 2nd, Mr. W. Whitehead; Holden prize—Mr. G. H. Foggett.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—The third volume of the *Transactions of the Edinburgh Architectural Association*—or more correctly, we believe, Part 4 of Vol. III.—contains a number of valuable and interesting papers on a variety of subjects. The issue is not complete in itself, starting in the middle of the paper in "The Architectural Antiquities of Leith," the system being apparently to issue a certain number of pages in each Part, to be bound up as a volume subsequently. The various short papers on places visited contain a great deal of information; a rather longer one on Bothwell Castle by Mr. G. S. Aitken deserves special mention. The volume also includes a long and excellent illustrated article by the late J. M. Brydon on the works of Cockerell, and another on "Indications of Roman Architecture in Scotland" by Mr. Thomas Ross. If all the *Transactions* volumes of the Association are as well filled as this it will make a valuable and interesting series.

## ARCHÆOLOGICAL SOCIETIES.

**BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.**—The Bristol members of the Bristol and Gloucestershire Archæological Society assembled on Saturday last week at the invitation of the vicar (the Rev. H. W. Boustead) and wardens of All Saints (City) to inspect some interesting features of early architecture brought to light during the recent work of renovation in the south aisle. The visitors were welcomed by the vicar and Dr. Cuthbert Atchley gave some general particulars of the early history of the church. While in the south aisle, Mr. G. H. Outley described some of the discoveries, and mentioned that the church had suffered from so called restoration more than most of their old churches. He pointed out that by the removal of a ceiling a XVth century roof was disclosed. There was a mutilated arch corbel, and the positions of other corbels were to be seen. The arcade had been painted many times during the last century. The eastern apse was a 14th-century work. The eastern wall was 14th-century work. The time, but there were the 14th-century work. The walls had been painted during the 18th century. The XVIIIth century work was visible in the



vestry wall they expected to find a hagioscope, but they found a window and a beautiful foliated opening lower down, through which, and from his bed on the inside, a man might, by just raising himself a little, see whether the candles on the altar were burning. Inside the house (the old vicarage), and on the first floor, could be seen the remains of the original fireplace. There was the door frame which led into the room over the south porch, and the springing of the third Norman arch. In the second floor was the Norman clear-story and original fireplace, and on the third floor was to be seen the original roof much decayed.—While one section of the party visited the old vicarage, the other was interested in the ancient vestry records.—*Western Daily Press.*

### ENGINEERING SOCIETIES.

**THE JUNIOR INSTITUTION OF ENGINEERS.**—The annual general meeting of this Institution, which took place on October 27 (the retiring chairman, Mr. S. Cutler, jun., presiding), was also the first general meeting of the Society after its constitution as an incorporated body, and was held under the requirements of the Articles of Association. After the usual routine business the annual report of the Council was presented. Reference was made in it to the increase of membership to 889; to the visits to works, thirty-two in number; to the meetings, eleven of which had been held; to the celebration of the "Coming of Age" of the Institution; the growth of the library; and to arrangements which had been made for the ensuing session. The scrutineers reported that the election had resulted as follows:—Chairman, Mr. Adam Hunter, A.M.Inst.C.E.; vice-chairmen, Messrs. Lewis H. Rugg, A.M.Inst.C.E., and F. S. Pilling, M.I.Mech.E.; hon. librarian, Mr. E. Eade; hon. auditors, Messrs. P. L. Young and W. H. de Ritter, M.I.Mech.E.; members of Council, Messrs. G. T. Bullock, F. R. Durham, A.M.Inst.C.E., G. H. Hughes, M.I.Mech.E., and A. G. Young. Provincial members of Council:—North of England, A. E. Bassy, A.M.I.Mech.E.; Midlands, E. King, A.M.I.Mech.E.; Eastern Counties, J. Julian; Southern Counties, F. S. Miller; West of England, E. W. Porter, A.M.Inst.C.E.; Scottish District, G. E. Johnston; Irish, W. E. Lilly, M.I.Mech.E.; Welsh, H. F. Hunt, B.Sc.

On November 3 the inaugural meeting of the twenty-fifth session took place. In the absence of the retiring President, Mr. W. H. Lindley, who was detained by professional work in Roumania, the chair was taken by Sir William H. White, Past-President. The Institution Medal for the most meritorious paper of the previous session was presented to Mr. George H. Hughes for his contribution entitled "Practical Notes on Water-works Construction." A very cordial vote of thanks having, on the proposal of Mr. A. F. Jones, seconded by Mr. G. Hughes, been passed to Mr. Lindley for his services to the Institution during the past year, and recorded on his behalf by Mr. F. R. Durham, Sir William White then inducted to the chair the new President, Mr. Dugald Clerk, M.Inst.C.E., investing him with the badge. Mr. Clerk took as the subject of his presidential address "The Problem of the Gas Turbine," his conclusion being that, so far as present knowledge went, there was but little hope of a business success being made of any internal combustion turbine. A hearty vote of thanks, proposed by Mr. I. L. H. Hagg, seconded by Mr. E. Eade, and supported by Mr. J. Fletcher Moulton, K.C., Past-President, was accorded the President in acclamation. On the motion of Mr. S. Cutler, jun., seconded by Mr. F. S. Pilling, a thanks of the Institution were also presented to Sir William White for undertaking the duties of Acting-President that evening, and the proceedings concluded with the announcement of the ensuing visit to Messrs. Barclay, Perkins, & Co.'s brewery at Southwark on Saturday afternoon, November 18, and a meeting on December 8, when a paper on "Electric Mains for Power Transmission Work" would be read by Professor John T. Morris, M.I.E.E. (member). The other meetings, etc., of the new session have been arranged as follows, and visits to various works will take place:—January 26, "Some Notes on Boiler Trials," by Professor J. D.

Cormack, B.Sc. (hon. member); February 2, "Some Recent Electrical Engineering Measuring Instruments," by Mr. Kenelm Edgcombe, M.I.E.E. (member); February 10, Anniversary Dinner in the Victoria Hall of the Hotel Cecil, the President in the chair; February 15, "Architectural Design and Expression," by Mr. H. Heathcote Statham, F.R.I.B.A.; March 2, "Gas Engine Indicators," by Mr. L. F. de Peyrecave, Stud.Inst.C.E. (member); March 10, Conversation. A short address on "The Evolution of the Man-of-War," illustrated by lantern slides lent by the Navy League, will be given by Mr. C. Alfred Smith B.Sc. (member); April 11, joint meeting with the Discussion Section of the Architectural Association at 18, Tufton-street, Westminster, commencing at 7.30 p.m., paper on "Ferro-Concrete," by Mr. S. N. Bylander (Mem.J.Inst.E.); April 20, "The Internal Combustion Engine as applied to Marine Purposes," by Mr. Francis J. Maddox, Stud.Inst.C.E. (member); May 11, "The Structural Design of Factories," by Mr. Adam Hunter, A.M.Inst.C.E. (Chairman).

**SOCIETY OF ENGINEERS.**—At a meeting of this Society, held at the Royal United Service Institution, Whitehall, on the 6th inst., Mr. N. J. West, President, in the chair, a paper was read on "The Metallic Preservation and Ornamentation of Iron and Steel Surfaces," by Mr. Sherard Cowper-Coles. A description of this process has already appeared in our columns.

**THE INSTITUTION OF CIVIL ENGINEERS.**—At the inaugural meeting of the eighty-seventh session of the Institution, held on Tuesday, the 7th inst., Sir Guilford Molesworth, K.C.I.E., the retiring President, alluded to the loss which the Institution and the engineering profession generally had sustained during the recess by the deaths of Mr. James Mansergh, F.R.S., and Mr. George Robert Stephenson, Past-Presidents, and of Sir William Shelford, K.C.M.G., member of Council. He then formally introduced to the members his successor in the chair, Sir Alexander Binnie, and Sir Alexander delivered an address to the members, in which he traced the influence of scientific thought and investigation upon the development of engineering practice. The President subsequently presented the medals and premiums awarded by the Council for papers dealt with at the Institution in the course of the past session, and afterwards received the members in the library.

### Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 10, 1855.

**THE DWELLINGS OF THE PEOPLE.**—At the West Brompton Mutual Improvement Society, on Friday, the 2nd inst., a lecture on "The Homes of the People," was delivered by Mr. G. Godwin. At the close of it Mr. Godrich, who was in the chair, said, in moving a vote of thanks to the lecturer, that the most distressing of the details given by Mr. Godwin could be paralleled in the Royal parish of Kensington, in which they were: the condition of Jennings-buildings, the Potteries, and Hooper's-courts, with a disgrace to the country. The Rev. Thomas Pearson confirmed the assertion of the lecturer, that the efforts of the clergyman were unavailing with people housed as he had described. The lecture will be repeated at the Polytechnic Institution on Monday, the 12th.

**WOODROOFE MEMORIAL TOWER, OATLANDS PARK.**—The tower which has been erected at St. Mary's Church, Oatlands, as a memorial of the late Mr. George Thos. Woodroffe, at a cost of some 2,500*l.*, was dedicated by the Bishop of Winchester recently. It has been built from the designs of Mr. J. Compton Hall, architect, London, by Messrs. Goddard, of Farnham and Dorking, Mr. Peters acting as foreman. The tower, which is detached from the church, with open arches on the ground floor, is 77 ft. in height to the top of the parapet, and consists of entrance porch, ringing chamber, clock-chamber, and belfry, with a turret as far as the clock-chamber. It is faced with Bargate stone, with Bath stone dressings, the more decorative work being concentrated in the lower story, or entrance, and in the upper part, or belfry. Messrs. Earp & Hobbs were responsible for the carving work.

### Illustrations.

#### SPIRE AND TOWER, ST. GEORGE'S CHURCH, BICKLEY.



THIS is a view of the spire and upper part of the tower of St. George's Church, Bickley (Kent), which has been rebuilt from the design and under the superintendence of Mr. Ernest Newton.

The church was built about forty years ago. The spire was built of Caen stone, which had perished so completely that it was necessary to pull the whole down. Advantage has been taken of this to heighten the tower, put in new belfry windows, and to build a spire of a different design from the old one. The "chequer board" pattern marks the addition to the tower, and is intended, besides doing this, to make the transition from the rubble work of the tower to the dressed stone of the parapet and spire less abrupt.

The builders are Messrs. Collins & Godfrey, of Tewkesbury.

#### ELYTHBURGH CHURCH, SUFFOLK.

THE views of the interior and exterior of this church are given as illustrations to the leading article in this week's issue, to which the reader is referred.

#### NEW BATHS, OLD KENT-ROAD.

WE give this week the exterior view and two plans of the baths recently built in the Old Kent-road from the plans and design of Mr. E. Harding Payne.

The first-class swimming bath had to be arranged in view to its use for bathers and swimming entertainments in the summer and as a public hall in the winter; it was, therefore, placed with its long side next Marlborough-road, this position giving the best facilities for easy entrance and exit.

From the gallery, over the corridor on one side and over the dressing-boxes of the second-class bath on the other, every person seated will be able to see the pond. The seats are Nicholl's patent automatic rising seats. The railing in front is of ornamental wrought iron by Messrs. George Wragge, Ltd., who also executed the railings in front of the building.

The plans sufficiently explain the general arrangement. In the entrance-hall, the floor of which is black and white marble, is a marble commemorative tablet in Verde Antico Sicilian and onyx marble, with the coat of arms in mosaic, from the design of the architect, and made by the Art Pavements and Decorations, Ltd., who have executed the rest of the marble and mosaic work throughout the building. The pay-box has been executed in teak and polished; the entrances will also be used as exits, and are fitted with Messrs. W. & R. Leggett's patent panic bolts. The walls of the bath are lined throughout with ivory-white glazed bricks with coloured dadoes and bands, obtained from the Leeds Fireclay Company, who have supplied the whole of the glazed bricks used in the rest of the building. The roof, which is constructed of steel and partly supported on stanchions, supplied by Messrs. Powers & Deane and Ransome's, is encased with fibrous plaster, and the stanchions in Keene cement to form ionic columns supporting the main cornice, this plaster work being executed by the Wellesley Fire Resisting Partition Company. The lantern light over the roof is glazed with patent lead-covered steel bars and rolled plate-glass; this work, as well as other lantern lights to building, is being carried out by the British Challenge Glazing Company. The gangway round the pond is laid to a fall with non-slipping tiling supplied by Messrs. G. Wooliscroft & Son, with slate coping and terrazzo flooring in dressing-boxes.

The lights at the sides are made to open, and are fitted with Messrs. Leggett's patent fanlight openers, the pairing being fixed on the outside and operated by a loose key. The coat of arms of the borough, executed in stained glass, was supplied by Messrs. Lills & Bishop, together with the leaded lights throughout the building. The lighting is by electric light, which is supplied from



two sources on the County of London Electric Supply Company's main and also from the council's own engine and dynamo. There is also a gas supply in case of emergency. There are twelve five-light incandescent lamp pendants and four arc lights, which are hung on wires, with winches for pulling up and down for removing lamps, cleaning, etc. The special bronze pendants, as well as the other bronze electric light fittings and bronze door furniture, were supplied by Messrs. T. Brawn & Co.

In the winter the bath will be floored over for use as a hall. This floor has been constructed by Mr. T. Sobey, and is supported by deal trusses in the wall of the bath, the floor being of pitch pine secured with secret

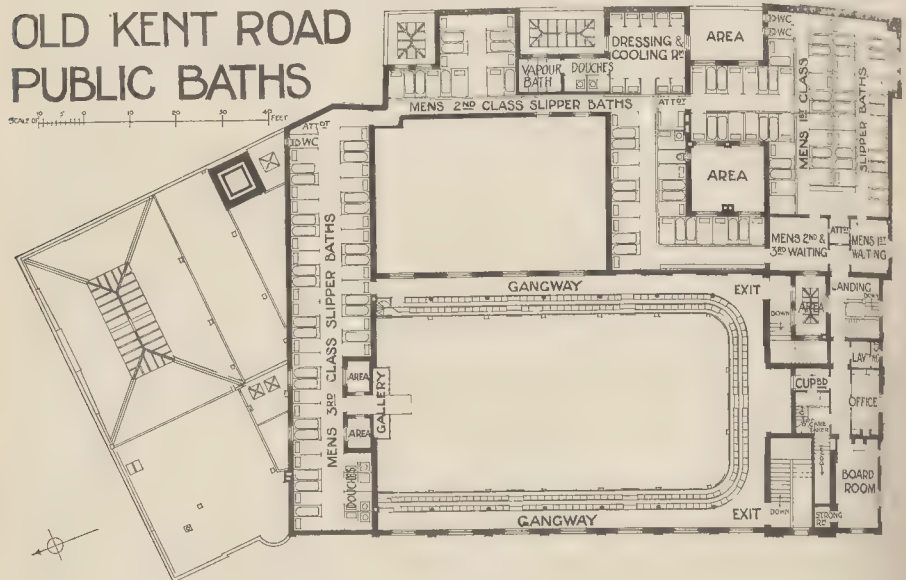
brass cups and screws, the whole being capable of easy removal and storage in the basement during the summer months. The platform, with oak panel front, has been erected by Messrs. A. F. Vigor & Co., and there are electric wall plugs for connecting up footlights, etc., if required. It is proposed to drape with fire-resisting curtains.

The entrance to the bath over the forecourt in Old Kent-road is paved with black and white Roman mosaic, with pavement and lanterns to light basement, and inclosed with wrought-iron railing and gates. A portion of the forecourt is utilised for entrance to men and women's public lavatories, which are under it, and which have been erected under the superintendence of the Borough

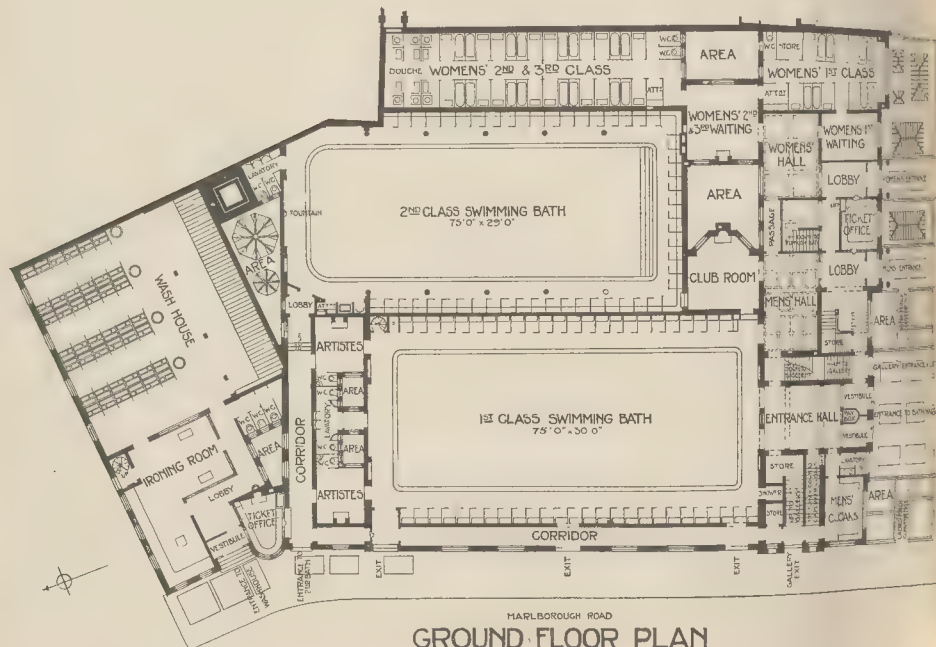
Engineer, Mr. William Uxtohy. The second-class swimming bath, the entrance to which is in the Marlborough-road, has a pond similar to that in the first-class swim, but not quite so deep.

The slipper baths are of white fireclay, and were supplied by the Leeds Fireclay Company, Ltd., those in the second class being specially made to the architect's design. The baths are inclosed with sides for the purpose of cleanliness and to prevent the misuse which occurs in many similar establishments of bathers secreting rags and filth behind them. Messrs. E. Busby & Co.'s patent valves and wasters are fitted in each case, and the valves are so arranged that the attendant can supply more

## OLD KENT ROAD PUBLIC BATHS



FIRST FLOOR PLAN



GROUND FLOOR PLAN

water to the bather without entering the compartment. The valves are inclosed in enameled iron covers. Each compartment is provided with the requisite seats, hat and coat pegs, bath brush, looking glasses, etc. In connexion with the second-class men's bath is a Russian vapour bath, which consists of a dressing and cooling room, a steam vapour-room, and two hot and cold rain douche baths—with accommodation for nine bathers at one time.

A Turkish bath is arranged in the basement, and is easy of access for either men or women on alternate days, the marble entrance staircase being arranged just at the back of the ticket-office in the Old Kent-road. The staircase is of white Sicilian marble, with bands, handrails, etc., of verte antico, with an oak screen with leaded lights to the communicating passage.

In the frigidarium the walls are lined with similar marble, while the floor is of black and white, with dove-coloured bands. There is a marble floor fountain, the floor of which is of variegated marbles with Sicilian curb. There is also an antique statuary marble wall drinking fountain. The reclining couches and the chairs, which are of special design, were supplied by Messrs. Mar, Tili, & Kirke, of Hull. The rooms have walls of glazed brickwork with coloured bands; the ceiling

is panelled with enamelled iron and oak ribs, supplied and fixed by Messrs. Simpson & Son. The floor is of mosaic and terrazzo; the benches have marble tops. The hot air is obtained through a stove, supplied and fixed by Messrs. Crumblehulme & Son, of Bolton, and is placed in a sub-basement under No. 3 hot-room. There is also a Russian vapour bath for those who prefer to use it either in conjunction with the hot-air bath or otherwise. This is heated by live steam introduced at a low pressure.

A plunge bath is provided about 24 ft. by 7 ft. 6 in., and there is a special needle, spray wave, sitz and douche bath, supplied by Messrs. Doulton & Co. The whole of the marble mosaic and terrazzo work to the Turkish bath has been executed by the Art Pavements and Decorations, Ltd. In the basement there is a large supper or club meeting-room and a dry and well-lighted store-room. Accommodation for the superintendent is provided on the second floor, with a separate staircase from Marlborough-road and a lift from the basement. The whole of the engineering work was designed by Mr. W. M. Binny, of Teddington, who acted as consulting engineer for the architect, and also supervised the erecting of the machinery. Mr. Morgan Williams acted as consulting engineer for the electric wiring.

Mr. A. N. Coles, of Plymouth, was the contractor for the building. Mr. William Lake acted as clerk of works.

#### MEMORIAL TABLET, COUNTY HALL, NORTHAMPTON.

This tablet, recently completed and put up in the ancient County Hall of Northampton, is of bronze, enamel, and marble. It was commissioned by Mr. J. A. Gotch, under whose control the design and execution of the memorial had been placed. The figure of "Fidelity" seemed appropriate in view of the long services rendered, whilst the conventional Northampton roses sufficiently show the local connexion. These being of red enamel make a special point of interest in the general scheme, and are a pleasant contrast to the marble, which is grey-dove. The bronze is dark, and as left will improve in colour with time; this also contrasts pleasantly with the marble.

NELSON DAWSON.

#### SCREEN, LANREATH CHURCH, CORNWALL.

The chancel screen in Lanreath Church has recently been restored and rededicated. The accompanying measured drawing, however, shows the screen in its maimed condition before restoration.

The principal new work required to bring it back to something like its former glory has been the reconstruction of the typical vaulted coving of the rood loft, in place of the plaster spandrels indicated by the drawing.

The church generally was restored under the direction of Mr. Bodley some years ago.

The sketch plan on the drawing indicates the position the screen occupies.

The restoration was made under the direction of Mr. T. Rogers Kitsell, of Plymouth, and the drawing is by his assistant, Mr. W. Leslie Stephens.

#### COMPETITIONS.

**ELEMENTARY SCHOOL, CARLISLE.**—The competitive designs sent in for the new school proposed to be built in Norman-street by the Carlisle Education Committee have been considered, and the plans of Messrs. Oliver & Dodgshun, architects, Carlisle and Leeds, have been accepted. Premiums of 75*l.*, 30*l.*, and 20*l.* were offered, to merge, in the case of the accepted design, in the commission. The second premium was awarded to Mr. Frank Lishman, Carlisle and London, and the third to Mr. J. W. Benwell, Carlisle. There were five designs sent in, and Mr. W. H. Brielerley, of York, was the assessor. The plans show a complete school for 1,250 children, including school for defectives and manual instruction-room. The building which is to be proceeded with at first will accommodate 800 children, the cost of which will be about 12,000*l.*

**GREENWICH BRANCH LIBRARY.**—On Monday the Libraries Committee of Greenwich Borough Council reported that upwards of 200 architects had applied for and received copies of the conditions in respect to the submission of designs for the branch library. The number of questions which had been asked by competitors was so great that, owing to the provision in the conditions that such questions with the answers thereto should be printed and supplied to all the competitors, it had been found necessary to postpone for a month the time for deposit of designs.

**CORONER'S COURT AND MORTUARY AT DEPTFORD.**—The following architects are to be invited by the Deptford Borough Council to submit designs for the proposed mortuary and coroner's court:—Mr. Horace T. Bonner, A.R.I.B.A., C.E., 13 and 14, King-street, Cheapside; Mr. Albert L. Guy, F.R.I.B.A., 4, Verulam-buildings, Gray's Inn; and Mr. Alfred Roberts, F.R.I.B.A., 92, London-street, Greenwich, S.E. The cost of the buildings to be erected are not to exceed 4,000*l.* The architect's commission on this is to be 200*l.*, and the two premiums to the unsuccessful competitors are to be 10 guineas each.

**WESLEYAN SCHOOL, HESENFORD.**—A new Sunday school has been opened by the Wesleyans of Hesenford. Mr. Harold Hosking, architect, of Landrake, drew up the plans for the building.

CLOCK CASE ON  
TOWER: OLD  
KENT ROAD PUBLIC  
BATHS





## BOOKS RECEIVED.

THE CATHEDRAL BUILDERS IN ENGLAND.  
By Edward S. Prior, M.A., F.S.A. (Seeley  
& Co.)

PORTLAND CEMENT: ITS MANUFACTURE,  
TESTING, AND USE. By D. B. Butler,  
A.M.Inst.C.E. (E. & F. N. Spon. 16s.)

## Correspondence.

## THE WATER SUPPLY OF LONDON.

SIR.—The interesting notes in your valuable journal of the 4th inst. on "The Water Supply of the London Poor" fifty years ago prompt me to ask permission for a few suggestions concerning the present water supply of the metropolis. While other cities are securing a pure and efficient supply of water, no adequate reform of the kind has been taken in hand in the interests of the inhabitants of London. Quite recently Liverpool has inaugurated its second pipe line, furnishing an additional supply of 15 millions of gallons of pure water, at a cost of 700,000. And only a few weeks since the Press called attention to what the municipal authorities of Edinburgh and Leith had accomplished by the opening of a new supply, which had been in course of construction for ten years, and furnishes 26 millions of gallons daily, at an outlay of 1,250,000. The *Lancet* has pointed out that all the water areas are being gradually acquired by provincial towns, and any further delay in following their example is perilous to the health of the vast population of the metropolis, which depends mainly upon the Thames for its domestic supply. The London Water Board appears to be tinkering with unimportant details, and ignoring the fact that five commissions, after exhaustive inquiry, have condemned the present water supply as incurably contaminated. The upper reaches of the Dee, where the surplus water is now wasted by floods, would, it is believed, provide an ample source of excellent water for all practical purposes. On page 26 of Dr. W. Scott Tebb's recently-published pamphlet on the "Metropolitan Water Supply" is the following:—"In the Report for 1876 Sir Edward Frankland writes: 'When the heavy rains of December set in, the accumulated filth of the summer and autumn was swept into the neighbouring streams, the Thames overflowed its banks, washing the manure from cultivated land, and liberating the water from stagnant ponds and ditches. Thus during the last month of the year the Thames was laden with organic matters of the most objectionable origin, which, carried down to the intakes of the metropolitan water companies, passed through the filters and were distributed to customers. Since January, 1873, the Thames has never been in such a filthy plight.' In referring to filtration, he says: 'No care, foresight, or appliance could convert the "puddle" (to quote an entry in the books of the West Middlesex Company), which entered the company's works, into wholesome potable water fit for domestic purposes. These uncontrollable and frequently occurring outbreaks render this river a very undesirable source of water for domestic use.'" Successive Reports of Sir Edward Frankland reveal similar sinister facts. In his summary of conclusions Dr. Tebb says "that the quality of the water as indicated by the analyses has shown no substantial improvement during the last thirty years." In the interests of public health, and for the avoidance of possible epidemics of zymotic disease, a new and pure supply of water for the metropolis is imperative, and should not further be delayed.

JAS. R. WILLIAMSON.

\*.\* We print our correspondent's letter, with a good deal of which we are in agreement, though we think the complaints as to the quality of the water supplied to London are exaggerated. What is more serious, to our thinking, is the deficiency in quantity, the quantity per head of population estimated as necessary by most water engineers being quite inadequate, and based on the calculations of a period when the domestic bath was a weekly instead of a daily function. It is now (rightly) considered necessary to provide bath-rooms in a class of house in which thirty years ago such a luxury (or necessity?) would have been considered out of the question; and as habits of copious ablution grow the demand for a larger supply of water will increase proportionately.—Ed.

## SAND PERCOLATING INTO A WELL.

SIR.—Having noticed "E. S. C.'s" letter, and being greatly interested in the question (as not only does the sand cut out pumps and plungers, but it is a constant source of trouble in tanks and pipes), I believe by carefully selecting bricks through which water would penetrate, and lining the well with them, jointed and bedded in cement, all head-ends (i.e. 9 in. work), and putting in a good coke breeze concrete bed 3 ft. thick, a sand-proof filter could be made. The well

would probably need to be of 10 ft. diameter if the water has to be pumped quickly, unless the well went for some distance into water-bearing sand—i.e., the filtering area either in depth or diameter should make up, say, 1,000 ft. superficial—more if possible. W. C. R.

## CHESHUNT LIBRARY COMPETITION.

SIR.—It sometimes happens that merit goes unrecognised on account of the modesty of the virtuous person. In these days of municipal extravagance it is encouraging to find an official who is careful of the pennies. The Urban District Council of Cheshunt, Herts, have such a treasure. In the recent competition for a public library there the competitors were required to deposit one guinea, which was to be returned in the usual manner. Now that the award has been made, the sum of 1l. 0s. 11d. is sent to competitors as their deposit. That more generous impulses have been stifled is shown by the fact that the printed receipt form was made out for "one guinea," but has been corrected. I trust this member of the lost tribe may soon aspire to the highest seat in the synagogue, which he so eminently deserves. Meanwhile I am  
MINUS A. PENNY.

## The Student's Column.

STEAM BOILERS AND PIPES.—XIX.  
BOILER-HOUSE ARRANGEMENT.

THE beginning of Article VI., p. 186, we mentioned the desirability of placing steam boilers upon a perfectly dry seating, at or only a little below ground level, in a light and well-ventilated building. In Articles V., pp. 131 and 157, we discussed various types of feed-water heating apparatus, including the variety more generally known as "fuel economisers," and that employed in the thermal storage system. Brief reference was also made to the desirability of softening apparatus for the treatment of hard waters before admission to water-heating and evaporating plant.

Succeeding articles dealt at length with the design and construction of foundations and brickwork for boilers, flues, and chimneys. Consequently, the next matter for consideration is the general arrangement of boilers and auxiliary apparatus in the boiler-house—a subject that might easily lead to a most extended discussion of the requirements of large and small power plants, from the huge boiler hall of a 100,000 horse-power generating station down to the modest shed accommodating the boiler for a small factory or hospital.

Even in a small establishment where one boiler would actually suffice, but where it is important that the supply of steam should be maintained without the possibility of accidental interruption, provision must be made for two boilers so that one shall always be in reserve for contingencies and permit periodical examination, cleaning and repair to be performed without undesirable haste or inconvenience.

An event of far too frequent occurrence is that the cost of building a public institution so far exceeds the expectation of the authorities that the engineering equipment has to be pared down in every direction. Sometimes the architect has to cut down the dimensions of the buildings and to sacrifice architectural features into the design of which he has thrown his heart. A more common eventuality is that, while the building plans and estimate go through without mutilation, the engineering scheme suffers in a lamentable way.

If an engineer were the architect he would reduce structural and decorative work, regarding these as the case of a watch, and preserve the integrity of the mechanical plant, considering this as equivalent to the mainspring and works. But an architect is almost invariably the engineer, and so the converse result obtains.

We have known many an instance where a public body have been prepared to spend a certain sum upon an institution, having first considered a rough inclusive estimate of the probable outlay. Then the architect has found that more exact estimates for the buildings and engineering work involved more money. One or more engineering firms who have submitted preliminary estimates in the hope of being specified, or favoured in some way, have consequently been requested to

strike out all items that are unnecessary, essential, and to reduce cost in other directions. Eliminations and contractions of this kind always mean the sacrifice of efficiency and economical operation.

Among the things generally thrown overboard are spare boilers, mechanical stokers, duplicate feed pumps, water softening apparatus, or live steam water-heaters, economisers, condensers, and main steam apparatus for the utilisation of condensed steam. The dimensions and strength of pipes and cold water-tanks are reduced; the systems of steam pipes are simplified; the omission of by-passes, and the junction-boxes, regulating valves at branches, and the diameters of the mains and branches are revised so that while still able to deliver the required quantities of steam, they do so at the expense of increased friction necessitating greater coal consumption. Exhaust steam heating apparatus, hot air furnaces and buildings is replaced by less costly and less economical appliances, the schedule of radiators is sweated down, and, unless that can be cheapened is submitted to the same process.

After things have been pared down to the desired figure, tenders are obtained, the buildings are erected and equipped, and the authorities congratulate themselves and the architect at a public function. A year or so later the dimensions of the coal bill begin to excite apprehension, and year by year it is discovered that extensions of the engineering plant are desirable not only for the sake of fuel economy, but also to provide more completely for other needs. The authorities do not attach blame to the architect; neither do we. We have to be blamed are the members of the board, or council, who were unwilling to expend enough money to secure true economy.

As boilers and auxiliaries represent comparatively heavy items of the expenditure, these portions of the engineering equipment are usually attacked first. Our advice to the architect is to fight to the utmost against any reduction in such items, and if compelled to yield to make sure that adequate space is provided in the boiler-house buildings for the additional appliances that will probably have to be installed at a later period.

In planning a boiler-house ample stoking space should be left in front of the boilers, and the coal store should be situated conveniently near to the stoker.

When the number of boilers laid down is sufficient to justify the employment of mechanical stokers, coal is stored in overhead bunkers, from which the feed gravitates to the stoking apparatus. In exceptional cases, where the levels are peculiar, it may be possible to deliver coal from wagons directly into the overhead bunkers without converting the boiler-house into a semi-underground chamber. The course is only practicable when the boiler-house is built upon a level foundation cut in the side of a steep hill, and, as a general rule, it is necessary to adopt conveying and elevating machinery of suitable character for the delivery of coal to the desired place. Similar apparatus can also be applied to the removal of ashes and clinker.

In small installations mechanical stoking effects no reduction of the wages bill, and may not justify the additional outlay involved. There are, however, simple and inexpensive forms of mechanical stokers, which, although effecting no saving of wages, obviate to a very large extent the nuisance of combustion and consequent disadvantages attendant upon inefficient and careless firing by ignorant stokers.

Assuming the spaces allotted for boilers, boiler-setting, flues, stoking, and coal storage have been satisfactorily determined, the designer has next to see that proper accommodation is provided for the water-heater, hot well, and feed-pumps in positions where they will not be in the way or liable to injury.

In one large public institution, built less than ten years ago, the boiler-house had been so long standing that the feed-water heater stood among a heap of coals in the stoking space, and the boiler feed-pumps were fixed about 12 in. above floor level at one side of the same space. The result was that the pumps were permanently covered with a thin layer of coal



last, to the manifest injury of their working parts. This was only one of many serious engineering blunders committed in the equipment of this institution by the architect, who occupied a deservedly eminent place in his own profession. The pumps in question were afterwards removed by the engineer in charge to an adjoining room, and, with the necessary modification of the water and steam pipes, the alterations caused considerable unnecessary expense to the payers.

This example illustrates the desirability of providing a room in communication with the boiler-house where feed-water heaters, feed-pumps, and the hot well can be fixed so as to be protected from dust, and at the same time, to be practically under the eye of the man in charge of the boiler plant.

As a general rule, a cold-water storage tank should be provided in the open roof of the boiler-house, with the object of insuring a sufficient supply for the boilers during temporary stoppages of the main water supply. Of course, the capacity of the tank must be governed by the daily steam consumption.

A second reserve of water is often provided by the collection of rain water from the roofs of the buildings in an underground reservoir of concrete situated close to the boiler-house. When this arrangement is adopted suitable provision must be made for ventilation, and a separate feed-pump should be provided in the boiler-house building for the rain-water service, this pump being connected with the ordinary feed-pump, so that the duties of the two machines may be interchangeable at pleasure.

Some water-softeners are combined with feed-water heaters, and when such apparatus is employed it may be fixed in the heater or pump-room adjoining the boiler-house. Various types of softening apparatus require much more space, and have to be accommodated in a special room of their own.

In arranging the connexions of the cold-water tank, of the feed-water heater, of the hot well, and of the feed-pumps, careful consideration should be given to by-pass and alternative services permitting the disconnection of any portion of the system without inconvenience. The same remark applies to the fuel economiser and the water-heating apparatus. Detailed reference to various alternative services will be made when we take up the subject of boiler-house pipes and fittings.

A detail requiring careful attention is the arrangement of the blow-off system. Where only one small boiler is employed this reduces to very simple terms, as nothing more is necessary than a short length of pipe from the blow-off cock to the nearest drain. But in very undesirable to discharge hot water and steam directly into any drainage system. A blow-off over an open gully means the liberation of so much vapour as to cause considerable inconvenience, except when the operation is conducted at a factory situated away from inhabited places.

It is quite easy to avoid the undesirable effects of direct, or open, discharge by the adoption of a blow-off sump, constructed with a siphon-delivery pipe dipping well below water level, so that nothing but water shall pass into the drain. As an alternative of the kind can be applied to the roof of the smallest boiler at very little expense it should always be used.

In small sizes the sump can be made of galvanized plate, galvanised after construction, and fitted with a bolted cover of the same material. For large sizes cast-iron is a more suitable material, the cover and top flange being machined so as to make a perfectly steam-tight joint.

An incidental advantage sometimes afforded by a blow-off sump of the kind is that it can be employed for raising water to a level above that in the sump if the boiler-house floor is too low to permit flow in the drain.

Installations of two or more boilers, with blow-off pipe from each boiler is connected with a common main carried along the continuous pit in front of the boilers, and thence outside the building to the sump. The sump should be fitted with a ventilating pipe of suitable diameter for the escape of vapour, this pipe being taken up

the side of the boiler-house, and terminated about 3 ft. above the eaves.

Another pipe, fitted with a stop cock, may also be fitted if desired for aiding the operation of periodical cleaning. The sump ought to be placed in a brick chamber, provided at the top with a manhole frame and cover of ample size for the purpose of access.

The positions of drains in the boiler department depend upon the details of the installation, and can easily be settled after the general arrangement has been decided upon. Provision should be made for carrying away water from the emptying pipes of feed-water heaters and economisers, and from the overflow pipes of tanks and hot well, as well as for receiving water from the cylinder cocks of the feed-pumps, the safety valves and other boiler mountings, and from steam traps and separators fitted in the boiler-house and adjoining rooms.

One very important point to be remembered is that boilers have to be got inside the buildings intended for their reception. This may seem a superfluous remark to many of our readers, but, judging by experience, it is not so in reality. The following examples illustrate the unnecessary expense entailed upon contractors by the oversight of the architects to provide openings of sufficient width.

The first example refers to some extensive additions to a large business house in the West-end of London. Nothing wider than an ordinary doorway was left in the only available wall, and, owing to the considerable height of the building, the brickwork was very thick at street level. The idea of the architect was that the boiler-makers should deliver the boilers before this outer wall had been closed up; the boiler-makers were a little behind time; the architect was urged by his client to hurry forward, and the result was that the boiler-makers had to cut out a large opening, to support the superstructure, and finally to make good, at a cost that doubtless made them feel sorry they had been fortunate enough to secure the contract. The architect was quite within his rights, and the contractors were at fault; but if the proper course of providing a wider opening had been adopted all trouble would have been avoided, and facilities for future additions or alterations to the boiler plant would have been in existence.

The second example relates to a steam disinfecter for a hospital in the north, the apparatus being equivalent, in point of size and weight, to a small Cornish boiler. The question of access evidently escaped the attention of the architect, and upon the arrival of the contractors' engineer to superintend the installation of the mechanical plant generally, it was found impossible to get the disinfecting apparatus into the allotted building by any ordinary means. Fortunately, the roof had not been built, and the contractors' representative found the best way of dealing with the difficulty was to hire a travelling crane, and, by the aid of this apparatus, to hoist the apparatus over the walls of the building.

Experiences of the kind are interesting and even amusing to those who are not called upon to pay the cost; but they are always unnecessary, and could easily be avoided if the practice were invariably adopted of providing every boiler-house with a doorway of double width or with an opening that could be bricked up after delivery of the boilers or re-opened at any future time at a minimum cost.

The alternative practice of building the house up around the boilers, or of leaving one wall down so that the boilers can be walked up in another way, is by no means a commendable mode of procedure.

**COUNCIL SCHOOL, KETERING.**—The new mixed school, adjoining the former structure in Hawthorn-road, and erected at the instance of the Kettering Education Committee of the Urban District Council, has now been completed. The school is built on the central hall plan, with classrooms around. The roof is asphalted over with concrete by the Val de Travers Company, and a tower is erected 63 ft. high. The plans were prepared by Messrs. Gutch & Saunders, and Mr. O. P. Drever, of Kettering, was the builder, his contract price being 3,717. 17s.

# COURT OF COMMON COUNCIL.

The Lord Mayor presided over a meeting of the Court of Common Council, held at the Guildhall on Thursday last week.

**The Late City Engineer.**—The Town Clerk laid before the Court a letter from Mr. Percy Ross, announcing the death of his father, Mr. D. J. Ross, the late City Engineer. On the motion of Mr. Morton, seconded by Mr. Tranter, a vote of condolence to the widow and family of the deceased was adopted.

**Thames Barrage.**—The Special (Royal Commission) Port of London Committee presented a report recommending that a representation should be made to the Government in favour of the appointment of a Commission or Departmental Committee to inquire into the proposal to construct a barrage across the Thames at Gravesend. Mr. Barber moved as an amendment—"But without this Court expressing any opinion as to the desirability or feasibility of the scheme." Mr. Cooper, in moving the adjournment of the debate, pointed out that the Thames Conservancy has passed a Bill through Parliament to provide for a water channel 30 ft. deep and 1,000 yds. wide at Gravesend. No one could tell what the effect of the dredging would be, and, therefore, it was inadvisable to take any definite action with regard to the barrage. The debate was adjourned.

**Blackfriars Bridge.**—Mr. Deputy Algar presented a report of the Bridge-House Estates Committee on the reference of October 19 last, to the necessary steps to promote a Bill in Parliament for powers to widen Blackfriars Bridge or construct a new bridge, and recommending: (1) Of the alternative suggestions, that for widening Blackfriars Bridge be proceeded with; (2) That powers be sought to widen the bridge to an extent not exceeding 40 ft.; (3) That the Bill be wide enough to enable the Corporation to round off the north-west corner of the bridge should the necessity for this extend beyond the proposed widening. After a discussion, in the course of which it was stated that Sir Benjamin Baker had told the committee that new foundations would have to be built in connexion with the widened structure, and, further, that he could not be tied down to the cost, the report was carried.

**Islington Cattle Market.**—The Cattle Markets Committee brought up a report relative to the Metropolitan Cattle Market, Islington, recommending that steps should be taken to obtain Parliamentary powers to dispose on building lease of certain portions of the land; that private slaughter-houses at the market should be abolished, and in lieu thereof public abattoirs should be erected at an estimated cost of within 30,000. The consideration of the whole of the report was adjourned.

# WESTMINSTER CITY COUNCIL.

The usual fortnightly meeting of this Council was held on Thursday last week at the City Hall, Charing Cross-road, W.C.

**Thames Embankment Extension and Westminster Improvement.**—The Finance Committee submitted a report dealing with this matter, and recommended "that the Council express the opinion that the contribution of 100,000, payable by the City of Westminster towards the cost of the improvement should be reduced to a pro rata contribution towards the net interest charges falling on the rates up to the time when the full rent is receivable, and that a communication be addressed to the London County Council accordingly." This was agreed to.

**London Squares and Enclosures Preservation Bill, 1906.**—The Law and Parliamentary Committee submitted a report dealing with this measure, and recommended that a communication be addressed to the London County Council stating that the City Council had no objections to offer to the draft of the proposed Bill. This was agreed to.

**Paving Works in Piccadilly.**—The Works Committee reported that they had been informed by the City Engineer that, having received a letter from a firm of timber merchants alleging that the Improved Wood Pavement Company were using spruce timber, and not yellow deal as specified, in the repaving of Piccadilly, he submitted for examination samples of the wood used to the Director of Kew Gardens and to Mr. H. J. Tingle, M.Inst.C.E., both of whom had reported that the wood was deal as specified. The Committee stated that they had referred the matter to the City Solicitors, with instructions to take such action against the writer of the letter as they may deem desirable, and that they had expressed the opinion that the writer of the letter ought at least to recoup the Council the expense incurred by them in consequence of the allegation.

**Spiked Trestle Rods for Barriers in Roadways.**—On a report by the City Engineer the Works Committee recommended that a letter be having power to break up the streets of the City stating that the City Council disapprove the use of spiked trestle rods for barriers, owing to the damage to the street paving caused by such use;



and that in the event of spiked rods being used the Council will make a charge for reinstating not less than 18 in. square of paving in each case.

**Tiling Work at Great Smith-street Baths.**—It was referred to the City Engineer to prepare a specification for the execution of certain tiling works at these baths and to obtain tenders for the execution of the works. The Finance Committee submitted an estimate of 1,000l.

**Proposed Widening of Long-acre.**—The Improvements Committee reported having received a letter from the London County Council stating that that body had decided to take no further action in this matter.

#### OBITUARY.

**MR. G. R. STEPHENSON.**—Mr. George Robert Stephenson, who died on October 26, aged eighty-six years, was a nephew of George Stephenson. He was closely associated with his uncle and his cousin Robert in their railway undertakings, and directed, during many years, the management of their engineering works at Newcastle. Mr. Stephenson's first employment was in the shops, and as a surveyor's assistant, of the Pendleton Colliery, his father being the chief engineer; he then entered King William's College in the Isle of Man, and when eighteen years old joined the engineering staff of the Manchester and Leeds Railway. He served as President of the Institution of Civil Engineers, 1876-7, and as consulting engineer to Canterbury Province, in New Zealand, constructed the line, the first in that district, between Christchurch and the Port of Lyttelton.

**MR. D. J. ROSS.**—We have to record the death of Mr. David James Ross, who retired a few months ago from the post of City Engineer at the close of thirty-four years' service with the Corporation. Mr. Ross was born in London in the year 1845, and, after receiving his education at various public schools, served his articles between 1861-1864 with Mr. John Foster Pickering, a son of Mr. Deputy Pickering, of Cripplegate Within. Experience in the offices of a number of surveyors, including Messrs. Hammack & Lambert, of Bishopsgate-street Within, followed, and in November 1871, he commenced his association in an official capacity with the Corporation, joining the engineer's staff under the late Colonel Haywood. Eleven years ago he succeeded the colonel, on his death, as the engineer to the Sewers' Commission, while in 1897, on the amalgamation of the Commission and the Corporation, his services were retained as the Engineer to the Public Health Department. In the course of his official career Mr. Ross had been associated with a number of important works connected with City sanitation and street widenings. The deceased was a member of the Institution of Civil Engineers, an Associate of the Surveyors' Institution, and a member of the Association of Municipal and County Engineers.

#### GENERAL BUILDING NEWS.

**CHURCH, SMETWICK.**—The foundation-stone has just been laid of the new Church of St. Alban the Martyr, in Devonshire-road, Smetwick. The cost of erecting the church is 3,125l. The building will include nave, north and south aisles, baptistry, chancel, organ chamber, choir stalls, and vestry. The principal entrance will be in the west end. It will be erected of red brick, with Broomsgrove stone dressings, and slate roofs, and wood block floor. It will provide accommodation for 650 worshippers. There will be glazed windows, with leaded lights. A bell turret will be fixed at the west gable, and the building will be heated with hot-water pipes. The interior walls will be of plaster, with red brick and stone dressings, while the interior timber will be of red deal. Messrs. J. Dulow & Son are the builders; while Mr. F. T. Beck, diocesan architect and surveyor, Wolverhampton, is the architect.

**ALL SAINTS' CHURCH, EALING.**—On the 1st inst., the Bishop of London consecrated All Saints' Church, Ealing, which has been erected as a memorial to the Right Hon. Spencer Perceval, Prime Minister in 1809-1812, who was shot in the Lobby of the House of Commons in the latter year. The site of the church forms part of the grounds of the house, Elm Grove, which Mr. Perceval occupied at the time of his death. The architect was Mr. W. A. Pite, and the builders Messrs. Dove Brothers. The organ is by Messrs. Norman & Beard, of Norwich.

**ST. SAVIOUR'S CHURCH, SOUTH HAMPTON.**—Messrs. Caroe & Pessmore will carry out an enlargement, on the east side, of this church. It was built in Eton-road in 1855-6, for 750 sittings, after designs in the Early English style, by E. M. Barry. The chancel was decorated twenty years afterwards by Messrs. Clayton & Bell.

**CHURCH OF OUR MOST HOLY REDEEMER, CLEREKNELL.**—It is proposed to erect a clergy house adjoining the west side of the church in Exmouth-street, which was built after J. D. Sedding's designs on the site of the Spa-fields (Countess of Huntingdon's) Chapel.

**CHURCH, BRITHDIR.**—The foundation-stone was recently laid of a new church at Brithdir,

The building, for which the contractor is Mr. William Speake, and the architect, Mr. E. A. Johnson, Aberystwyth, is being built of brick, with stone dressings, at an estimated cost of 1,600l.

**ROMAN CATHOLIC CHURCH, DOVER.**—The new Roman Catholic Church of St. Mary and St. Martin is being built in Snargate-street. The contractor is Mr. George Munn, and the architects Messrs. Bowles & Hawkins, of Dover.

**FOREST GATE U.M.F. CHURCH AND SCHOOLS.**—The foundation-stone laying ceremony of the new U.M.F. church and schools at Forest Gate took place on the 2nd inst. The buildings occupy a prominent corner site, and a square tower and cupola form a feature at the corner. Red-brick facings are used. The church will accommodate 1,289 persons, and proportionate school premises are provided. The contract is let to Mr. H. J. Carter, of Grays, Essex, the amount being 7,328l. The architects, whose designs were selected in a competition, are Messrs. George Baines and R. Palmer Baines, Clements-lane, Strand, London, W.C.

**CHURCH, INVERGOWRIE.**—A new church is to be erected at Invergowrie at a cost of 3,200l. It will accommodate 600 people, and has been designed by Mr. Robertson, architect, of Inverness.

**DUNFERMLINE ABBEY.**—The interior of the portion of Dunfermline Abbey which since 1818 has been used as a parish church for fully a century, is in the hands of the renovator and the decorator, under the supervision of Sir Rowand Anderson. The building eighty-seven years ago covered part of the site of the original abbey. The whole of the interior and vaulting was then plastered. The scheme employed by Sir Rowand Anderson represents in broken detail the colour and the beauty of the columns here decorated, consisting of a running ornament of vine carried round the church below the Clerestory windows, are displayed the armorial bearings of the Kings and Queens of Scotland buried in the abbey, and of Charles I., who was baptised in it. All the ribs and bosses of the vaulting and the capitals and bases of the columns have been treated with colour and gilding. The decoration of the chancel has been specially treated, the walls being covered with a broad diaper design in two colours, with an arched screen in decoration carried along the lower portion of the east wall. The old seating, with its comfortable and antiquated high-backed square pews, have been entirely removed, and the church re-seated in modern style. The old wood and stone floors have been entirely taken out and new floors of wood laid except in the passages, where a wood-block floor on a cement concrete bed has been employed. The chancel of the church, which is raised above the rest of the area by a step, is floored in stone flags, and on this floor the pulpit, with the memorial brass to King Robert the Bruce, with the communion table in front. A panelled dado of oak is carried round the walls of the church, and entrance porches made of oak have been erected at the principal entrances. The heating and ventilating arrangements have been entirely renewed, and the church is being suspended from the bosses of the groining of the ceiling and small groups of lights placed at intervals to light the galleries and the portion of the area beneath.—*Times*.

**WESLEYAN CHURCH, HULL.**—A new Wesleyan church has been erected in Prince's-avenue, Hull. The church is built of red brick, with red Rushton and stone dressings. The elevation to Prince's-avenue is flanked by a tower and spire rising to a height of 108 ft. The interior is formed with a colonnade, and half-open roof, with end gallery, transepts, and organ recess, with which latter the rostrum is connected. The length of the church is 65 ft. from the rostrum to the vestibule screen, breadth 54 ft., and the distance between the transept windows is 78 ft. The whole of the woodwork is of pitch pine, and the church provides seating accommodation for 834. The windows are of tinted glass. The heating apparatus is on the low-pressure system, fitted by Messrs. Sheen & Wells, of Sheffield. The electric fittings are being supplied by Mr. H. Hyde, of Hull. The pendants are of oxidised silver, with chain suspensions. An electric fan is placed in the tower, connected with a ventilating shaft. The contractors were Mr. G. Houlton, bricklayer; Mr. J. Houlton, joiner; Messrs. Bowman & Sons, masons; Messrs. Williamson & Co., slaters; Mr. W. G. Chesterfield, plumber; and Mr. Codner, painter. The architects were Sir Alfred Gelder and Mr. L. Kitchen.

**PRIMITIVE METHODIST CHURCH AND SUNDAY SCHOOLS, CHESTERFIELD.**—A new Primitive Methodist church and Sunday schools have been opened in this town. The buildings have been designed by Mr. W. Cecil Jackson, architect, of Chesterfield. The style is Gothic. The front walls will be of pressed brick with stone dressings. The interior woodwork, roof, and furniture will be of pitch-pine, and the windows will be glazed with cathedral glass. The roof will be covered with blue slate. The church will provide accommodation for 650 worshippers, and the school premises will accommodate an equal number of

scholars. Mr. W. Rhodes is the builder, and the cost, exclusive of site, was about 2,000l.

**CHURCH RESTORATION, RUSSELL PERSEY.**—The parish church of St. Michael, near Persey, has recently been restored and renovated. The work was carried out by Messrs. Hoskins Bros., of Newbury and Hungerford, under the supervision of Mr. C. E. Ponting, the diocesan architect.

**CHURCH RESTORATION, DORCHESTER.**—The restoration of St. Peter's church, Dorchester, has been completed. The work has been carried out in two sections. The tower has been repaired by Messrs. Meyrick & Son, of Gloucestershire, under the direction of Mr. Carie, and the roof of the fabric has been renovated according to the plans of the diocesan architect, Mr. Ponting, of Marlborough. The total cost of the work was about 1,700l.

**PRIMITIVE METHODIST CHAPEL, BRIMPTON.**—On the 25th inst., the foundation-stone was laid of a new Primitive Methodist Chapel. The building is being erected in Chatsworth-road, Brompton, and will provide a chapel with a seating capacity for 650, while the schoolroom in the rear will accommodate a similar number. The work is being carried out by Mr. W. Rhodes, of Marlborough, and the architect is Mr. W. Cecil Jackson.

**PRIMITIVE METHODIST CHAPEL, BENTLEY.**—The foundation-stone of a new Primitive Methodist church and Assembly-room in Westgate-road has just been laid by Mr. Thomas H. Marsh. The buildings are to be placed on a site at the junction of Westgate-road and Condercum-road. The church is to be entered from Westgate-road through an outer porch, which leads into an inner vestibule, giving access to the gallery, which extends along the bottom of the chancel only. The chancel has accommodation for 450 people, and is 18 ft. long by 39 ft. wide, with windows on the east side. The pulpit is placed in the centre, immediately in front of the organ chamber, and the choir is arranged in front of the pulpit. At the rear there are two rooms, one of which will be used as a vestry, and the other as a choir or steward's-room. The church is 43 ft. long by 30 ft. wide, with accommodation for 300 sittings. The hall is also entered from Westgate-road through a porch. There are two class-rooms at the back, one of which will hold sixty people. The heating chamber is placed under one of these rooms. There is a side entrance from Condercum-road, also one from the street at the rear, giving access to the large class-room above mentioned, and also to the hall and church. There is another entrance approached from Westgate-road between the church and hall, with easy access to any part of the buildings. The walls are to be faced with red-pressed bricks, and the dressings are to be of stone. The Assembly-hall, class-rooms, etc., are only to be built at present, the cost of site, about 1,800l. Mr. T. Hutchinson, of Newcastle, is the contractor, and Messrs. Davidson & Phillips, of Newcastle, are the architects.

**BAPTIST MISSION, HAMPTON WICK.**—The new chapel for the Baptist Mission has been opened at Hampton Wick. Messrs. Carter & Ashurst, of Kingston, were the architects, and Mr. F. Hawley, of Surbiton, the builder.

**NATIONAL SCHOOLS, BALLYVAUGHAN.**—The foundation and memorial stones have just been laid of new national schools in connection with the church of St. Michael's, Ballyvaughan. The new school occupies a site at the rear of the church, and has street frontages at two sides. The premises are arranged so as to accommodate 350 pupils. The central hall, which will have adjoining classroom, will be 38 ft. by 27 ft. wide by 21 ft. high to the ceiling line. For general purposes this hall can be quickly enlarged by opening sliding doors, to give a large room 45 ft. by 36 ft. Separate entrance vestibules, with cloakrooms, are provided for boys and girls. From the girls' vestibule access is obtained to the infants' department, which will be in a separate classroom with gallery and large open space for drill. Adjacent to boys' entrance is a senior classroom and science room. The work has been carried out by Mr. Oliver, builder, from the plans and under the superintendence of the architect, Messrs. J. J. Phillips & Son.

**CHANCEL, COMPTON CHURCH, HAMPTON WICK.**—The Bishop of Winchester has recently consecrated the new chancel, nave, and vestry, which form part of the extension scheme of the church of All Saints, Compton and Shroton. Accommodation has been provided for 170 worshippers, being an increase of 170 upon the previous seating accommodation. The church, standing in a deep valley between the hills, is Norman, and built of the stone of a Sussex church. The external are undoubtedly Norman, and the corner of the old window man, and at each corner of the old window man, are placed one of the ancient stones, in which the neighbourhood abounds. The work is by Norman, with an Early English style. The church, which was built in the thirteenth century, when the church was a semi-circular apsidal church, and the church possesses two piers near the window man, and left in the chancel near the window man and the other taken from the old south wall and











The men had dug a trench for the wire from one side of the road up to within 2 ft. of the outside rail of the down line, and also a trench in the space between the up and down lines. The applicant's husband was engaged in making a hole under the down set of lines, so as to connect the trench outside the rails with the trench between the up and down rails. While he was so engaged he was killed by a passing train. The widow's claim for compensation under the Act was upon the ground that her husband at the time of the accident was "on or in or about an engineering work"—viz., the "alteration of a railroad" within Section 7 of the Act. The County Court Judge decided that the respondent was not liable on the ground that the question was not one of alteration of a railroad, as the "alteration of a railroad" must be confined to work undertaken by or for the proprietors of the railroad. From this decision the



applicant appealed on the ground that the learned County Court Judge had misdirected himself.

Mr. John Sankey appeared for the appellant, and Mr. W. Shakespeare for the respondent.

At the conclusion of the arguments of counsel the Master of the Rolls, in giving judgment, said he had not formed a very clear or satisfactory judgment in the matter, the Act not admitting of any very certain conclusion in the interpretation of its definitions. The question for decision was whether the deceased man was engaged in "engineering work" within the Act. In this particular case the work which the workman was employed to do was not work which the tramway company were concerned in. The work was undertaken by strangers to the tramway company who had statutory powers to carry the wire across and under the roadway. That work undoubtedly involved an alteration of the physical condition of the surface of the roadway between the up and down lines of the tramway. The question was whether the workman was employed on or in or about engineering work, viz., the work and construction or alteration or repair of a railroad—that was to say, a tramway. They had to apply that definition, and he thought they were justified in looking at the scheme of the Act, which was to single out certain classes of employment, and to place workmen engaged in those employments under the protection of the Act. It looked probable that the Act contemplated different elements of danger in different employments, and those employments which were thought to have special elements of danger were brought within the Act. Therefore, by whomsoever the workman was employed, if he was employed upon work which entailed a physical alteration of the tramway, the employment was brought within the line of danger, and was one of the employments to which the Act extended its protection. He came to the conclusion, not without hesitation and difficulty, that the work done in this particular case did involve an alteration of the physical condition of that part of the road where the tramway was laid. The workman was employed on engineering work, although the tramway company were not the undertakers. The respondent, who employed him, was undertaking the work, which involved the physical alteration of what would, in the popular sense of the term, be deemed a railroad. He thought that the learned County Court Judge had arrived at the conclusion in favour of the employer by a misdirection, and that the appeal should be allowed.

Lord Justice Romer differed, being of opinion that the learned County Court Judge's decision was right. His lordship could not see how, upon any fair construction of the Act, it could be said that this workman was employed on the work of construction or alteration or repair of the tramway.

Lord Justice Mathew agreeing with the conclusion arrived at by the Master of the Rolls, the appeal, by a majority of the Court, was allowed.

A stay of execution was granted on terms for fourteen days to enable the respondent to consider whether he would appeal to the House of Lords.

#### ALLEGED DEFECTIVE VENTILATING SHAFT:

##### ACTION AGAINST A DISTRICT COUNCIL.

The hearing of the case of *Boome v. the Bromley Rural District Council* concluded before Mr. Justice Bigham and a special jury in the King's Bench Division on the 3rd inst., an action brought by the plaintiff, a barrister, a householder, at St. Mary Cray, Kent, to recover from the defendants damages for injury sustained by him owing to an alleged nuisance committed by the defendants in erecting, close to the plaintiff's house, a ventilating shaft connected with a sewer.

The defence was that the ventilating shaft was properly erected, and that it did not constitute a nuisance.

Mr. Hugo Young, K.C., and Mr. Edward Morten appeared for the plaintiff; and Mr. J. Eldon Banks, K.C., and Mr. Fleetwood Pritchard, for the defendants.

Mr. Hugo Young, in opening the plaintiff's case, said that his client had suffered serious injury and annoyance by the erection of the ventilating shaft outside his gate, the shaft emitting smells into a window of his house at St. Mary Cray, Kent. The local authority had to use due and reasonable care and not keep their sewers so as to be a nuisance and injurious to health. The plaintiff lived in his house from 1886 to 1899 without any complaint or illness in his family. In 1899 he purchased the freehold and made alterations to the house. When he came back after the alterations he found that the local authority had erected a tall shaft from the sewer about the height of his house. In 1901 all the family developed sore throats. Although plaintiff's drains were in perfect order, disagreeable smells were noticed in the garden near the shaft. In 1902 a servant and two of the plaintiff's daughters got scarlet fever, and in 1903 two of his daughters developed diphtheria. On plaintiff

writing complaining of the shaft a Committee of the Rural District Council came down and expressed the opinion that the shaft had not been properly placed, and gave instructions that it should be stopped up and sealed. That, said the learned counsel, was not a proper way of dealing with it. The defendants, if they did not intend to use the shaft again, should have removed it. He submitted that the plaintiff was entitled to damages for the injury he had sustained.

The plaintiff having given evidence in support of counsel's statement, the defendants called several experts, who said that the germs of diphtheria were not present in sewer gas, but a person's health might become so impaired by inhaling it, that they would be predisposed to catch diphtheria if they came in contact with a person suffering from the disease.

Mr. Justice Bigham, in summing up the case, said it was an important one, both to the plaintiff and to the public. Before the jury could find a verdict for the plaintiff they must be satisfied that the defendants were negligent, and that it was that negligence which caused the damage in respect of which the plaintiff sought to recover.

In the result the jury returned a verdict for the defendants, and judgment was entered accordingly, with costs.

#### ARCHITECT QUALIFIED AS ARBITRATOR.

The case of *Base v. the Building and Vendor Company* came before a Divisional Court of King's Bench, composed of Mr. Justice Wills and Mr. Justice Darling, on the 3rd inst.

Mr. Macmorran, K.C., and Mr. Lever appeared for the appellant, Mr. Base; Mr. Danckwerts, K.C., and Mr. N. H. Wilson for the company; and Mr. Eydell Houghton for the arbitrator, Mr. Bishop.

Mr. Macmorran said this was a special case stated by an arbitrator under these circumstances. The plaintiff, Mr. Base, made a contract with the Building and Vendor Company for pulling down a large building known as *Wokingham House*, and in the contract there was a usual clause, that, if any dispute arose between the parties, it was to be referred to an arbitrator, who was the architect acting for the defendant company. Some disputes did arise, and Mr. Base commenced an action against the company to recover a sum of money. Thereupon an application was made to stay proceedings, having regard to the arbitration clause, and an order was made for a stay. The matter then came before Mr. Bishop, the architect, and two objections were made to his acting. The first one was that it was said that Mr. Bishop was a necessary witness to prove the facts, and as such had been subpoenaed. He did not propose to argue that question.

Mr. Justice Wills: He was appointed as arbitrator because he would have a knowledge of the facts.

Mr. Macmorran: Quite so; I feel I cannot argue that point.

The learned counsel proceeded to say that the other point was that, although the plaintiff knew that Mr. Bishop was the architect of the company, he did not know that he, instead of being paid a commission in the ordinary way, was paid a salary, and, although not exclusively in the service of the company, had an office provided for him by the company. The distinction, no doubt, was a very fine one, but he suggested that under the circumstances Mr. Bishop was disqualified from acting.

Without calling upon counsel for the company, Mr. Justice Wills, in giving judgment, said there was absolutely nothing in the point. The arbitrator was appointed because the parties were satisfied of his integrity, and, knowing his position, did not think that any personal interest would influence his decision.

Mr. Justice Darling concurred, and the Court held that the arbitrator was qualified.

The appeal was accordingly dismissed.

#### SLANDER ACTION BY AN ARCHITECT AGAINST AN ENGINEER.

The case of *Flowers v. Wilson* came before Mr. Justice Bigham and a special jury in the King's Bench Division on the 3rd inst.—an action by Mr. H. H. Flowers, an architect, formerly employed in the architect's department of the Great Eastern Railway Company, against Mr. Wilson, the chief engineer of that company, for damages for alleged slander.

The plaintiff appeared in person; and Mr. J. Eldon Banks, K.C., and Mr. Lewis Thomas for the defendant.

Mr. Flowers said that his counsel had deserted him at the last moment. Before opening his case he would like to ask Mr. Wilson if he would withdraw the cruel remarks he had made against him.

Mr. Banks: We have never made any cruel remarks.

His Lordship (to plaintiff): What is it you want?

Mr. Flowers: I have no desire to hurt Mr. Wilson's feelings in any way. Shall I read his remarks?

His Lordship: What are the remarks?

Mr. Flowers: It is a long and long list of interlarded remarks. His Lordship: You are making a complaint against Mr. Wilson. Mr. Wilson says, through his counsel, it is a mistake to suppose that he made any cruel remarks as against you.

Mr. Flowers: Shall I read the statements I claim?

His Lordship: I have read the statements until I have had enough of them. Mr. Banks said his client's position was that there was no conversation which took place was private. He further said that any conversation which took place at the inquiry, which it was in the possibly be twisted into anything but a libel. Mr. Flowers said he had brought his action until some years after the time when the alleged slander, and in the meantime he had applied to Mr. Wilson for references, and the latter had endeavoured to get him a situation. He (counsel) would take any course his lordship thought right.

His Lordship: Are you pressing him for costs?

Mr. Banks: No. His Lordship: Are you asking the jury to settle this? Are you asking the jury to settle the matter go on in the ordinary way. If I like to let the matter drop now there is an end of it.

Mr. Flowers said he would raise the matter went to the jury, and proceeded to open his case. He said the present proceedings were taken in respect to charges made against his character and his professional skill as an architect—charges fully made by the defendant, Mr. Wilson, who was very imperfectly heard in the proceedings. It was understood to say that he had served his articles with an architect at Worcester, and after the completion of his articles he had been engaged in carrying out several important works. He had been for eleven years in the service of the Great Eastern Railway Company. When he entered the service of the company in 1882 he was temporarily engaged, but was afterwards permanently employed. He was in the architect's department under the supervision of the defendant, Mr. Wilson. During the first few years he was evidently a favourite of Mr. Wilson, and he was praised for the way he did his work. In the course of his employment he had done several important works for the company. Towards the end of 1890 he was put in charge of the construction of the Woodford and Ilford light railway. Among the other projects temporarily engaged by him was a Mr. Mahomed. Towards the end of the job some of the officials who had been his subordinates went to Mr. Wilson and made a complaint that he (plaintiff) had been tyrannical. They never complained of his treatment until he gave them notice to go, and then they put their heads together to get him out of his post. On or about June 10, 1891, Mr. Wilson, in the presence of Mr. Mahomed, Mr. Inglis, Mr. Baker, and himself, spoke the words which he alleged constituted the slander. These words were as follows:—"I would not trust you as I tell you straight. You are nothing but a common daughter-man. I have told you so before, and I tell you again. You are an intimate friend of a criminal—that man who got three years for assaulting young girls in the recreation ground. I had known the way you had treated these girls. You would not have been in this office two minutes. Let this be a lesson to you to keep your mouth shut."

Mr. Flowers, continuing, said that on a previous occasion to this the defendant had shaken his fist at him, saying, "You are a—d—d clever fellow, but I will have you yet, and I will bite your time." Mr. Flowers explained that the "criminal" referred to by Mr. Wilson was a young member of his staff on the Woodford light railway. He had not engaged. He denied that he was an intimate friend of the young man, or that he had done more than lend him a few shillings. Some months after he (plaintiff) received his discharge on the ground of lack of work, although the defendant had discussed future plans with him.

Cross-examined by Mr. Banks, the plaintiff denied that previous to the alleged slander he had always been treated with the greatest generosity by Mr. Wilson. After his discharge he had made several attempts to see Mr. Wilson but in vain. Mr. Wilson afterwards gave him testimonials to help him to employment, but he sent him to places where he knew there was no chance of getting work.

The plaintiff then called a number of witnesses, including Mr. Mahomed, who said that the plaintiff's treatment there was an unbecoming enmity and petty tyranny. Did you act honestly by me as your friend, and was not employed by the company? Did you not say that before you left me? "drag me out of it"—Certainly not. I had an impediment in my speech, and that was the last I should ever think of using.

In the result the jury returned a verdict for the plaintiff, and judgment was entered accordingly, with costs.











PRICES CURRENT.—Continued on page 515.



## CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Corrugated Iron Chapel at Workhouse	Kingston-on-Thames Guardians	W. H. Hope, Architect, Hampton Wick
Turf-Paving at Essex-rd. and Shaftesbury-rd. Schools	East Ham Education Committee	H. C. Padgett, Secretary, Education Office, East Ham
Barrier & Slipway to Beach & Repair to Esplanade	Aberavon Corporation	J. Roderick, Borough Engineer, Aberavon
Premises (Business), Batches-street, Elgin	Leigh-on-Sea U.D.C.	C. C. Doig, Architect, Elgin
Borehole (10 ft. internal diameter)	Caeppilly U.D.C.	W. J. Petch, Surveyor, Council Offices, Caeppilly
Road Works, Llanbadoc-rd., Wingham	Croydon Borough Council	G. F. Carter, Borough Engineer, Town Hall, Croydon
Foundations of Engine-room, Stroud Green	Hastings Corporation	P. H. Palmer, Borough Engineer, Town Hall, Hastings
Pipes, 800 yds. of Cast-iron Socket	Kent Education Committee	Committee's Secretary, Kent Educa. Com., 44, Bedford-square, W.
*NEW COUNCIL SCHL., PRESTON-NEE-WINGHAM	Waltham Holy Cross U.D.C.	W. T. Streater, Council's Engineer, Waltham Abbey
*RETAINING WALLS, ETC., AT PUBLIC OFFICES	Dublin, etc., Steam Tramway Co.	P. H. McCarthy, Engineer, 59, Westmoreland-street, Dublin
Sole-plates, Clips, Fang-bolts, Fish-bolts, etc.	Leyton U.D.C.	Schoolmaster, Middleton
School Additions, Mickleton Church, near Middleton	do.	F. H. Lewis, Electrical Engineer, Cathal-road, Leytonstone
Engines (with condenser)	Southend-on-Sea Corporation	E. J. Hildor, Borough Engineer, Southend-on-Sea
Condenser Water-cooling Tower	Greenwich Guardians	S. Saw, Clerk, Union Office, Union Workhouse, East Greenwich
Lavatories and Shelters, The Lees	Hull Corporation	City Engineer's Office, Hull
Boiler (Steam), at Workhouse, East Greenwich	Yardley R.D.C.	A. W. Smith, Engineer, Council House, Sparkhill, near Birmingham
Stores	Thames Conservancy	Offices, Victoria Embankment, E.C.
Roadworks, Alexander-road, Aconee Green	Rushlip-Northwood U.D.C.	W. Louis Carr, Surveyor, Council Offices, Northwood
Paving a Cabstand, Maxwell-road, Northwood	Penge U.D.C.	H. W. Longdin, Surveyor, Town Hall, Anerley
Wood Pav., Soft, & Concrete Foundation, Beckenham	Wimbledon Borough Council	C. H. Cooper, Borough Engineer, Town Hall, Wimbledon
Steel and Iron Work, Electricity Works Extension	do.	
Steel and Iron Work, Sewage Pumping Station	Midland Great Western Ry., Ireland	R. L. Badham, Secretary, Broadstone Station, Dublin
Motor Pumps, etc.	Belfast Improvement Committee	City Surveyor's Office, Belfast
Overhead Travelling Crane, etc.	do.	
Stores	Devonport Corporation	Borough Surveyor's Office, Devonport
Reservoir, etc., for Water Supply to Workhouse	King's Guardians	C. S. Delfosse, 8, Duke-street, Kingston
Oils	Powell Duffryn Steam Coal Co.	Stores Manager, Aberavon Office, near Aberavon
Materials, etc.	West Hartlepool Corporation	N. F. Daniels, Borough Eng., Municipal Buildings, W. Hartlepool
Stores	Caledonian Railway Co.	J. Lortimer, Caledonian Railway, Charles-st., St. John's Glasgow
Street Improvement, Vickers-street, Castleford	Belfast Corporation	Mr. Green, Surveyor, Council Offices, Castleford
*OAK FLOORING, ETC.	Herta C.C. Education Committee	A. Bramwell Thomas, Architect, 5, Queen Anne's-gate, S.W.
*INFANT SCHOOL, ST. ALBANS	Sunderland R.D.C.	County Surveyor, County Surveyor's Office, Hatfield
Roadworks, Fulwell	do.	T. Young, Surveyor, 17, John-street, Sunderland
Roadworks, Micheldever-road, Leas	Lewisham Borough Council	do.
Sewering, etc., Illey	Headington R.D.C.	H. H. Humphreys, Engineer, 28, Victoria-street, Westminster
Road Material	Warwickshire C.C.	J. Willmet, County Surveyor, Birmingham
Water Tank, Hot-water Boiler, etc., at Workhouse	Shaftesbury Guardians	J. Burridge, Clerk, Bell-street, Shaftesbury
The Fire Station, etc., Station-road, Carlton	Carlton U.D.C.	C. C. Haller, C.E., Surveyor's Office, Carlton, near Nottingham
Stores	Gt. Southern & Western Ry., Ireland	Storekeeper, Inchicore, Dublin
House, Gilfach Bargoed	Spring Grove House Estate	W. Harris, Architect and Surveyor, Gilfach Bargoed
*SEW. DRAIN & RD.-MAK. WKS., ISLEWORTH	Flintshire Education Committee	S. Evans, County Surveyor, County Offices, Mold
School (Elementary), at Queen's Ferry	Sheffield Corporation	C. F. Wike, City Surveyor, Town Hall, Sheffield
Roof, Out. Walls Gate, etc., at Carsheds, Queen's-rd.	do.	
Ironfounderwork for Carsheds	West London School District	F. G. Beeching, Ashford, Middlesex
*DIVID. SCREEN, CLASSROOMS ASHFORD SCHS.	Metropolitan Borough of Hackney	Borough Engineer and Surveyor, Town Hall, Hackney N.E.
*UNDER, CONVEN., JUNG. WELL & MARE-ST.	Cheshire Lines Committee	S. S. Barton, Stores Superintendent, Cheshire Lines, Warrington
Stores	Erith Education Committee	Mathews & Coleman, 11, Old Queen-street, Westminster, W.C.
Iron, Chains, Timber, etc.	Felling U.D.C.	G. Bolam, Clerk, Council-buildings, Felling, R.S.O. on Durham
Limestone and Limestone Gravel	Swansea Harbour Trust	Engineer, Harbour Office, Swansea
Bridge Reconstruction, Strabane (228 ft. length)	Ogmore and Garw U.D.C.	Council Offices, Brynmawr
Bridge Reconstruction, Swilly (40 ft.)	Great Northern Railway Co., Ireland	W. H. Mills, Engineer-in-Chief, Amiens-street, Dublin
Bridge Reconstruction, Kilryes and Traan (1 ft.)	do.	
Bridge Reconstruction, Dublin-road, Drogheda (40 ft.)	do.	
Bridge Reconstr., 2 Bridges, between Portadown & Omagh	do.	
Bridge Reconstruction, Carney's (37 ft.)	do.	
Roof, Steel Platform (97 ft.), Ballybay	do.	
Tanks, Settling and Straining, at Brynethin, Bridgend	Ogmore and Garw U.D.C.	H. D. Williams, Engineer, Council Offices, Brynmawr
Baths and Washhouses, Derby-street	South Shields Corporation	H.M. Office of Works, etc.
*NEW SCHOOLS, POULTON	Wallasey U.D.C.	T. Samuel, Central Park, Liskeard, Cheshire
*ENLARGE, OF P.O. SORTING OFFICE, READING	Commissioners of H.M. Works, etc.	H.M. Office of Works, etc., Storey's-gate, S.W.
*CAR SHED IN LEVEN-ROAD, POPLAR	London C.C.	E. W. Carling & Co., St. Dunstan's-bldg., St. Dunstan's-lane, E.C.
Builder's Work, etc., at West Boldon Infants' School	Durham C.C.	Highways Section, Architect's Department, 18, Chancery-lane, W.
*DEMOL. OF 38 TO 40, KENLEY-ST., W., & WORKS	Royal Borough of Kensington	W. Rushworth, Architect, Education Office, Durham
*BATHS AND WASHHOUSES	South Shields Town Council	Town Clerk, Town Hall, Kensington High-street, W.
Homes (Probationary), at Styal	Chorlton Guardians	J. H. Morton, 50, King-street, South Shields
Sludge Removal (48,000 cubic yds.)	Hanley Corporation	J. W. Beaumont & Son, Architects, 10, St. James's-lane, Manchester
Tanks (four settling, 2,000,000 gallons total capacity)	do.	Willcox & Raikes, Engineers, 63, Temple-row, Birmingham
Division of River Trent	do.	
Engine (triple expansion), etc.	Widnes Corporation	do.
*MILITARY SCHOOL, GUSTON, NEAR DOWRY	Commissioners of H.M. Works, etc.	Isaac Carr, M.Inst.C.E., Widnes
*NEW POST OFFICE AT HULL	H.M. Office of Works	H.M. Office of Works, etc., Storey's-gate, S.W.
Enamelled Street Name Plates	Johannesburg Municipality	E. W. Carling & Co., St. Dunstan's-bldg., St. Dunstan's-lane, E.C.
Huts for Accommodation of Sinkers	Broadsworth Main Colliery	At Colliery, Duckmanton, Chesterfield
Oak: 1,200 ft., cabs, English	do.	T. Parkinson & Son, St. Margaret's Works, Ipswich
Church Exterior Restoration, etc. St. Petrock's, Exeter	do.	J. Jerman, Architect, 1, Bedford-circus, Exeter
Stone heading (500 yds.), Blangwaw, Aberdare	do.	J. Williams, Carmel, Curraghmore
Turfing and Leveling 8,000 sq. yds., Ely Racecourse	do.	R. David & David, 27, High-street, Cardiff
Stores	Sligo, Teltrim, etc., Railway Co.	R. B. Davis, Secretary, Lurganboy, Manorbennigan, Ireland
*MATERIALS AND WORKS FOR WATER SUPPLY	Congleton R.D.C.	W. Wyatt, Engineer, 99, Radford-road, Leamington
Works and Offices, Preston-street, Bradford	Mr. H. C. Slingsby	F. Fox, Architect, 14, Manchester-road, Bradford
Alterations, etc., to 167, Newport-road, Cardiff		W. Beddoe Rees, Architect, 3, Dumfries-place, Cardiff

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be
*BUILDING INSPECTOR	Wood Green District Council	£2. 3s. per week	Nov. 1
*SURVEYOR AND INSPECTOR OF NUISANCES	Dunstable Town Council	132s. per annum	Nov. 1
*INSPECTOR OF WORKS	Government of Lagos	350s. per annum	Nov. 1
*FIVE BUILDING FOREMEN OF WORKS	do.	300s. per annum	Nov. 1
*SAWYER	Sec. of State for India in Council	Not stated	Nov. 1

Those marked with an asterisk (\*) are advertised in this number.

Competitions.

Contracts, 1s. 7d. VIII. X.

Public Appointments, VIII.

THE CURRENT.—Continued from page 513.

WOOD (continued).

	At per standard.
	£ s. d.      £ s. d.
Walrus' Wood (continued).....	0 0 9    ... 0 1 0
Mahogany—Honduras, Ta-	
baco, fig. tr. super. as inch	0 1 6    ... 0 2 6
Selected, fig. tr. as such.....	0 1 6    ... 0 2 6
Walnut, American, per ft.	0 1 0    ... 0 1 0
super. as inch.....	17 0 0    ... 22 0 0
Whiteoak Planks,	
per cube.....	0 4 0    ... 0 5 0
Pine Flooring, etc.—	
Per square.	
1 in by 7 in. yellow, planed and	0 13 6    ... 0 17 6
matched.....	0 14 0    ... 0 18 0
1 in by 7 in. yellow, planed and	
matched.....	0 16 0    ... 0 20 0
1 in by 7 in. white, planed and	
matched.....	0 12 0    ... 0 14 6
1 in by 7 in. white, planed and	
matched.....	0 13 0    ... 0 15 0
1 in by 7 in. white, planed and	
matched.....	0 15 0    ... 0 16 6
1 in by 7 in. super. matched	
and beaded or V-jointed brds.	0 11 0    ... 0 13 6
1 in by 7 in.      "      "	0 14 0    ... 0 18 0
1 in by 7 in.      "      "	0 10 0    ... 0 11 6
1 in by 7 in.      "      "	0 10 0    ... 0 11 6
1 in. at 60, to 9d, per square	less than 7 in.

## JOISTS, GIRDERS, &amp;c.

	In London, or delivered Railway Vans, per ton.						
Steel Joists, ordinary	£	s.	d.	...	£	s.	d.
Sections	6	5	0	...	7	0	0
Compound Stanchions	9	7	6	...	10	17	6
Trusses, and Channels, ordinary	7	15	0	...	8	15	0
Sections	7	15	0	...	8	15	0
Flat Plates	8	0	0	...	8	10	0
Free Columns and Stanchions	6	17	6	...	8	0	0
Working patterns	6	17	6	...	8	0	0

## METALS.

	\$s.	d.	\$s.	d.		
Jones Bars .....	8	0	0	8	10	0
Philadelphia Crown Bars, good quality .....	8	10	0	9	0	0
" " " " " " " " " " " " Marked Bars .....	8	10	0	9	0	0
Hot Steel Bars .....	8	15	0	9	0	0
" " " " " " " " " " " " In Bund, heavy price .....	9	5	0	9	10	0
Galvanized .....	9	5	0	9	10	0
(And Underwards, according to size and gauge.)						
" In Black -						
" Heavy sizes to 20 g. ....	9	10	0	—	—	—
"         " 24 g. ....	10	10	0	—	—	—
"         " 26 g. ....	12	0	0	—	—	—
" In Galvanized, flat, ordinary quality—						
" Heavy sizes, 6 ft. by 2 ft. to	14	0	0	—	—	—
"         " 20 g., and 24 g. ....	14	10	0	—	—	—
"         " 22 g. ....	15	0	0	—	—	—
"         " 24 g., flat, best quality ..	17	0	0	—	—	—
" Heavy sizes, to 20 g. ....	17	0	0	—	—	—
"         " 22 g., and 24 g. ....	17	10	0	—	—	—
"         " 26 g. ....	19	0	0	—	—	—
"         " 28 g. ....	19	0	0	—	—	—
" Corrugated Sheet—						
" Heavy sizes 6 ft. to 8 ft. 20 g. ....	13	10	0	—	—	—
"         " 22 g. and 24 g. ....	14	0	0	—	—	—
"         " 26 g. ....	15	5	0	—	—	—
" Cold Sheet—6 ft. by 2 ft.						
" No. 30 g. and thicker .....	11	10	0	—	—	—
" No. 28 Sheets, 22 g. & 24 g. ....	12	10	0	—	—	—
"         " 26 g. ....	14	15	0	—	—	—
" Sheet, 3 in. by 36 in. ....	9	15	0	—	—	—
(Under 3 in., usual trade extras.)						

LEAD, &c. P.

Sheet, English, 3lb. and up.	17	15	0	10	8	5	d.	d.
1000 coils .....	13	5	0	0	0	0	0	0
1000 coils .....	13	5	0	0	0	0	0	0
1000 coils .....	20	15	0	0	0	0	0	0
1000 coils .....	20	15	0	0	0	0	0	0
1000 coils .....	33	0	0	0	0	0	0	0
1000 coils .....	32	0	0	0	0	0	0	0
per lb.	0	1	0	0	0	0	0	0
1000 coils .....	0	1	0	0	0	0	0	0
1000 coils .....	0	0	11	0	0	0	0	0
1000 coils .....	0	0	11	0	0	0	0	0
1000 coils .....	0	1	0	0	0	0	0	0
1000 coils .....	0	1	0	0	0	0	0	0
1000 coils .....	0	0	7	0	0	0	0	0
1000 coils .....	0	0	0	0	0	0	0	0
1000 coils .....	0	0	19	0	0	0	0	0

ENGLISH SHEET GLASS IN CRATES.

[illegible]

## VARNISHES, &amp;c.

Fine Pale Oak Varnish .....	2 s. 8.
Fine Copal Oak .....	0 s. 0.
Superior Pale Oak .....	0 10 6.
Superior Oak .....	0 12 0.
Superfine Hard-drying Oak, for seats of Churches .....	0 14 0.
Fine Elastic Carriage .....	0 12 6.
Superfine Pale Plastic Carriage .....	0 12 6.
Fine Maple .....	0 12 0.
Finest Pale Durable Copal .....	0 18 0.
Extra Pale French Oil .....	1 1 0.
Eggsell Flattening Varnish .....	0 18 0.
White Copal .....	0 12 0.
Extra Pale Paper .....	0 12 0.
Best Japan Gold Size .....	0 10 6.
Best Black Japan .....	0 16 0.
Black and Mahogany Stain .....	0 9 0.
Brackish Black .....	0 8 0.
Berlin Black .....	0 15 0.
Knottin .....	0 10 0.
French and Brush Polish .....	0 10 0.

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## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect of the building-owner, and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

\* Denotes *accepted*. † Denotes *provisionally accepted*.

BRATTON, LEMING (N. Devon).—For erecting a Council school for 138 children, and masters' house, for the Devon County Education Authority. Mr. P. Morris, Architect to the Committee. Quantities by Mr. J. W. Haughton, Plymouth:—						
£.	s.	d.	J. Bryant & Son.....	£2,295	0	0
R. Pickett..	2,677	13	3	W. T. Steven.....		
H. Burgess	2,620	0	0	son .....	2,105	0
E. Karslake	2,558	10	0	F. J. Badcock .....	2,193	0
W. Sleggs	2,540	0	0	son .....	2,190	9
C. C.	2,347	16	0	H. Sillicant & Son .....	1,889	5
R. Goss & Son.....	2,359	2	5	Woodman & son, Exeter* ..	1,841	6

---

CANWELL HALL (Staffs).—For the conversion of existing gas house and addition of engine house, etc., as an electric light station on the Canwell Hall Estate, Staffordshire. Mr. Philip S. Foster, M.P., M.C. M. C. M. C. Armstrong, architect, 5, High-street, Warwick:—

Maple & Co. ....	£3,908	0
W. J. Whittall & son, Birmingham	1,242	2

CARDIFF.—for alterations and extensions to		
premises, No. 9, Queen-street, for Messrs. J. Williams & Sons (Cardiff) Ltd. Mr. E. Seward, architect, Queen's-chambers, Queen-street, Cardiff. Quantities by the architect.		
S. Shepton & Co.	F. Small	£3,620 0 0
S. Sons	E. Turner & Sons	3,588 0 0
F. Ashley	K. J. Wells	3,387 0 0
W. Williams	— Dunn	3,399 16 0
G. G. G.	W. Thomas & Co.	3,365 0 0
G. Hallett		
D. Davies		
W. Symonds		
CARDIGAN.—For erecting a minister's house, for Blenwain Baptist Church, St. Dogmaels, Mr. H. O. Davies, architect, St. Dogmaels, Cardigan:—		
J. Williams & Sons	£641	1 0
D. Davies	467	10 0
J. Bowen & W. Morgan, St. Dogmaels		
Thomas Cardigan	484	0 0
Michael & Evans	397	14 0

CLATTERBRIDGE, —For proposed additions to Workhouse, for Virral Union. Messrs. J. H. Davis & Sons, architects and surveyors, 14, Newgate-street, London.			
Quantities by architects,	£	s.	d.
G. Roberts			W. Williams
& Bro.,	£10,008	0	0
G. Ellidge,	9,776	15	0
J. Smith,	9,330	0	0
Brown & Back- house,	9,324	0	0
W. D. Devereux,	9,317	0	0
Waring, White,	9,257	0	0
J. Thomas & Sons,	9,247	0	0
H. Hoyle,	9,210	18	5
J. H. Stiles,	9,108	0	0
P. Rothwell & W. Moss	9,097	7	2
Lindsay Jones	9,040	5	0
W. Fleming & Co.,	9,019	4	3
J. E. Bennett			8,991
J. C. Webb			8,971
J. E. Cabutt			8,860
J. Mayers & Son			8,815
W. Ford			8,752
Hughes & Stirling,			8,700
A. White & Sons,			8,700
F. Matthews			8,652
J. Bells,			8,649
G. Gerard			8,555
T. Huxley			8,555
Dryland & Ferguson, Little- borough,			8,250

<b>CHISWICK</b> —For street improvement works at Brooks lane, for the Urban District Council. Mr. J. Barclay, Council's Surveyor, Town Hall—							
W. White .....	£570	5	0	Watson & Co., Ltd.	..... £500	0	0
M. E. Rhodes .....	570	0	0	Junior .....	500	0	0
Chesterbourne & Co. ....	580	0	0	E. Hall .....	550	0	0
.....	580	0	0	.....	497	0	0
Jackson .....	527	5	9	Wimpey & Sons .....	495	0	0
R. Swaker .....	519	19	9	Woodham & Sons .....	482	0	0
Mowlem & Co. ....	519	0	0	J. & W. Wrako .....	487	0	0
Waterhouse .....	517	8	2	Sons .....	482	0	0
Cunningham, Forbes, & Co. ....	506	11	0	H. Wheeler, Blackfriars-road*	..... 423	0	0

<b>DURHAM</b> —For rebuilding Thornley Police Station, and for the Durham Building Joint Committee. Mr. W. Crozier, County Surveyor, Shro' Hall, Durham—							
Wright & Freeman .....	£1,107	2	6½	W. C. Atkinson & Son .....	£1,002	6	7½
F. G. Brown .....	1,088	4	6½	H. C. Howe, 10, St. George's-street .....	980	11	0
G. P. H. Stott .....	1,059	19	3½	W. Hartlepool*	930	11	0
Thos. Gill-espence .....	1,026	10	10				

**GREAT CROSBY.**—For 2,400 lin. yds. of invert blocks, for the Urban District Council. Mr. Watkinson, Surveyor, Great Crosby:—

J. Ellis & Sons, Ltd., Leicester:—

	Per lin. yd.	
	s. d.	
For a 4-ft. by 2 ft. 8-in. brick sewer . . . . .	17	p Granite concrete "Aquaduct" invert 6½" x 6.
For a 3-ft. 9-in. by 2-ft. 8-in. brick sewer . . . . .	16	d Concrete stone ribbed with "Aquaduct" base.
For 36-in. pipes, brick sewer . . . . .	39	0

[Seventeen firms tendered, price varying from 2s. to 22s. per yard.]

**HENBURY.**—For erecting a police-station and petty sessional court at Henbury, near Bristol, for the Gloucestershire County Council. Mr. R. Phillips, A.M.Inst.C.E., County Surveyor, Shire Hall, Gloucester. Quantities by Messrs. Argent & Palmer, 7, Adelphi, London, W.:—

	Estimate No. 1.	Estimate No. 2.	Total.
	f. s. d.	f. s. d.	f. s. d.
H. Browning .....	3,008 10 0	1,557 0 0	4,565 10 0
F. A. R. Wood- ward .....	2,800 0 0	1,500 0 0	4,300 0 0
J. Eatherley .....	2,680 0 0	1,490 0 0	4,170 0 0
Stirling, Easlow & Co., Ltd. ....	2,692 0 0	1,463 0 0	4,155 0 0
E. Love .....	2,530 0 0	1,400 0 0	3,930 0 0
A. R. Pearce & Son Glasgow .....	2,500 0 0	1,430 0 0	3,930 0 0
H. Walters & Son R. ....	2,531 0 0	1,380 0 0	3,911 0 0
J. Perkins & Son Adams & Jeffries R. ....	2,518 7 1	1,380 13 1	3,898 2 2
J. Perkins & Son Adams & Jeffries R. ....	2,396 0 0	1,310 0 0	3,706 0 0
W. Jones & Sons R. ....	2,317 0 0	1,257 0 0	3,574 0 0
R. Wilkins & Sons R. ....	2,277 0 0	1,269 0 0	3,546 0 0
W. Jones & Sons R. ....	2,230 0 0	1,260 0 0	3,540 0 0
T. Lovell & Sons R. ....	2,241 0 0	1,308 0 0	3,489 0 0
W. A. Osborne, Swindon .....	2,176 13 6	1,100 16 6	3,347 10 0

[No. 1 estimate was for police-station; No. 2 estimate was for petty sessional court.]

**HORNSEA.**—For 900 yds. of 6-in. cast-iron water pipes, for the Urban District Council. Mr. W. E. Warburton, surveyor, Public Rooms, Hornsea :—

	Per cent.	Casting per cent.
	s. d.	s. d.
C. & J. Sheepsbridge & Co.	4 9	10 0
C. & J. Stavelay & Co.	4 10	9 8
C. & J. Stoddard & Co.	4 10	9 8
Clay Cross Co.	5 0	9 8
Oakes & Co.	5 0	9 8
Newton, Chambers, & Co.	5 0	9 6
Birtley, Iron Co.	5 0	9 6
Stanton Ironworks Co.	5 2	9 6
G. & W. H. Haley	5 2	10 9
Yarrow & Co.	5 3	10 3
J. Allen & Sons	5 3	10 3
A. G. Clonks & Co.	5 3	10 6
Cochrane & Co.	5 6	9 8
Wright & Son	5 6	9 8
Watson, Gray, & Co.	5 7	10 9
J. W. Grimsley & Co.	5 9	10 6

**KIRKCALDY.**—Accepted for the erection of business premises, High-street, Kirkcaldy, for the Pathhead and Sinclairtown Reform Co-operative Society, Ltd. Mr. D. Forbes-Smith, architect, Kirkcaldy. Quantities by the

Architect:—		
Mason: D. Weik, Sincelairtown . . . . .	£2,929	0 0
Joiner: J. Monro, Kirkcaldy . . . . .	1,999	9 3
Plumber: A. Thomson, Dunfermline . . . .	250	0 0
Ironwork: W. L. Mitchell, Kirkcaldy . . .	700	0 0
Tiler: R. Ryne, Edinburgh . . . . .	23	19 3
Glaziers: J. Haxton & Co., Kirkcaldy . .	146	18 9
Slaters: Currie & Cant, Kirkcaldy . . .		10 0
[Total, exclusive of electric hoists, shop fittings, electric lighting, and heating, £6,450 17s. 3d.]		

LONDON.—For Dulwich new sorting office, for H.M.			
Office of Works :			
W. V. ...	£2,461	F. Webster & Son ...	£2,786
H. Hyde ...	2,467	J. Shebourn & Co. ...	2,803
F. & G. Foster ...	2,527	H. L. Holloway ...	2,817
Martin Wells & Co., Ltd. ...	2,600	T. D. Shorrock ...	2,900
Galbraith Bros. ...	2,635	Holiday & Green-wood Ltd. ...	2,914
J. How ...	2,639	Perry & Co. ...	2,926
H. & E. Higgs ...	2,674	W. Vogel Goald ...	2,950
H. Groves ...	2,686	C. Ainsell ...	2,989
Cropley Bros., Ltd. ...	2,690	F. Kinnaird ...	3,050
Edwards & Medway ...	2,700	R. Kent ...	3,225
J. Garrett & Son ...	2,784	H. Dean & Co. ...	3,900
W. Smith & Son ...			
Hysman Hill Ltd. ...			



**LLANDRINDOD WELLS.**—For erecting bank premises in Temple-square, for Mr. T. A. Jones, of Tudor House, Llandrindod Wells. Mr. E. Peters Morris, architect, Llandrindod Wells:—  
 Lloyd Bros. £2,954 11 6  
 J. Dallow & Sons 2,650 0 0  
 R. E. Davies 2,340 0 0  
 S. A. Bonds 2,200 0 0  
 E. H. Williams 2,195 0 0  
 Henry Smith £2,130 0 0  
 G. Bullock 1,963 12 0  
 Shrewsbury\* 1,897 0 0  
 A. Holmes 1,300 0 0

**LONDON.**—For Admiralty extension, block IV. (sub-structure), for H.M. Works and Public Buildings Commissioners:—  
 A. Hudson & Co. £25,550 0 0  
 J. Mowlem & Co. Ltd. 26,485 0 0  
 H. Lovatt, Ltd. 27,000 0 0  
 W. Patinson & Sons, Ltd. 27,543 0 0  
 C. Wall, Ltd. 27,977 0 0  
 Leslie & Co., Ltd. 28,170 0 0  
 Holloway Bros. (London), Ltd. 28,600 0 0  
 E. Lawrence & Sons 28,832 0 0  
 N. Fortescue & Sons, Ltd. 28,855 0 0  
 J. E. Johnson & Son 29,360 0 0  
 J. Smith & Sons, Ltd. 29,773 0 0  
 Foster & Dicksee 29,467 0 0  
 T. H. King-lee & Sons 29,310 0 0  
 B. E. Nightingale £29,470 0 0  
 Higgs & Hill, Ltd. 29,840 0 0  
 Hollday & Greenwood, Ltd. 30,777 0 0  
 Patman & Fotheringham, Ltd. 30,893 0 0  
 J. Allen & Sons, Ltd. 30,975 0 0  
 Perry & Co. 31,885 0 0  
 Martin Wells & Co., Ltd. 33,912 0 0  
 J. & M. Patrick 34,900 0 0  
 J. Johnson & Co. 36,360 0 0  
 D. R. Pater-son 36,401 3 2  
 H. Willock & Co. 36,775 0 0  
 Greig & Matthews 37,860 17 9

**MOUNTAIN ASH.**—For erecting twenty-five houses, for the Clifton Building Club. Mr. T. W. Millar, architect and surveyor, Mountain Ash:—  
 T. W. Davies £5,475  
 Jenkins Bros. 5,350  
 Jones Bros. 5,200  
 Davies & Co., Mountain Ash £5,100

**ONGAR.**—For provision of laundry and pumping machinery at the Hackney Union Children's Homes. Mr. W. A. Finch, architect, 76, Finsbury-pavement, E.C.:—  
 Clements, Jencks, & Co. £1,900  
 T. Bradford & Co. 1,851  
 Fraser & Co. 1,599  
 J. & F. May 1,580  
 Summerscales & Sons 1,571  
 T. Potter & Sons 1,498  
 Western Engineer-ing Co. 1,370  
 [Architect's estimate £1,660.]

**ONGAR.**—For laying gas main services, fittings, etc., at the Hackney Union Children's Homes, at Ongar, Essex. Mr. W. A. Finch, architect, 76, Finsbury-pavement, E.C. Quantities by Mr. T. G. Wright, 3, Great Winchester-street, S.E.:—  
 W. Sugg & Co. £2,370 0 0  
 Buckley & Beach 2,133 10 0  
 J. C. Christie 2,028 9 3  
 T. Potter & Son 1,996 0 0  
 W. Edgar 1,917 8 3  
 C. Thome-son 1,898 0 0  
 W. C. Brett 1,852 0 0  
 H. Braith-waite & Co. 1,818 0 0  
 Handover & Gascoigne 1,775 10 0  
 J. M. Pat-rick 1,699 0 0  
 W. H. Tilley £1,691 0 0  
 Harding & Son 1,674 18 6  
 Palowkar & Sons 1,669 0 0  
 J. Richmond & Co. 1,610 0 0  
 A. R. Canler 1,600 0 0  
 E. Taber 1,523 6 0  
 P. R. Allen 1,439 17 8  
 Western En-gineering Co. 1,377 6 0  
 Brummit & Co. 1,299 12 0  
 Cooper & Berry 1,159 0 0  
 [Architect's estimate £1,550.]

**PONTYPRIDD.**—For rebuilding business premises at Taft-street. Mr. T. R. Phillips, architect, Old Bank-chambers, Pontypridd:—  
 A. Seaton, Gelliwastad, Pontypridd £963 13

**SETTLE.**—For roadworks, Middle Craven-road, for the Rural District Council. Mr. T. A. Foxcroft, Surveyor, Town Hall, Settle. Quantities by Surveyor:—  
 Brassington Bros. & Corney, Bridge End, Settle, Yorks. £161 14 7

**SACRISTON (Durham).**—For the erection of a new lock-up, for the Durham Standing Joint Committee. Mr. W. Crozier, C.E., Shire Hall, Durham:—  
 M. R. Draper J. G. Bradley £1,117 14 0  
 & Son £1,382 15 0  
 Wright & Free-son 1,268 18  
 J. B. Stott 1,100 0 0  
 J. G. Brown 1,184 10 2  
 C. Groves 1,089 9 5  
 W. Lodge 1,175 10 0  
 W. C. Atkins Craig Bros. 1,064 7 2  
 & Son 1,165 9 2  
 G. P. Gillhespy 1,150 5 7  
 J. Burnett 1,100 19 1  
 J. B. Stott 1,100 0 0  
 C. Groves 1,089 9 5  
 W. Norman 1,064 7 2  
 Sacriston\* 1,049 6 0

**TONBRIDGE.**—For the erection of boundary fences. Tonbridge Council School (No. 1), for the Kent Education Committee. Mr. C. H. Strange, architect, 30, Dudley-road, Tunbridge Wells:—  
 Davis & Leane £134 0  
 Martin & Co. 184 0  
 Strange & Sons, Ltd. 182 15  
 Punnett & Sons, Tunbridge 173 0

**TUNBRIDGE WELLS.**—For head gardener's house and a cottage at Buckhurst, for the Right Hon. Earl De La Warr. Mr. W. Kirk, architect, 30, Monson-road, Tunbridge Wells:—  
 J. Luxford, Forest Row\* £751

**WANSTEAD.**—For making-up Orford-road, for the Urban District Council. Mr. C. H. Bressy, Surveyor, Council Offices, Wanstead, N.E.:—  
 G. Porter £632 18 0  
 W. Griffiths £363 0 0  
 Grounds & Newton 339 10 11  
 T. Adams 450 0 0  
 G. Bell 337 0 0  
 T. Adams 437 0 0  
 W. & C. French 325 0 0  
 G. I. Ander-son 390 0 0  
 sons, Ilford\* 297 0 0  
 J. Jackson 383 12 9  
 [Surveyor's estimate £310.]

**WIMBLEDON.**—For the erection of a house in Alan-road, Wimbledon, for Mr. Charles J. Dixey. Mr. G. A. Lansdown, architect, 9, Regent-street, Waterloo-place, S.W.:—  
 Dove Bros. £2,315  
 W. Hammond 2,180  
 Parsons & Townsend 2,270  
 C. Ansell 1,818  
 H. & E. Lea 2,100  
 Whitehead Bros. 1,780  
 J. Marsland & Sons 1,986  
 J. Burgess & Son 1,727  
 Johnson & Co. 1,850  
 [Slightly reduced and accepted.]

**WIMBLEDON.**—For the erection of a house in Belvedere-avenue, Wimbledon, for Mr. H. C. Archer. Mr. G. A. Lansdown, architect, 9, Regent-street, Water-loo-place, S.W.:—  
 J. Burgess & Sons\* £2,162  
 [No competition.]

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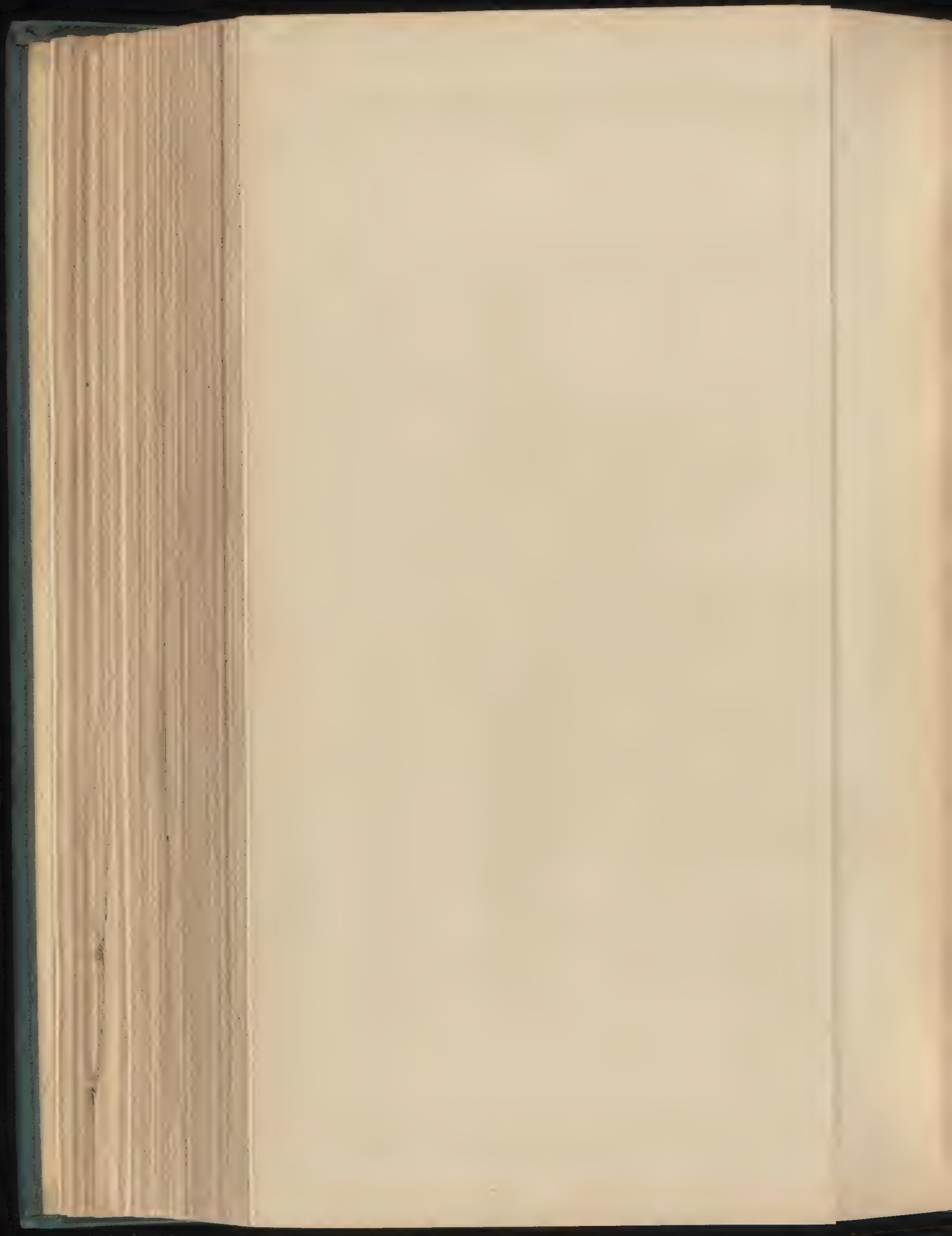
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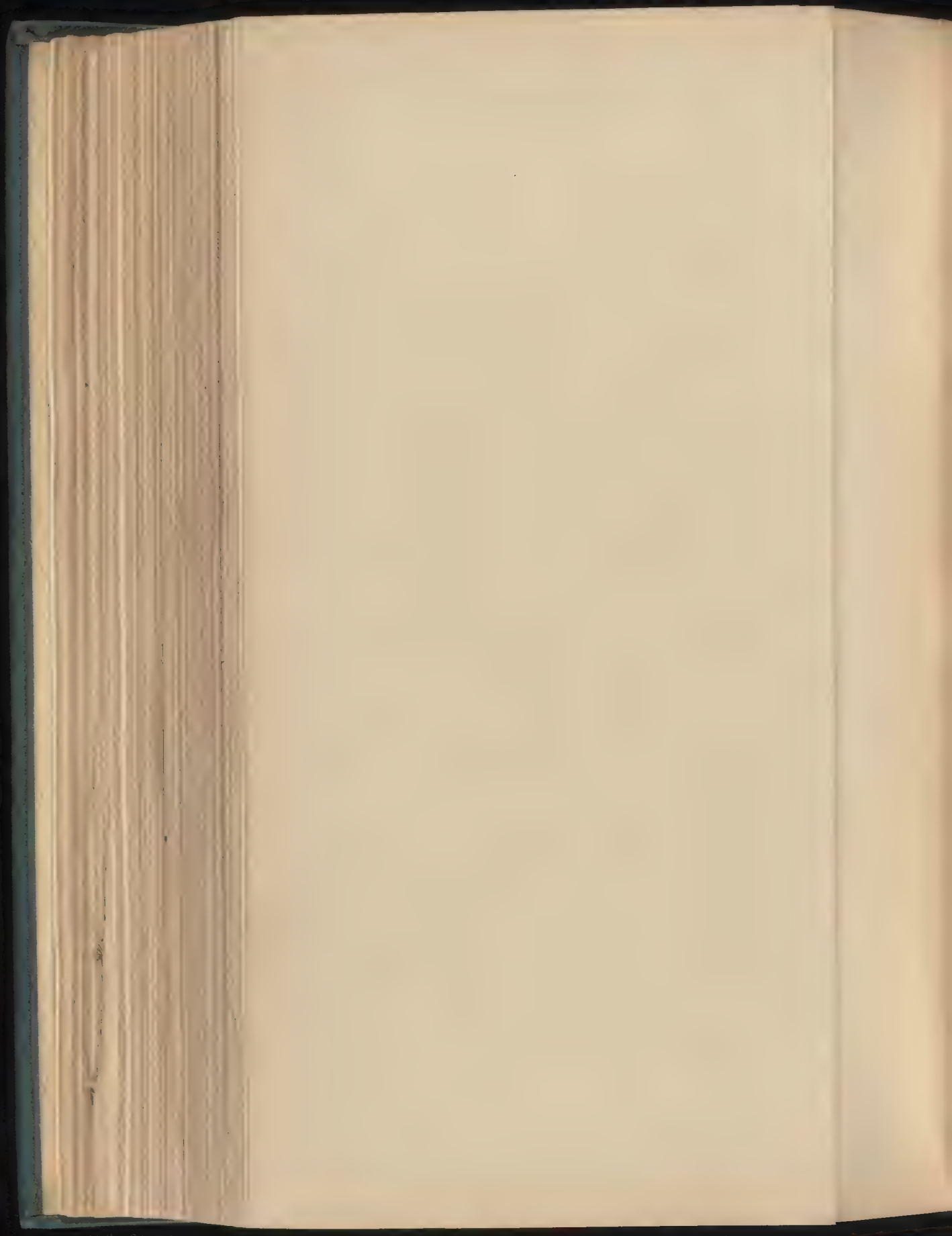


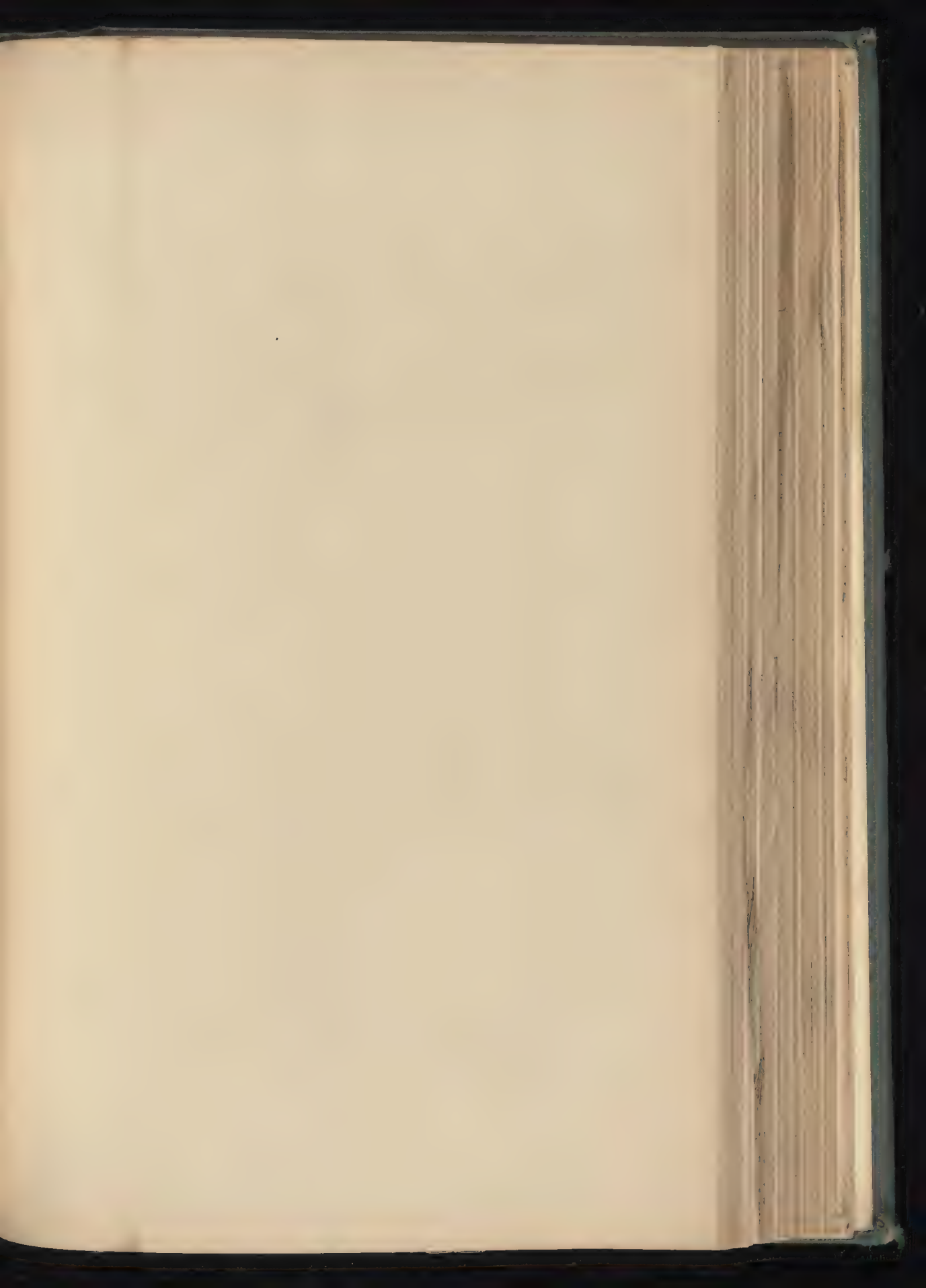
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THE BUILDER, NOVEMBER 11, 1905.

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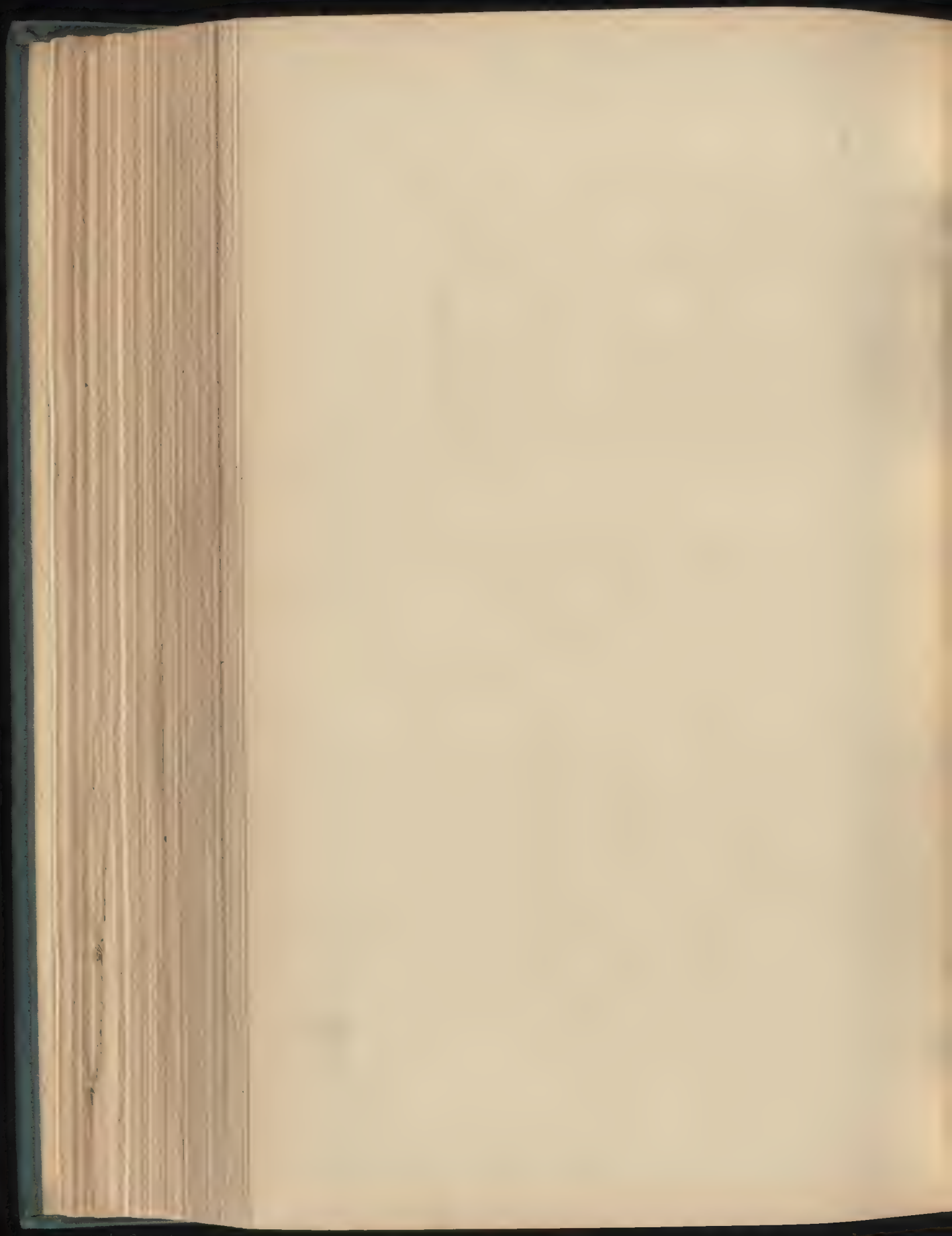




INK PHOTO SPRAGUE - C L<sup>Y</sup> 4 & 5 EAST HARDING STREET FETTER LANE E C

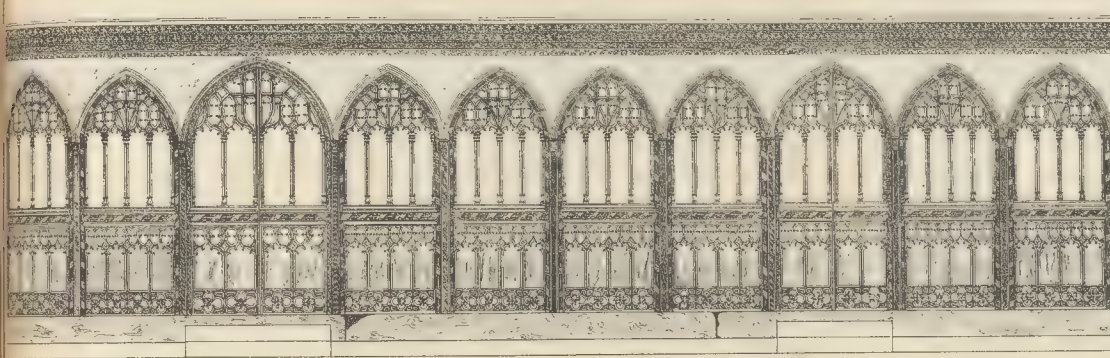
MEMORIAL TABLET, COUNTY HALL, NORTHAMPTON. BY MR NELSON DAWSON





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CHANCEL SCREEN.



ELEVATION.



PLAN.



CORNICE.



ORNAMENT TO MID-RAIL.



ORNAMENT IN DOOR ARCH.

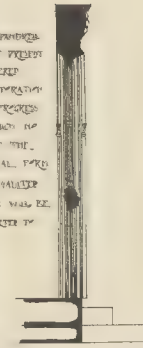


ORNAMENT IN ARCHES.

SECTION OF CHANCEL.



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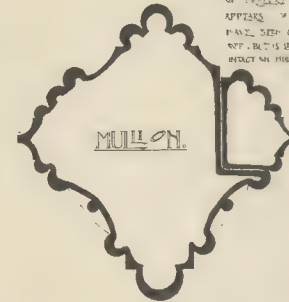
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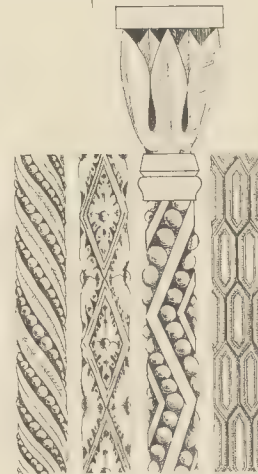
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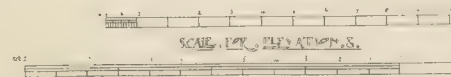
BASE.



MID-RAIL.



DETAIL OF SHAFTS.

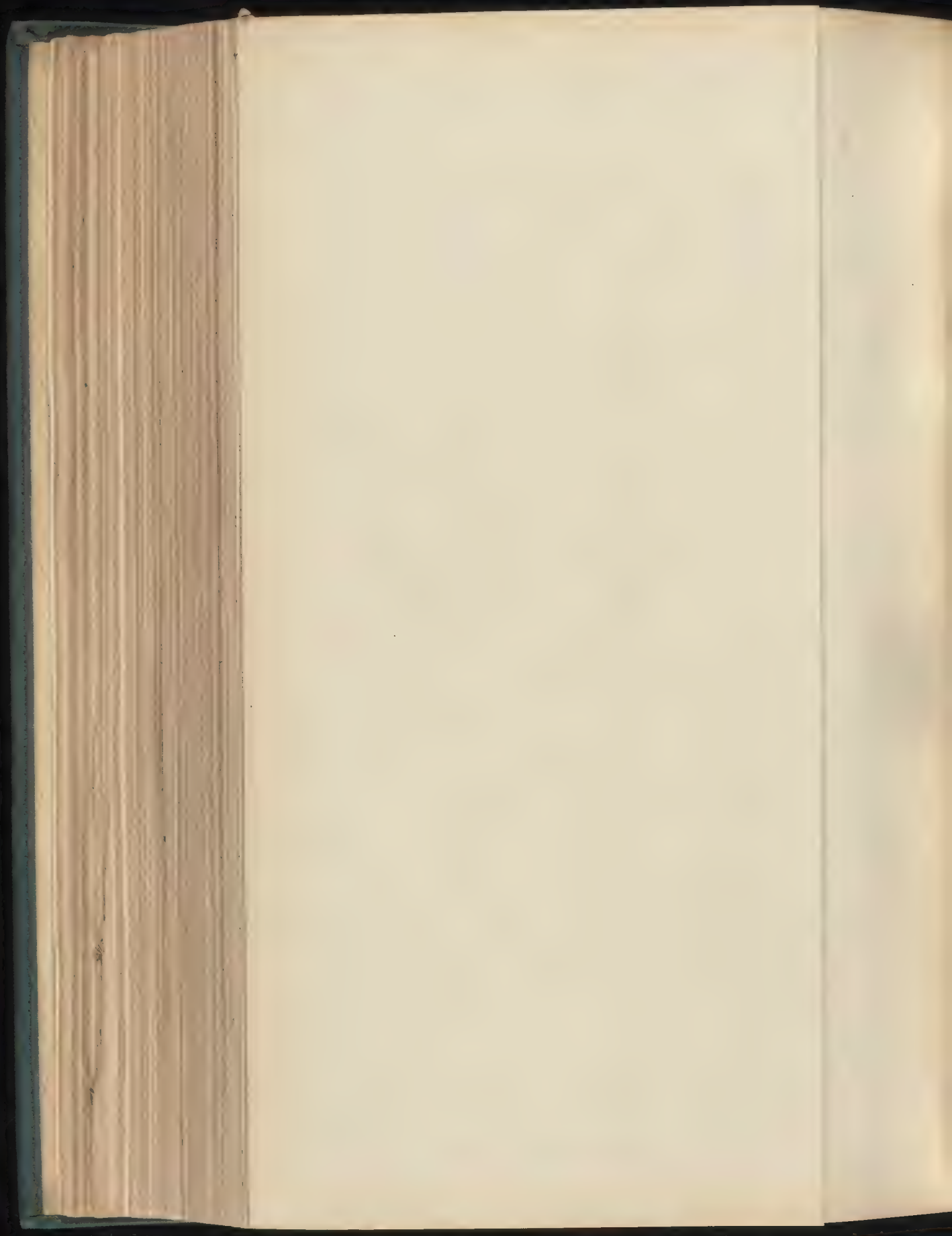


SCALE FOR ELEVATIONS.

SCALE FOR DETAILS.

SCALE FOR DETAILS.





# The Builder.

VOL. LXXXIX.—No. 3275.

NOVEMBER 19, 1905.

## ILLUSTRATIONS.

Design for Decoration of a Staircase in a Town House.....	By Chevalier C. Formili.
St. Gabriel's Training College, Camberwell.....	Mr. Philip A. Robson, A.R.I.B.A., Architect.
New Premises, High-street, Mayfield.....	Mr. Percy K. Allen, Architect.
Additions to "The Stocks," Wittersham, Kent.....	Messrs. Forsyth & Maule, Architects.
Christ's Hospital, Newgate-street (Demolished 1902).....	Measured and Drawn by Mr. Alfred J. Peyto.

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## An Analysis of the London Building Acts (Amendment) Act, 1905;



THE importance of this Act, which received the Royal Assent last August, is not to be measured by the number of its effective sections. When we come to deduct

from the forty-three sections of the new Act those fifteen sections which deal with exemptions, the nine sections which have to do with definitions and other Acts and the ten sections concerned with machinery penalties and procedure, there are left but nine sections which directly affect buildings in the County of London. These nine sections, however, are so wide-reaching, and will probably involve so much structural alteration to existing buildings, besides having an important influence on the construction and arrangements of new buildings, that it behoves all who are interested in land and houses in London, even as occupiers only, to take note of the provisions of this Act, which comes into operation on January 1 next.

Generally speaking, we may say that the London County Council up to the passing of this Act has, except in special cases under the Metropolitan Management Act, 1878, and the Factory and Workshop Act, 1901, exercised a very limited control over existing buildings (as distinguished from new buildings erected since January 1, 1905) in London. Now, for the first

time, Parliament has sanctioned interference with existing buildings, and has conferred upon the London County Council powers with respect to the provision and maintenance of proper means of escape in case of fire from buildings, both new and old, in the administrative County of London. The necessity for legislation in this respect was clearly realised both by the authorities and the public at the time of the Queen Victoria-street fire, where ten lives were lost in broad daylight on June 9, 1902. We are not, however, at the moment concerned with the history of the various Bills which have been promoted, withdrawn, amended, re-introduced, partially dropped, and, as to a small part, finally added to the Statute Book after very considerable emendation and amendment. Our object, rather, is to call attention to the provisions of the new Act itself.

### Provisions in Relation to Existing Buildings.

It will, perhaps, give an idea of the scope of the Act with regard to existing buildings if we point out what existing buildings are not affected under the Act.

There are five classes or groups of buildings the owners of which are exempt from any obligation whatsoever under the Act, viz.:—

A. Any existing dwelling-house occupied as such by not more than two families\* (except in the case when such

dwelling-house is used as a shop and has any part projecting 7 ft. or more beyond the main front, see below).

B. Every\* existing building not exceeding 30 ft. in height and of two stories or less above the ground story (except where the building is used as a shop and has any part projecting 7 ft. or more beyond the main front, see below).

C. Any building, the whole of which is a factory or workshop, within the meaning of sect. 14 of the Factory and Workshop Act, 1901.

D. Any part of a building used as a factory or workshop which has since August 11, 1902, been provided in that part with means of escape in case of fire, in accordance with the Factory and Workshop Act, 1901.

E. Any common lodging-house within the meaning of any Statute for the time being in force, relating to common lodging-houses within London.

Except in special cases exempted under the Act, see sects. 28-42 (inclusive), there are only the above-named five classes of existing buildings which are outside the scope of the Act.

Of the existing buildings which fall within the scope of the Act, as regards some of these the provisions of the Act come into force on January 1, 1906, whilst as regards others the operation of the Act is postponed till January 1, 1907.

\* In those cases where the dwelling-house is a "high building," or what has been called a "twenty-person building," "one family" is the limit laid down instead of "two families" for the purpose of exemption.

\* In those cases where the building (even though it be not more than 30 ft. high and of two stories only) is a twenty-person building, in order to be exempt it would have to be "a dwelling-house occupied as such by not more than one family."



### Existing Buildings Affected on January 1, 1906.

Subject to the afore-mentioned exceptions, this group consists of four classes, viz.:—

I. Every existing building having more than two stories above the ground story.

II. Every existing building exceeding 30 ft. in height.

III. Projecting shops where projection exceeds 7 ft. (except what are called lock-up shops, *i.e.*, a shop not forming part of a building in which persons are employed or sleep).

IV. Living rooms over premises used for storage of inflammable liquid.

The above four classes will be more or less affected on January 1, 1906, but the requirements in regard to I. and II. will probably be found less costly than the requirements in regard to III. and IV.

The requirements with regard to I. and II. may be shortly stated as follows, viz.—Either (a) an accessible dormer\* or door\* opening on to the roof, or (b) a trap-door,\* hinged and counter-weighted, covered with copper or zinc, and also a fixed or hinged step-ladder leading to the roof, or (c) other proper means of access to the roof, and, where practicable and necessary, a parapet or guard-rail. The likeness between the requisitions of this sect. 12 of the new Act and sub-sect. 2 (now repealed) of sect. 61 of the Act of 1894 is noticeable, but it will be remembered that the repealed sub-section of the Act of 1894 provided proper means of access to the roof of dwelling-houses or factories exceeding 30 ft. in height and having a parapet, so that by leaving out the parapet the requisition to provide access to the roof was avoidable. Under the new Act, however, access to the roof is, in certain cases, compulsory, and where necessary to prevent persons slipping off the roof a sufficient parapet or guard-rail is also exacted; obviously, as was wittily remarked by one of the counsel who appeared for the promoters of the Bill, "it would be no use inviting people out on the roof unless there be a parapet to meet them, for they would only be going out of the fire into the frying-pan."

With regard to shops projecting 7 ft. or more the requirement is—A roof over the projecting portion of the shop, which roof shall be "constructed of fire-resisting materials not less than 5 in. thick." This is in addition to the provision of the means of access (a), (b) or (c) to the roof of the main building.

The second sub-section of sect. 10 makes it lawful to have a lantern light or ventilating cowl in or upon the fire-resisting roof, provided certain rules as to position and construction of such light or ventilator be observed.

As regards requirements I., II., and III., there is a power given to the London County Council, or (in the event of an appeal) to the Tribunal of Appeal, to sanction entire or partial exemption "in any case where it is reasonable so to do."

IV. In the case of premises where inflammable liquid is kept for sale or trade

\* Position of dormer, door, or trap-door is to be approved by the District Surveyor, and the fastenings are to be such as will ensure ready access to the roof from inside the building.

purposes so as to be liable to cause fire or explosion two requirements are necessary for living rooms or work rooms over or communicating with such premises:—

(1.) Adequate safeguards for prevention of spread of fire. (2.) Means of ready escape from room in case of fire.

The above four classes of existing buildings will be affected on and after January 1 next. There remain now two classes of existing buildings in regard to which the operation of the Act will be deferred until January 1, 1907.

### Existing Buildings Affected on January 1, 1907.

These are the following:—

V. Existing high buildings—*i.e.*, a building which has any story whose floor surface is more than 50 ft. above the footway.

VI. Existing twenty-person buildings—*i.e.*, a "building in which sleeping accommodation is provided for more than twenty persons or which is occupied by more than twenty persons, or in which more than twenty persons are employed."

It is to be noted that any existing dwelling-house occupied as such by not more than one family is excepted from the classes V. and VI.

In regard to these classes V. and VI., powers are given to the London County Council to require the owner to provide such means of escape therefrom in case of fire "as can be reasonably required under the circumstances of the case."

When the Bill was before Parliament there was a great deal of opposition to this clause, it being contended, among other things, by the opposers that the powers given to the London County Council were too wide; the promoters, on the other hand, submitted that the London County Council had exercised their similar powers, with regard to existing factories and workshops, in a reasonable manner. In the result Parliament has determined that the owner shall have a right of appeal to the Tribunal of Appeal in case he is advised that the requisitions of the Council are unreasonable or excessive. It is to be noted that, even though no structural alteration be made in a building, certain changes of user (*e.g.* the termination of an occupancy of a building by, say, nineteen persons, and the new occupancy of the building by, say, twenty-one persons) are deemed to be a conversion of a building, and notice of such conversion must be given by the "owner or occupier" to the District Surveyor.

It was pointed out in Parliament that the want of a definition of "one family" may lead to dispute and litigation. The promoters for their part did not appear to regard the definition as necessary, for, they submitted, there was no definition in the Act of 1894 of "two families," and yet sect. 69 of that Act has worked smoothly. It does appear to us, however, that the question promulgated by one of the counsel appearing for petitioners against the Bill seems to require an answer: "Are two bachelor friends living together to be deemed to be more than one family?"

### The Provisions with regard to New Buildings.

The changes in regard to new buildings come into operation on January 1 next, and although, of course, these matters are of very great importance to owners who have ultimately to pay—either themselves or their tenants—for improvements which are introduced in their buildings, yet the persons most immediately concerned are architects and surveyors, who are called upon to advise owners, and we shall, therefore, in what follows address ourselves most particularly to those professional men who may not as yet have made themselves acquainted with the new Act.

It will be remembered that by sect. 61 of the London Building Act, 1894, it was enacted that "every new building exceeding 60 ft. in height shall be provided on the stories, the upper surface of the floor whereof is above 60 ft. from the street level, with such means of escape in the case of fire for the persons dwelling or employed therein as can be reasonably required under the circumstances of the case, and no such stories of such building shall be occupied until the Council shall have issued a certificate that the provisions of this section have been complied with in relation thereto."

Now this sect. 61 of the Act of 1894 has been repealed, and it has been practically re-enacted (with important additions as to appeal to the Tribunal of Appeal) in sect. 9 of the new Act, but with "50 ft." substituted for the "60 ft." in the old Act. The reason for the lowering of the height was given in evidence before the Select Committee of the House of Commons in the form of a formula by Captain Hamilton, the chief officer of the London Fire Brigade, who, when under examination in regard to life-saving work by the use of fire-escape ladders, said, "It has been found that you can save life at 40 ft. perpendicular height slowly; at 50 ft. you can save it with great difficulty; above that height it becomes a sort of forlorn hope—you may succeed or you may not in saving one life."

The practical effect of the change of law is that when designing high buildings an architect is bound to contrive "proper and sufficient means of escape" from those upper stories where life can only be saved by fire-escape ladders "with great difficulty."

But it is not only new high buildings but also new twenty-person buildings which come under the provisions of sect. 9 of the new Act. It will be remembered that by sect. 14 of the Factory and Workshop Act, 1901, it was enacted that factories and workshops in which more than twenty persons are employed must be provided "with such means of escape in case of fire for the persons employed therein as can reasonably be required under the circumstances of each case." Now, in the London Building Acts (Amendment) Act, 1905, forty-person factories are left to be dealt with under the Factory and Workshop Act, 1901, but the provisions of sect. 14 of the Act of 1901 are extended (with modifications as to appeal) to every new building "in which sleeping accommodation is provided for more than twenty persons."

which is occupied or constructed or adapted to be occupied by more than twenty persons, or in which more than twenty persons are employed, or which is constructed or adapted for the employment therein of more than twenty persons." [See sect. 7 of the new Act.]

The only new building which, being a high building or a twenty-person building, is excepted from sect. 7 of the new Act is "a dwelling-house occupied as such by not more than one family."

It will thus be evident to our readers that the practical effect of sect. 7 of the new Act is to require proper and sufficient means of escape to be provided not only for tenements 60 ft. above pavement and forty-person factories, but also for tenements 50 ft. above pavement, and factories employing between twenty and forty persons, and from every other twenty-person building.

It is, therefore, as we have seen, new high buildings and new twenty-person buildings which will be most affected by the new Act. New projecting shops are, however, affected in the same way as existing projecting shops (*vide supra*), and every new building, if having more than two stories above the ground level, or if exceeding 30 ft. in height, must be provided, "unless and except so as the Council otherwise allow," with the means of access to roof which is indicated above. See I. and II. of existing buildings:

It may be a matter of interest to our readers if we point out that the definition of "owner" in the case of a forty-person factory coming under the Factory and Workshop Act, 1901, differs from the definition given in the new Act, and that the difference arises from the fact that under the Factory and Workshop Act, 1901, which followed the Public Health Act, 1875, "rack-rent" is defined as two-thirds of the full net annual value, whereas in the new Act the word "net" is omitted from the definition of rack-rent, a distinction which may mean a considerable difference to those lessees from whom the obligations of "owner" have not been transferred by deed, as is now frequently done. For example, after January 1, 1907, the case may occasionally arise where "the owner" from whom is the obligation to provide means of escape would be a different person according as the factory in question employed forty-one persons or thirty persons.\*

\*Definitions of rack-rent under:—

Factory and Workshop Act, 1901, and Public Health Act, 1875.

"Rack-rent" means rent which is not less than two-thirds of the full net annual value, and the full net annual value shall be taken to be the annual rent which a tenant might reasonably be expected, taking one year with another, to pay for the premises if the tenant undertook to pay all usual tenant's rates and taxes and tithe commutation rent-charge (if any), and if the landlord undertook to bear the cost of the repairs and insurance, and the other expenses (if any) necessary to maintain the premises in a state to command such rent.

Lastly, it may be noted that the whole of the second schedule relating to fire-resisting materials in the Act of 1894 is repealed, whilst the first schedule of the new Act contains an amended and extended list of materials which are to be "deemed to be fire-resisting materials."

We have thus endeavoured to put our readers generally in possession of the main features of the new Act. There is, however, one point to which we have on previous occasions drawn attention, viz., that we consider the owners, their advisers and the public are to be congratulated on the retention under the new Act of that Tribunal of Appeal which, established under the Act of 1894, has proved itself during the last ten years a well-constituted, impartial, and judicial tribunal, and we cannot help thinking that, when they have had time to think over the matter, the promoters of the Bill will see that, to say the least, a tactical error was committed in making what was commonly regarded as a thinly-veiled attack on that tribunal, which now has been endowed by Parliament with the important function of seeing that the London Building Acts, 1894 to 1905 are truly and impartially administered.

### NOTES.

GENERAL satisfaction with British Canals, be felt that the important subject of inland navigation has been brought for discussion before the Institution of Civil Engineers by the paper read on Tuesday by Mr. J. A. Sauer. The most practical suggestion in this paper was that direct water communication, available for barges up to 250 tons capacity, should be established between five points in the approximately rectangular figure of which the corners are represented by London, Hull, Liverpool, and Bristol. These points are four of the points, and the fifth is Birmingham, the centre of the figure. Of course, it would be useless to connect London and Hull in the east, or Liverpool and Bristol in the west, as the sea in each case is the cheapest possible waterway. Hence the proposal of the author for diagonal lines passing through Birmingham, and horizontal lines connecting London with Bristol, and Liverpool with Hull. Communication of a kind already exists on each route, some portions of the rivers and canals permitting navigation in a satisfactory manner, but the remaining sections require considerable expenditure in re-modelling works. The main project put forward by the author is of a generally practicable nature, and if carried out it would constitute a useful instalment of reform. But the scheme is not free from difficulties, the chief of these being the questions of finance and of the increased water supply required for the greatly enlarged locks proposed. We have no doubt, however, that the second difficulty—which is well illustrated by the hilly route between London and Birmingham—could be largely reduced by the use of hydraulic canal lifts, and possibly also by pumps for returning water discharged from locks to the upper level. When complete, the discussion of this paper will certainly afford valuable

technical matter for the guidance of those who are working for the restoration of our neglected inland waterways:

A USEFUL study of the typhoid fever epidemics at Lincoln, Maidstone, and Worthing is contained in the paper read by Dr. Childs before the Incorporated Society of Medical Officers of Health. The water supply to each of these towns represents a type of supply constantly liable to pollution, and occasionally to infection with typhoid fever germs. From the evidence available, the author draws the conclusion that any community may use with impunity a grossly and constantly polluted water supply for a long succession of years, until by some combination of circumstances specific germs are introduced under conditions favourable for the infection of consumers. We must point out, however, that at Lincoln the water was naturally bad apart from typhoid infection, whereas in Maidstone and Worthing it was normally of good quality. Dr. Childs makes several proposals providing for the more adequate examination of public water supplies and for inquiry into outbreaks of water-borne disease. However excellent suggestions of the kind may be, their adoption could be of little use under present conditions. The history of the Lincoln outbreak teaches us that it is not sufficient to detect dangerous features in a given supply. There must be power to compel the water authority to take notice of the warning given: To safeguard the general water supplies of the country it is necessary that plenary powers should be vested in bodies dealing with far greater areas than those of existing sanitary authorities:

THE most useful and practical speech made in the discussion on the Rural Housing question at the Sanitary Institute on Tuesday, was that of Miss Cochrane, since it gave definite information, obtained at first-hand, as to what some of the rural population do or do not want. Miss Cochrane had been interviewing a large number of the wives of agricultural labourers in several counties. One thing we have learned as the result is that they very much like to have a parlour besides the kitchen; we, among others, were under the impression that this was superfluous, but it is evident that the inhabitants of the cottages, at all events, do not think so. They want three bedrooms (in which they are quite right), and they want a good-sized larder, the larder being put apparently to a rather general use for storage. They do not, it appears, want a fixed bath; some were even contemptuous on the subject, thinking it a reflection on them, and affirming that they could keep their children clean without that fixture. This is, of course, partly want of habit; but it must also be said that as long as dwellers in rural districts are obliged, as is too often the case, to go a considerable distance for every pail of water they want (often obtaining it then from a polluted source), the large fixed bath is rather a mockery, for it could not be filled. Some of these



arrangements in the Garden City houses seem to have been made with the impression that there would be water laid on. There are many rural districts where this is, as yet, merely a Utopian dream.

**Another City Fire Case.**

SOME practical points distinctly worth attention were brought out in the course of the fire inquest held last week by Dr. Waldo, the City Coroner. The fire, which took place at 49, Queen Victoria-street, was evidently due to the short-circuiting of electric current conveyed by imperfectly protected conductors in the basement, where wood and inflammable rubbish were littered. To make matters worse, the lift casing was of wood, and timber had been employed to a very large extent in the construction of office and other partitions throughout the building. In spite of previous warnings, property owners continue to permit the enclosure of electric light cables and wires in wood casing, presenting no obstacle to the access of damp, which sooner or later causes a short-circuit, with the result that the conductors are fused, and combustible materials in their vicinity are set on fire. The recommendation of the jury "that all electrical wires throughout the building should be encased in metallic tubing" is right, but it does not go far enough. The tubing and joints should be perfectly watertight and insulated against external heat, conditions that are not secured by common types of tubular conduit. We fully agree with the remarks made by Colonel Fox that the lift ought not to have been lined with wood, and that there was far too much of that material about the building. One other feature deserving the most severe criticism is the inadequate means of escape provided for inmates in case of fire.

**Telegraphy and Telephony.**

MR. J. GAVEY, the Engineer to the Post Office, gave the presidential address to the Institution of Electrical Engineers last week. Choosing as his subject the progress that has been made in telegraphy and telephony, his address appealed more to telegraph engineers, by whom the Institution was originally founded, than to the modern electricians who are mainly interested in lighting and traction. We were very glad to learn that the Post Office is thoroughly alive to the great progress that has been made recently in the development of electrical theory, and that they are carrying out elaborate experiments to see how far these developments can be utilised in practice. A formula has been found for the limiting distance to which speech can be carried by overhead wires of given capacity, and thus telegraph engineers can work with confidence, knowing that they have only to contend with faulty workmanship, and not with faulty theory. By placing inductance coils in telephone cables it has been found that the speaking range has been very considerably increased: in one case the speaking range was increased from 6½ to 176 miles. This method, proposed about twenty years ago by Heaviside, is an excellent example of the commercial value of advanced mathematical theory. Considerable im-

provements have also been made in work with underground cables. With Wheatstone apparatus a speed of 200 words a minute can be attained between London and Glasgow, the lines being connected at Preston by a repeater. It is hoped that the London to Glasgow underground telegraph line will be opened early next year. We were surprised to learn that, notwithstanding the invention of the many types of printing, writing, and drawing telegraphs, the Morse code and the Morse apparatus are still practically universally used. The Post Office is at present considering the relative merits of two different types of automatic apparatus. In one a perforated strip of paper is used for transmission, and at the receiving office a similar strip is perforated the exact counterpart of the original. When placed in a type-printer the message is printed in ordinary letters. In the other method the message is printed directly at the receiving office.

**The Dilluth Transporter Bridge.**

OUR readers are already familiar with the type of transporter bridge as erected at Runcorn and Newport in Great Britain and across various estuaries on the Continent. A distinctly novel form of design is embodied in the structure completed this year for the transportation of street traffic across the ship canal between the City of Dilluth and Minnesota Point, the latter being a natural breakwater separating Dilluth harbour from Lake Superior. As long ago as 1889 suggestions were made for the construction of a bridge similar to that built at Rouen by M. Arnodin. It was proposed later by Mr. C. A. P. Turner that a girder instead of a suspension span, and a stiffly-suspended car in place of one hung by cables, would be more economical as well as more satisfactory. Judging by the description and drawings given by Mr. Turner in a paper read before the American Society of Civil Engineers, we think the two contentions are fairly substantiated so far as this particular example is concerned. It must be pointed out, however, that the span is only 393 ft. 9 in. from end to end, and that a similar design would be out of the question for a bridge such as that across the Mersey. The details in the paper mentioned are of considerable interest, especially those relating to the method of bringing the travelling carriage to a standstill in the dock at each end of the bridge.

**Concrete Buildings in Liverpool.**

NOTWITHSTANDING the usefulness of destructor clinker as an aggregate in concrete making, municipal authorities often experience difficulty in disposing of this product in a remunerative manner. Liverpool is a case in point, for in that city, out of some 50,000 tons of clinker produced annually, about 15,000 tons have to be deposited in the sea at the cost of the ratepayers. With the laudable object of reducing this waste both of money and of good material, the city engineer has applied destructor clinker in the manufacture of concrete foundations and paving blocks, and more recently in building workmen's dwellings of clinker concrete with a small propor-

tion of steel reinforcement. The building of the kind is a three-story block, covering an area of 234 sq. yds., in which the foundations consist of concrete piers 12 ft. deep supporting flat arches, the walls and floors of separate concrete slabs, and the cornices, stairs, parapet walls, and chimneys tops of concrete specially moulded to the required form. All the slabs, blocks and other moulded parts were made at the corporation workshops and carted to the site ready for erection. Openings for doors, windows, and fireplaces were moulded in the slabs, mortises and tenons being formed on the edges, so that the parts of the building could be securely jointed with cement mortar. Although the system of construction is certainly novel, it has objections. The weight of the slabs, ranging up to 11 tons each, necessitates heavy tackle for handling, and the completed structure cannot be anything like so firmly connected as monolithic concrete work. To say nothing of concrete-steel construction. Further, unless a regular demand can be established for slabs and blocks of given dimensions the cost of moulds must be excessively high.

**The Midland Reafforestation Association.**

AN appeal has just been made by the officers of this Association for funds to help it to carry on its work. Its labours are undoubtedly beneficial. Its object is to cover the bare and hideous pits and mounds with trees. Anyone who has seen one of these disused banks must admit it is about as ugly and depressing an object as can be imagined. But, as there are certainly 30,000 acres of waste area, it is obvious that, if this quantity, or the 14,000 acres which the Association estimate can profitably be covered with trees, is planted, a considerable supply of timber will in course of time be grown. Such timber must necessarily vary in quality; but, though the utilitarian object of the Association must not be overlooked, its first claim on public support is that it will restore a large area of English country to something of the agreeable character which it once possessed.

**Winchester Cathedral.**

IN our "Note" of June 3 last, relative to the threatened portions of Winchester Cathedral, we pointed out that until the completion of borings then in progress it would be impossible to decide upon a scheme for insuring the complete safety of the structure. The object of the borings was to obtain definite information as to the stratum of gravel 16 ft. below the surface, underlying the bed of loamy soil insufficiently supporting the foundations some 10 ft. below the surface. This bed of soft material is permanently washed by water, which rises some feet above it in wet seasons. From the reports submitted to the Dean and Chapter by Mr. J. B. Cokson, Mr. T. G. Jackson, and Mr. Francis Fox, it appears that the gravel is not capable of supporting the underpinning works that are necessary. The authorities are to be congratulated upon the finding, which limits the depth of the underpinning to about 6 ft. The preliminary south wall, where the most serious movement has occurred, is at present

securely shored, and Mr. Jackson recommends that after it has been consolidated by grouting and bonding, the work of underpinning should be taken in hand. The east wall of the south transept, where sufficiently alarming subsidence is evident, also requires underpinning, and so does the central column of the crypt vaulting which is stated to be in a critical condition. There is no doubt that the danger in these parts of the building is of such urgent character as to demand immediate attention, after which some less alarming but sufficiently serious excavations will have to be made good.

STEPS are being taken by a local committee to celebrate at Whitsuntide, 1907, the thousandth anniversary of the foundation of Ramsey Abbey, and to organise some historical pageants and tableaux after the manner of the recent celebration at Chesham. The story of the foundation of the Abbey Church, dedicated to SS. Mary and Eufleda, does not seem as yet to be precisely ascertained. The generally received account is that King Edward the Elder (901-925) established there some Benedictine nuns with his daughter Eufleda as first abbess, and that in 967 King Edgar augmented the foundation. All of the earlier abbesses were of royal lineage, and to the nuns was entrusted the education of many princesses, one of them being Matilda, daughter of Malcolm III. of Scotland, and wife of Henry I. There are some traces of the abbey buildings, but of the Saxon church, which the Danes plundered, no vestiges remain above ground *in situ*. The erection of the Norman church is attributed to King Stephen's daughter Mary, Countess of Boulogne and Mortaigne, who went to Ramsey, as abbess, from St. Leonard's, near Stratford, London. She married Matthew, son of Theodore, Count of Flanders, but the Pope compelled her to return to Ramsey. The benefactors to the abbey were numerous. At the time of the surrender the revenues were valued at 528*l.* 18*s.* 10*d.* per annum. In 35 Hen. VIII. the site was granted to the townsmen, and three years afterwards to one Bigot of John Bellow. A history, written by Mr. E. Loftus Brock, of the cruciform church, which is notable for the chapels at the ends of the choir-aisles, semi-circular within and square-ended without, with illustrations and a plan after drawings by Mr. R. Phené Spiers and Mr. C. E. Mallows, form No. XV. of our series "The Abbays of Great Britain," October 5, 1895. The oak shelter (1898) of the carved crucifix on the west wall of the south transept was designed by W. Butterfield.

THE owner of an estate at Smithill, Co. Roscommon, seeks to recover possession of the property and to eject the present tenant. At the hearing of the case in the course of last week at the Boyle Quarter Sessions it was stated in evidence that it is believed that Oliver Goldsmith was born in the house which belongs to the property. In his "Life and Times of Oliver Goldsmith," 6th edition, 1875, John Forster avers the poet was born—Dr. Johnson sets forth in the epitaph

he wrote for the memorial in Westminster Abbey—at Pallas (or Pallice), a remote village on the south bank of the River Inny, in the county of Longford, the property of the Edgeworths of Edgeworthstown in that same county. Forster also says that a tradition that the old parsonage house was afterwards haunted by good fairies did not save it from being levelled to the ground. Some may read in the words *in loco cui nomen Pallas* of the epitaph an allusion to the tutelary goddess, but the context dissipates the conceit, and there can be no doubt that at the time of Goldsmith's birth his father held the living of Pallas, in the parish of Forney, near Ballymahon.

A FRAGMENT of the City Wall has just been laid bare in the course of excavation for the building of some new premises in Jewry-street, on the south side of Aldgate. The piece of wall is 12 ft. high and about 9 ft. thick, and its upper surface lies 8 ft. beneath the soil. At that spot the wall lies almost due north and south in its course from the old Postern-row, at Tower-hill, to the bend, north-westwards, at Aldgate. Between those limits it traverses George-street, Tower-hill, passing along the west of the Crescent, America-square, and New-square, Minories, and continuing thence between Vine and Little George streets, and Crutched Friars and Jewry-street. Of the last-named thoroughfare it forms the boundary on the east side, in part, of the street.

THE most interesting part of the exhibition of the Society of Portrait Painters at the New Gallery is, in an artistic sense, the collection of sculpture got together in the Central Hall, by Messrs. Gilbert Bayes, Bertram Mackennal, E. Roscoe Mullins, and F. M. Taubman. A good many of the more important works have been exhibited before, but they are such as one is glad to see again; and the collection forms a kind of representative illustration of the art of four very gifted sculptors. Mr. Mackennal's large group of two figures for the Tympanum of the new Public Offices at Westminster it is rather difficult to judge of apart from the whole composition; separately, and seen close at hand instead of in the intended position, it looks rather violent in action, but may fall into line well enough in its place on the building. His small marble relief, "Mother and Child" (heads only), which we do not remember to have seen before, is a very expressive work. Passing from the sculpture to the portraits which form the ostensible object of the exhibition, we can find nothing to call a great portrait; but there are some fine works, a good many clever ones, and some, like M. Besnard's "M. Frantz Jourdain" (43) and Mr. Orpen's "Portrait of a Man" (59), which seem intended to show how far the fashionable cult of the ugly and repulsive can be carried into portrait painting; and a portrait of a woman, we cannot say a "lady," by Mr. J. E. Blanche, is a terrible example of absolute vulgarity. The portrait of his mother by the late A. Stuart-Wortley

(18) is perhaps the most dignified work in the collection. Various portraits of men by Mr. John Bowie, of the Royal Scottish Academy, are good examples of vigorous, straightforward portraiture, of the kind which aims rather at being a likeness than a picture. M. Besnard's "Madame Nocard" (19) is an example of the peculiarly French style of hard, glittering highly-finished portrait; the opposite extreme, that of rough modelling of the features in which every brush-mark is palpably visible as such, may be seen in Mr. Orpen's heads of Mr. T. W. Russell and Mr. W. O'Brien (38 and 48), representing only what may be called the scaffolding for a portrait; forcible, but not attractive. In the North Room Mr. Spencer Watson's "Miss Snowdon" (58), Mr. Collier's "Professor Vines" (73), and M. Nicolet's "Egerton B. Coghill, Esq." are good pictures. Perhaps the most pleasing work in the galleries, in an artistic sense, is Mr. Herman Herkomer's pastel of Mrs. C. C. Rogers (125) in the South Room; a portrait noticeable both for effective colour and for its fine and graceful lines of composition.

At Messrs. Dowdeswell's Gallery is a very interesting collection of landscapes in water-colour by Mr. Alfred East, noticeable especially for this, that they do not consist of landscape studies all in one style and one class of effect, but represent an effort to treat each subject as a special problem to be worked out in its own way. Thus there is far more variety of style than we usually find in an exhibition of the works of one artist. The finest thing is "The River at Avranches" (11), a scene with masses of trees beneath a sky of massed white clouds; a landscape well worth working out on a large scale as an oil picture. "A Showery Day, Venice" (8) and "Sunset, Venice" (22), with a tumultuous crimson-lit sky over it, are things from entirely a different world of landscape-painting from the Avranches scene. The one numbered 39, which had the wrong title to it in the catalogue (at least on the day of our visit), is a forest scene with a distant view of Château Gaillard between the trees; a fine example of landscape composition in the repeating lines of trees, clouds, and distant château. The small drawing called "The Meadow" (34) is one of the same class, a broad little composition with a fine sky. "A Festa, Venice" (3), is different again from any we have named, being essentially a foreground garden picture with figures, and a misty sunlit Venice in the background. In the smaller room is a small collection of the artist's vigorous and effective etchings.

THE second "spasm" of the "Purple Patch," which is otherwise called *The Tufon St. Toller*, appears, we are glad to see, with an artistically designed cover instead of the shapeless patch which characterised the first issue. In other respects the second issue is an advance on its predecessor; there is a good deal of clever fun in it, and the imitation of Tennyson in the lines on testing a drain is very good. But may



we be allowed to suggest that it is not quite "good form" to write a satirical description of the work of an architect with an assumed name which at once points to a personal application. Satire should deal with types, not with individual names under a transparent disguise.

We print on another page a statement as to a Bill which is to be promoted for enabling (or we hope obliging) the police to take more direct and repressive methods of dealing with two of the curses of London life, the news-vendor ruffian and the organ-man. We hope all our readers who can in any way support the objects of this Bill will do so. The state of things at present in regard to these two nuisances is a disgrace to London. The By-law passed some little time since to prohibit the shouting of newspapers in the streets is, as far as its operation is concerned, a mere farce. It might have been supposed that when a by-law had once been passed against shouting papers down the streets, a policeman could have taken into custody any man found infringing it. Nothing of the sort; the police either have no power or will not exercise it—indeed, they seem generally to be on the side of the offenders; the householder whose Sunday evening is made hideous by the cries of these ruffians can get no redress except by following the man till he finds a policeman, going to the police office to charge him, and attending at court the next day to give evidence, with the probable result of the man being merely discharged with a "caution." As to the barrel-organs, they are a barbarism which is allowed in no other capital in Europe, and ought to have been peremptorily put a stop to long ago; and their existence is actually supported by Philistines who regard them—save the mark—as "music."

#### WORKMEN'S COMPENSATION.

THE Court of Appeal have commenced the present session by sitting to hear some thirty appeals under the Workmen's Compensation Acts. The list contains about the same number of these appeals as in May, when the court last sat to determine such cases. The case of *Rogers v. Mayor, etc.*, of Cardiff (the *Builder*, November 4) well illustrates the difficulty in determining the area of employment, especially in connexion with "engineering works," a difficulty which will disappear when the amending Act is passed, which would carry out the recommendation of the Departmental Committee that the Act should apply as long as any workman is engaged on the duties in question a workman was employed by the Corporation of Cardiff to repair the overhead wires of the electric tramway system. To do this he was using a trolley called a "tower wagon," and he had completed the repair at a certain point and was driving this wagon to a point three-quarters of a mile distant, following the line of tramway, when the horse bolted, and the man was thrown out and injured 200 yds. away from the spot where he had completed the last repair. It was contended that the accident had not happened "on, in, or about" the engineering work, but the Court of Appeal, affirming the County Court judge, held that the accident happened in physical contiguity to the engineering work, and that the Act was not limited to the particular spot requiring repair. This case alone would not appear to offer difficulties, but it has to be brought in line with former decisions. Thus in *Back v. Dick, Kerr, and Co.*, which we commented on May 27,

1905, where a man was injured whilst stacking timber to be used by his employers in reconstructing a tramway, in a station yard 700 yds. away from where the work on the tramway was being carried on, he was held to be outside the Act, and in our Note on *Pattison v. White* (November 19, 1904) we cited the cases which showed how arbitrary the line of demarcation was. From the above case and from the case of *Back v. Dick, Kerr, and Co.* this much appears clear, that the man must be engaged directly upon the engineering work itself, and not upon any incidental process, and the employment must also be within the physical area of the work.

It must be noticed also that "tramways" are not within the Act except in so far as some work of construction, alteration, or repair is being carried on in relation thereto so as to bring the operation within the definition of an "engineering work." The Departmental Committee, however, advised their inclusion, and the Bill to amend the Acts contained a clause to this effect.

The Court of Appeal has, however, just decided another case (*Adams v. Shaddock*) dealing with this question, which certainly offers some points of difficulty. In this case the claim was in respect of the death of a workman employed by a contractor who had contracted with a telephone company to carry a telephone wire underneath a road upon which a tramway ran. For this purpose a trench had been dug in the road close up to one of the lines of rails, and the workman was engaged in boring under the rails to another trench made between the two lines of rails when he was killed by a passing car. The working of the tramway was not at all interfered with, and the County Court judge had found that this was not employment on an engineering work as being an alteration of a railroad, and the work was not being carried on by or for the proprietors of the railroad. The majority of the Court of Appeal found that this operation involved an alteration of the railroad or tramway, but the Master of the Rolls expressed doubt in so doing, and Lord Justice Romer dissented, and the case will probably be carried to the House of Lords. The Master of the Rolls said a common-sense interpretation had to be given to the Act, and seems to have formed his judgment with a view to attaining that end. Lord Justice Romer used the same words in arriving at his interpretation of the law, but it led him to an opposite conclusion, and this case exemplifies the danger of interpreting statutes by common sense. As laymen we may perhaps venture to express the opinion that common sense or the beloved "man in the street," so often met with nowadays in the Law Courts and out of his proper sphere, would lean to Lord Justice Romer's view. The man was engaged by a telephone company to do work solely connected with the telephone, and the tramway was undisturbed. Telephones are not at present within the scope of the Act, but the Departmental Committee has recommended their inclusion.

Another case connected with "engineering works" is *Morris v. Lambeth Borough Council*. The Council were engaged in some operation upon a sewer, and the applicant was a night watchman. There was a watch-box, in which he could sit, which had a fire before it, but he went to a "shanty," which was erected for the workmen's tools, as it was raining hard, to cook his supper. The "shanty" fell upon him and injured him. It was contended the accident had not occurred out of and in the course of his employment, as he ought not to have been in the "shanty," and the County Court judge had so held, but the Court of Appeal reversed his judgment. The case seems to fall within the rough working test which has been deduced from former decisions, that as long as a man is furthering his employer's business he is within the Act, unless he is guilty of wilful misconduct. The preparation and taking food was necessary to his duties.

A case of importance is that of *Howells v. Thomas* (the *Builder*, October 28) in relation to "quarries." A builder was building two cottages upon an estate for two persons who had permission to take stone from a quarry upon the estate, and the deceased workman had engaged to fetch the stone from the quarry at so much a load.

The important point in the case is the decision that the builder was the "undertaker" in relation to the quarry. The Act the "undertaker" in the case of a "quarry" is defined to be the occupier within the meaning of the Factory Act. This Act contains no definition of "occupier," but the word "occupier" is in connexion with other undertakings the element has to be on the employer's own undertaking, and he is not liable if a workman doing work for him in somebody else's factory. The present decision seems to show that a temporary occupation in fetching stone from the quarry is sufficient in such a connexion, but, as we have repeatedly pointed out, the matter should not be left in doubt when the Act is amended, and the Departmental Committee have overlooked this point. In the case of docks, wharves, quays, and warehouses a special definition of "occupation" is given by the Factory Act and incorporated in the Workmen's Compensation Act, "the person having the actual use or occupation," and these words have been interpreted to mean just such a temporary use or occupation as the facts in this case disclose. This definition in any future statute should be extended to quarries.

The only further case at present decided requiring notice in these columns is that of *Osmond v. Campbell and Harrison*. In that case a man had been killed, and his widow was claiming compensation, and the decision turns only upon the amount of compensation which should be awarded. The man's wages as a wool-comber were 13s. 10½d. a week, and his wife by taking in a little washing made 1s. 10½d. a week, and therefore she could only claim as being "partially dependent" upon her husband, and in such a case the Act provides that in default of agreement the amount must be determined on arbitration to be such as is reasonable and proportionate to the injury to the said dependents, but not exceed that compensation which is fixed by the Act where dependents are wholly dependent. The County Court judge had awarded 150s., or 5s. less than if the widow had been wholly dependent, but it was contended he should have deducted such an amount as it was necessary the man should expend upon himself. The Court of Appeal required this contention, and held that no such considerations entered into the scheme as to partial dependents as apart from the principles laid down in cases of total dependency, and that the County Court judge, having considered the amount of the partial dependency, had exercised his discretion rightly.

#### THE SOCIETY OF PAINTERS IN WATER-COLOURS.

Those who wish to see the best lot of works in the Society of Water-colourists' winter exhibition should go straight to No. 135, "Evansong," by Mr. E. B. Hughes, a half-length of a woman in some kind of religious dress holding an infant in her arms. The face of the woman, partially turned upwards and aside from the spectator, and therefore in a very difficult position, is one of the most finely-drawn and modelled heads we have seen for some time, and has the beauty of sentiment and expression as well. There is no other picture in which the figures are predominant which can compare at all with this. Mrs. Stanhope Forbes' "By the Light of the Camp Fire" (170) is a good sketch of strong colour effect, hung apparently with intention next to Mr. Wagnon's cold blue picture, "A Pastoral" (157), which has however a pretty poetic fancy about it; but this artist's nude figure (see also No. 54) are too cold in colour to give the sensation of life; they are like statues in a landscape. Miss Fortescue-Prior's "Not at her best" in "The Greatest of These is Charity" (45), except as regards colour. "The First-born" (153) is more true to her best ideals in composition as well as in colour. In "The Sleeping Beauty" (24) Mr. Anning Bell, while showing admirable drawing and colour, has contrived to make the poetry out of a lovely legend by the coarse character of the personages depicted huddled together in sleep—Mr. Bell's ladies-in-waiting as kitchen-maids. Mr. Walter West is not equal to himself in "Chrysanthemums" (160), one of these interiors with a richly-dressed figure of a



body which he has made his peculiar "note"; it would pass for a very good work if it were not for comparison with its predecessors of the same type; the figure is not interesting in expression, and has too much the air of stillly posing for her portrait; but we regard it as only a passing failure; so able an artist is pretty sure to find himself again in future works. It is rather amusing to see Mr. Arthur Hopkins, in "One of Our Great-grandmothers" (269), making such a palpable imitation of Mr. West, even to the peculiar manner of treating the texture of the furniture surroundings. Miss Rose Barton, always delightful in treating children, shows a charming baby under the high-sounding title "The Honble. Madeline, Daughter of Lord Grenfell" (208), and in her architectural interior of "Sunday in St. Bartholomew the Great" (26) it is the little child on the bench who really makes the picture, for which the rest is only a setting. Mr. Rackham's grotesques we suppose we must put up with for their misdirected ability, until the artist or the public get tired of them; but in his most scene under the title "The Little Piper" (191) the group of children in the foreground is charming; if he would only take to child pictures and let bogies alone he would become one of the most charming contributors to the exhibitions. The more or less clever vulgarities of Mr. Glindoni and Mr. Henshall, worse than ever this year one Nos. 247 and 248), are unworthy of the walls of the Society; and a better man, Mr. Walter Crane, exhibits a drawing of two boys seated in a hammock (256), and looking at two dolls, which for his own sake he had better not have shown.

Landscape is, as usual, the strongest element of the exhibition, and in this respect it is quite up to the usual high level maintained in this gallery. If we class sea-pieces with landscape, perhaps the strongest contributor is Mr. Napier Hemy, who shows his finest powers in his three principal works, "Breezy Weather" (77), "Hauling Crab-pots" (65), and "Moonlight at Sea" (90). The last-named is a real moonlight effect; in the first-named, the rush of the sea, through the water is splendidly conveyed; and in "Hauling Crab-pots," where the boat goes from the spectator, just lifting over a wave, and the man in the bows is calling with his hands on a level with his head at the clumsy sea-oars, one can almost feel the motion of the boat and the tug at the oars. No one but a painter practically acquainted with sea-boating could have painted that; and it is worth noting how thoroughly and specially English is this kind of art; you find no sea or boat painting with the truth and reality of this in any other country; certainly we have never seen any.

Among landscapes in the usual acceptation of the word we are much interested in that as far as we can remember, is the first of the word we are much interested in that we have ever seen with the name of Mr. Allingham to it, and a most beautiful and delicate work it is—"Freshwater Bay from the Farringford Fields" (242). Mr. Allingham's two Highland landscapes (61, 178) are finely composed and built up as usual; we may have seen even better ones, but they are not his reputation. Mr. Eyre Walker's "Twilight on the Lowther" (26) is a grand landscape on a small scale; the finest perhaps of his eleven contributions, all of which, however, show the artist as a true student of nature and a follower of the best school of water-colour art, with no tricks of effect or handling. Compare "A Dorsetshire Upland" (170) with the drawing (108) hung below it, in which Nature only subserves a trick of mannerism, and the difference will be apparent. "Fallow Land in Surrey" (221), with the carpet of white flowers and the blue of the fox-glove bushes sticking up out of it, is an interesting record of a curious natural effect, though it does not make one of the best pictures. Mr. Cuthbert Rigby shows a fine foreground picture out of "Foxgloves near Ambleside" (292), and his "Cauldwell Beck" (238) is, like the one just mentioned of Mr. Walker's, a grand landscape on a small scale. Then we have Mr. A. Godwin's important series of contributions. "Ceylon's Isle" (12) is an attempt to render the tone of tropical sea and tropical landscape; a very bright and exotic-looking scene, in which the bright blue of the sea is broken

by innumerable touches of warm brown; the whole effect to the eye is that of a bright blue sea; it is only on minute inspection that one notices this treatment for rippling up the surface. "The Taj Mahal" (51), seen in silhouette with a red sunset sky behind it, is an effective landscape, though the Taj does not do much more than give a name to it. "Siena" (43) is one of the artist's delicate town pictures, with the distant architecture perhaps a little too clear and precise in detail; "Etna and Taormina" (49) is a fine landscape and at the same time a representation of one of the most interesting of archaeological relics; among others are "Stonehenge" (159), or rather, a red sunset with "the stones" (as they are called in the neighbourhood) introduced as an incident; "The Road to Monreale, Sicily" (188), a classic hillside road with Renaissance steps and balustrades to right of it; and "Bristol—When the Day's Work's Done" (137), a quay scene in which the surface of the quay becomes the same tone as the side of the ship; a little device for breadth of effect which is rather artificial (for the light is not gone sufficiently for that), but which may pass as producing the pictorial sentiment desired.

Mr. Robert Little's art is of the opposite kind—broad and full of a rich warmth of colour, with rather a neglect of detail, and sometimes of composition, as is the case certainly with "Watford from Hamper Mill" (17), which is very ragged; his best work here is the small landscape on Screen II., "Nets on the Solway" (232), which has the making of a larger work in it. Mr. Paterson is an artist who carries the culture of colour *maris* detail still further, and his landscapes and sea-pieces are often mere blots of effect; in the present exhibition he has two Edinburgh pictures, "Grassmarket" and "Greyfriars Churchyard" (63 and 81); his rather woolly style has been somewhat modified for the painting of buildings, and the Grassmarket house, with the dark-purple silhouette of Castle Hill behind them, make an effective picture, but we have always thought that an expanse of wet street and reflections is a very cheap and easy way of getting an effect. Yet it cannot be denied that Mr. Paterson's drawings, though somewhat eccentric in method, are usually interesting; it is difficult to understand why Sir E. Waterlow's landscapes, which have everything to recommend them in the way of composition, balance of style, and true water-colour treatment, yet mostly fail to interest us. The merits of composition and style belong just as much to Mr. Eyre Walker, Mr. Phillip, and Mr. Cuthbert Rigby—there is not the slightest touch of eccentricity or sensationalism about any of their work, but it is all interesting; and it is difficult to see exactly why such obviously good and sound work as Sir E. Waterlow's is nevertheless somewhat dull. Mr. Wilmot Pilsbury's works continue as good and complete in their own style as ever; it is a somewhat prosaic and somewhat mechanical style, and yet retains a hold upon one by the really conscientious work displayed in it, which is at all events different from the mere conventional spotting of Mr. Gregory's trees, which one sees in drawing after drawing, just the same every time, and just as uninteresting. Mr. R. W. Allan's is a much broader and more vigorous style, but this also tends to become a little too much of the repetition of one effect. Among other landscapes to be noticed are Miss Alice M. Swan's spring scene (162) having for title a well-known line of Browning's—this is a landscape of great originality and force of treatment, and with a real look of spring in it; Mr. H. Alexander's little picture, "Sea Vale Farm" (62), very simple but with a real charm of colour and composition; Mr. Smythe's "Gathering Dandelions" (11), a hill with one figure on it, somewhat reminding one of the style and feeling of Frederick Walker; Mrs. Allingham's "The Kitchen Garden, Farringdon ham" (an excellent bit of foreground study in "Sturland Bay" (92), by Mr. Arthur Hopkins; "The Happy Valley" (134), a landscape with a peculiar warm light over it, by Mr. Little; "Evening on the Arun" (150), by Mr. Tom Lloyd; "Evening on the Somme at Amiens" (95), by Mr. Herbert Marshall; "A Little Garden" (234), by Miss Constance Phillott, with a most successful

and charming effect of sunlight; Mr. Hughes's curious little experiment in the head on Screen I. called "Dusky Night" (272), in which he has endeavoured to produce the effect of actual confiscation of light from the stars around the head; and Mr. Walter West's drawing of a white horse on the cliffs, entitled "Moonrise Over the Sea" (18); the horse is very well drawn, but one does not quite see how the horse's head and neck come to show light against the moon.

Among the drawings in which architecture holds a prominent place (besides those already mentioned) the most important perhaps is the fine set of three drawings in one frame of "The Manor-house of Faulin" (259), one of the series of drawings of ancient architecture which Mr. T. M. Rooke is making for the Municipal Gallery at Birmingham. The building is a most interesting and picturesque piece of mediæval architecture, and the drawings as good as they well could be. Among Mr. Rooke's other exhibits is one of "Sculpture in the North Transsept, Semur" (70), a very good piece of detail. Among Mr. Herbert Marshall's thirteen contributions a particularly interesting one is "A City of Burgundy" (25), with its ancient bridge and a huge round tower forming a prominent object in the centre of the picture. "Laon" (42) is also a fine piece of architectural composition. Mr. Reginald Barratt has a fine drawing of "A Courtyard of the Alhambra" (72), and another of "Cranborne Manor" (89), an old Renaissance house in the foreground, beyond the angle of which is seen a bit of sunlit lawn and hedge. "Dedham Lock" (109), a bit of timber construction, is an interesting drawing out of the artist's usual beat. Mr. Cameron's "The Citadel" (225), which appears to be merely an imagination, is a finely composed and effective view of a mass of old fortifications built along a headland, and in this case the artist has fortunately discarded the too black and colourless tones which characterise many of his water-colour drawings, and led us to remark that they looked like an etcher's water-colours; in this drawing there is a fine warm colour pervading the composition. Miss Montalba's Venetian drawings are becoming too slight and careless of everything but her favourite effect of colour to be of much value as architectural subjects. We may conclude by calling attention to the very fine drawing of "Durham" (122), exhibited by a very old member, Mr. Callow, and noted in the catalogue as "Painted from Nature, 1843." The grave and severe scale of colouring belongs to the artistic habit of a past day, but the solid force and power of the work are undeniable, and we may congratulate the veteran artist on having such a fine record of his youthful work to show us.

#### EGYPT EXPLORATION FUND.

THE nineteenth ordinary general meeting of this Fund was held on Friday in last week at the rooms of the Royal Society, Burlington House, under the chairmanship of Sir John Evans, K.C.B.

Mr. H. A. Grueber read the treasurer's statement, which showed that on the Fund proper there was a large deficit, but the deficits on the archaeological survey and the Græco-Roman branch were not so serious. The position as regarded the Exploration Fund was serious if they considered that only two years ago it had a balance of over 3,000l. He accounted for last year's deficit by the fact of the Fund having undertaken two expeditions and by the falling off of subscriptions from America. As the deficit arose this year from precisely the same causes, it was very evident that in future the scope of the Fund's work would have to be brought within a more limited area.

The statement was adopted.

The Chairman, in the course of his annual address, first referred to the losses the Fund had sustained in the deaths of Mr. William Fowler, Sir Charles Wilson, Mr. F. D. Mocatta, Mr. G. Wedgwood, Dr. Cross, Mr. J. W. Anderson, and Mr. J. Morris. Their work during the past season, notwithstanding the low condition of their finances, had been carried on in two directions—first by Professor Petrie, principally in Sinai; and secondly by M. Naville and Mr. Hall, whose work at Deir el Bahari they







equipment. No one could enter the German Institute at Rome without feeling something like a sense of shame when he compared the provision made, not only by Great Britain, but by the United States. They had other difficulties. Whereas the German or French student went to the German Institute or the École de Français knowing that he had something like a career marked out before him, the British student knew that the time spent at the school led practically to nothing. They did want something more in the way of an organised career, and he hoped that, with an increased sense of that in the Universities and also by the increase in the number of Universities, they would be able to offer to students something more in the nature of an assured career. There was also ingrained in them a certain individualism, which had its merits, but which did not always lead them to value co-operative work. There, again, a change was coming, and they were beginning to see that a great deal of the most important work could only be done by co-operation. Still, they had got on, and he said, without exaggeration, that the published papers of the school had taken a high place and had been appreciated by foreign scholars. There was a great variety of work to be done, and he hoped no one would go away with the opinion that the School at Rome was either purely classical or purely archaeological or purely Oxford and Cambridge. Rome was a place where there was an infinite variety of lines of study which might be profitably followed, and they were in the school prepared to welcome every man wherever he came from who was anxious to pursue in a serious and scientific spirit a general line of study in Rome and Italy. There were fields still untouched. There was medieval history. He was anxious that the British School should produce under its auspices an account of the English in Rome. The materials were there, and if medieval historians would supply them with a man they would do their best for him. There was also an enormous amount of work to be done with architectural buildings—Renaissance buildings and others. They had made beginning there, and had had two architectural students, and around the room they would see the drawings which Mr. Orr made in the past season, and they would say that the drawings reflected great credit on Mr. Orr and the school.

Sir A. Geikie seconded the motion, and the Report was adopted.

Mr. H. Stuart Jones, late Director of the School, gave an account of some Roman historical sculpture in the light of recent studies. He illustrated his remarks by a series of lantern slides. He said that the study of Roman historical sculpture and the history of art in general in the Roman Empire, which had been long undeservedly neglected, had in the last ten years been in the foreground of archaeological discussion. So far, the harvest which had been reaped had fallen almost entirely to Continental, and mainly German, scholars. When the British school was established in Rome it was the legitimate expectation that British scholars would do something to increase the knowledge on this subject, and he thought it was fair to say that this anticipation had been justified. In the two years during which it had been his privilege to be Director of the school he paid much attention to the subject, and was ably seconded by other members of the school, and it was only fitting that he should mention Mr. A. J. B. Wace, some of whose work was about to be published, and Mr. A. H. S. Yeames, now of the British Museum. They were able to further the cause of scholarship in three ways. Firstly, by the eradication of certain deep-seated errors prevalent amongst archaeologists; secondly, by exhibiting more clearly than before the continuity and development of Roman art by filling up certain gaps in its history; and thirdly, by the deduction from the study of its monuments facts which were of value and importance to the historian. The results of some of their studies were about to be published in the third volume of the papers of the school, but he proposed to give a few of the results they had succeeded in obtaining, and he began at the earliest point. A great deal was already known as to the art of the Augustine Age and the art of the

Flavian Age, but they were now enabled to correct some errors and to fill up the gap between them. Augustus transformed the art which existed in the great Hellenic Period, and the characteristics of this art were found in the processional frieze with the series of portraits of the Imperial family of the Ara Pacis. They noticed the rigid classicism of this art, and it was quite obviously the natural successor of the Parthenon. If they passed on to Flavian art, they found the reliefs in the passageway of the Arch of Titus, which had been held to illustrate the great features of Flavian art. Coming next to the bas-reliefs in the Villa Borghese, they knew that these had been attributed to the arch erected by Claudius to commemorate the conquest of Britain; but their attribution to the Arch of Claudius rested on very doubtful testimony. The composition was very clumsy, and had such extraordinary mistakes that it seemed impossible that it could occupy a space midway between the Ara Pacis and the Arch of Titus. There was no longer any need to think that that was so, because their pedigree had been ascertained up to a certain point, and it was found that the reliefs had once been used in the decoration of a church in the neighbourhood of Forum. The reliefs could be traced as far back as the XVIIth century, so that they could have had nothing to do with the Arch of Claudius discovered in 1852. Proceeding to deal with the circular medallions of the Arch of Constantine, Mr. Jones said that recent attempts had been made to attribute them to the reign of Hadrian, but a close examination of the figures on the rough face showed that the Emperor was beardless, and therefore not Hadrian. The features, however, were so defaced that it was difficult to say who it was meant for. The medallions on the north face had undergone restoration in ancient days, and the original heads of the Emperor had been substituted by other heads. One was the head of Constantine, but in the other two medallions the heads were clearly not those of Constantine. That, he felt, could only have one meaning, viz., that the heads were those of Claudius II., from whom Constantine claimed to be descended. Illustrating the panels which decorated the Arch of Constantine, but which belonged to the period of Marcus Aurelius, Mr. Jones said he had shown by comparison that the heads were quite modern, and were probably put there by Pope Clement in 1731. Certain historical deductions could be made. The panels represented the return of Marcus Aurelius to Rome, and showed that in the course of the war on the Danube Marcus actually came back to Rome, which some historians had denied, and said that he did not come to Rome for eight years. There was no doubt but that distinct historical deductions could be made from a close study of these monuments, and he hoped the work would be continued.

Professor E. Gardner proposed the re-election of the President, of Mr. A. H. Smith as Treasurer, of Mr. E. Waterhouse as Auditor, of Mr. F. J. Haverfield and Mr. Geo. Macmillan on the Committee, and of Mr. Baker-Penoyre as Secretary, and the election of Sir E. Egerton and Mr. H. Stuart Jones to the Committee.

Mr. G. F. Hill seconded the motion, and it was agreed to.

Sir J. Evans proposed a vote of thanks to the Chairman, and this being carried the meeting terminated.

ROYAL SANITARY INSTITUTE.—The following is the list of those who were elected as Fellow, Members, and Associates in November of this year: *Fellow*—Major W. H. Horrocks, R.A.M.C. (M.D. (Gibraltar)). *Members*—R. Nusservangi Coorlawala, L.R.C.P., L.R.C.S. (Edin.); H. E. Corbin, M.R.C.S., L.R.C.P. (Willesden); G. C. Hancock, M.R.C.S., L.R.C.P. (Gravesend); H. L. Heath, L.S.A. (Tisbury); T. Selkield (City Engineer, Delhi); W. M. Willoughby, B.A., M.D. (Gravesend); J. M. Wilson, M.D. (York); K. W. Adecock (Bradford); W. J. Dunning (Colwyn Bay). *Associates*—T. J. Bernes (Woodford); H. Coleman (London); E. R. Cunliffe (Rochdale); J. Dempsey (Salford); T. Douglas (Percy Main); H. Evans (Cricklewood); W. Fowler (Leeds); J. P. Hargreaves (Milton); C. Lewis (Crewe); Miss M. A. Lloyd (Birmingham); E. Rees (Covbridge); F. G. Sendell (Walthamstow); J. T. Shawcross (Didsbury); F. R. Thorley, jun (Selly Park); P. Williams (Liverpool); H. Woodham (Southampton).

## THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The second meeting of the Discussion Section of the Architectural Association was held at 18, Tufton-street, on Wednesday, the 8th inst., Mr. E. W. Wonnacott in the chair, when Mr. Stanley Towse read a paper on "Libraries."

He said that a suitable site should be centrally, but not noisily, situated in the most populous district of the town.

It should be open, so that good lighting and cross ventilation are secured, and, where possible, of a rectangular shape, with main entrance on the long side. A corner site is of advantage in securing separate entrances for staff, and children, if the latter is desirable at all.

The accommodation required usually consists of news and reading rooms, reference, and children's rooms; lending library, with workroom and lavatory for the staff; a librarian's or committee room; book store and heating in basement; and caretaker's rooms on first floor. In the case of a larger library, accommodation for the librarian's household, consisting of some seven or eight rooms.

The next point is whether the lending library is to be on the "closed" or "open access" system. The former, with its long counter and indicator, is the one generally adopted in this country, probably owing to its greater cheapness, as less floor space is required. Probably, also, those responsible for the promotion of libraries have not yet realised the very great advantage the "open access" system gives to the public. An excellent example of a library on the latter system is the Kingston Library, by Mr. Alfred Cox. Also that at Kettering, by Messrs. Goddard, Paget, & Catlow. In this is an inclosed space, measuring about 10 ft. by 5 ft., for the attendants, surrounded by a counter, with a barrier outside each end, to be used as inlet and outlet. These are controlled by the attendants by means of foot pedals. In very large libraries two inlet barriers are advisable.

It is possible to deal with five or six borrowers a minute, so that the staff can be reduced to a minimum. Not only do the public have a better opportunity of choosing their books, but it is found that the loss of books is less than with the indicator or "closed" system. The arrangement in which all the bookcases radiate from the counter, as at Kettering, looks very attractive in a competition drawing, but is wasteful, and the complete supervision it is supposed to give may be easily spoilt by one or two people standing at the near end. The approximate difference in accommodation between the two systems is that a room, measuring 40 ft. by 30 ft., with shelving 7 ft. 6 in. high, will take 24,000 volumes on the indicator or "closed" principle, including the counter and borrowers' public space; whereas a room, 52 ft. by 35 ft., on the "open access" system, with shelving 8 ft. high (this is rather too high), will only accommodate 25,000 volumes, but, after all, very few libraries require space for more than 20,000 volumes, and only a few reach that number. Moreover, books are continually getting out of date, especially text-books; these are discarded, and so make room for others.

The key-note in library design is simplicity, both in planning and materials, and good supervision from the lending library, so that the staff may be reduced to a minimum. In a very large library the latter point is not so important, as there must be attendants in each room. The best way to obtain good supervision is to carry the upper internal walls on piers or columns, filled in with glass screens.

Varying levels in the floors, especially odd steps, should be avoided. The entrance-hall and corridor (if any) should be well lighted and ventilated. Lighting on both sides of indicators is absolutely necessary. The librarian's room should be off the lending library, and in touch with the reference library, and it need not necessarily command a view of all the rooms. The staff and workrooms, the latter being very necessary, should be off the lending library. Lavatory accommodation for the public is to be avoided, unless actually asked for; but where a lecture-hall is provided, it is advisable. Heating should be by radiators; fires require too much attention, and encourage loafing.

In arranging the various departments on



plan a good method is to place the lending library (when on the "closed" system) centrally, with its long counter directly opposite the main entrance. This can generally be easily done when you have a rectangular open site, with entrance on the long side; a good example is the admirable library at Hammersmith, by Mr. Henry T. Hare. In dealing with a deep site, arrange a wide corridor straight up the middle from the main entrance, with the lending library counter parallel to one side, and set well back from passage, the news and reading room on the other, and the reference at the end, as in Mr. Bakewell's design for Ilkley. For a corner site with entrance at the angle, the plan of Darlington Library is a good one. Here there is a vestibule off the porch, opening into a public space, with lending library in front, the counter running the whole length of room. The general reading-room and ladies' room are on the right, and reference and committee rooms on the left. The library consists of one floor only, and is almost wholly lighted from the top. A recent idea is to treat the whole area as a one-storied hall, dividing it into different departments by glazed screens, as at Plaistow Library, by Mr. S. B. Russell.

In fitting up a library it is best for the firm who supply the fittings also to supply and fix the glass screens, as it usually works out cheaper. The question of the wood to be used for fittings depends on the money available. Where possible, use oak, which looks very well when slightly stained and waxed. A good and cheaper wood is "Sequoia," which somewhat resembles mahogany, and is about half the cost of oak. The ends only of bookcases in libraries on the indicator or "closed" system need be of oak, if they are arranged so that the ends face the counter. The bookcases need not exceed 7 ft. 6 in. to 8 ft. in height, giving eight shelves and the plinth, nine in all. Allowing nine volumes per foot, gives 162 volumes to each foot of double-fronted bookcase, 1 ft. 8 in. wide. A space of 3 ft. to 3 ft. 6 in. should be given between each bookcase, but where the "open access" system is adopted the minimum should be 4 ft. The length of the lending counter, which should be 3 ft. high and 2 ft. wide, is governed by the length of the indicators required for record. Cotman's indicators, which are usually considered the best, are made in multiples of 1,000, each requiring 12 in. to 15 in. linear, provision being made for two or three openings, 3 ft. to 4 ft. wide, for issue and return of books. A small table for the assistant, commanding the counter, is necessary, besides the workroom; and a small lift to the store-room, if on a different floor, is very useful. If the reference library adjoin the lending library, a small counter between the two is an advantage. The windows to the lending library should be high up to give as much space for bookshelves as possible, and augmented by a lantern, if practicable. The top of this should not be glazed if sufficient light can be had without, as otherwise the sun may make the room very hot.

In fitting up the news and reading rooms, wall-stands should be used for newspapers rather than pedestals, as the latter stop all supervision. For wall-stands, allow 3 ft. 6 in. to 4 ft. linear per paper. At present it is a question whether newspapers should have any place at all in a library, as they tend to attract a certain class not wholly desirable. In one new library it is proposed to do away with all newspapers except the *Times*; but to provide for those seeking employment the advertisements of vacant situations will be cut out of the three best papers and posted up outside at seven in the morning. In the reading-room allow for tables, 3 ft. wide, with 5 ft. or more between, and allow 2 ft. for each person. The reference-room is sometimes provided with bookcases, which may even be carried to the ceiling, if extra shelving is required, without much inconvenience to the staff. The special tables, measuring about 3 ft. by 2 ft., with raised back and shelves, are better for reference-room use than the ordinary tables, and may be placed back to back. A showcase for recent books may be put in a convenient corner of the entrance-hall. Revolving doors may be used for entrances, but the danger arising from a fire panic is to be considered, and probably two sets of swing doors, with a heated vestibule between, are better.

Materials should be local where possible, and selected with an eye to future maintenance. Iron casements, if arranged for easy cleaning, are convenient. The hall and corridor may be paved with marble, tiles, or similar material. Neither wood block nor floor boarding are ideal floor coverings; they are apt to wear unevenly, and to harbour dirt. Granolithic, finished with a fine face, and cork carpeted, is said to be good; but in this case provide broad bases to the chairs. A glazed brick or tile dado, about 4 ft. 6 in. high, round all public rooms is desirable; the upper part being finished in paint or light distemper. Internal woodwork may be of varnished pitch-pine, or whitewood stained and varnished; paint is not wholly desirable.

The ventilation for large libraries may be on the "Plenum" system. In small libraries use air inlets behind radiators, and ceiling outlets connected to a roof ventilator.

Mr. S. K. Greenslade, in opening the discussion, said that sites, especially of central libraries, should allow of lecture halls, galleries, and other extensions being added. Librarians were still undecided as to the merits of "closed" or "open access," but no doubt the latter would eventually win. The objections urged were wastefulness and misuse. The first might be removed by adopting the American method of forming the end wall circular on plan and using the space below as a lecture-hall; the latter by the more extensive use of children's rooms, so that they are early trained in the proper use of books. These rooms only require simple furniture of varying heights, low bookcases, a space for attendants and books of the lending library, and a wash-basin for the children's use. American architects have had fine opportunities of planning on a large scale, and the keynote is usually the great octagonal or circular domed reading-room. Here, in spite of the famous example of the Radcliffe at Oxford, this has not been generally adopted; but the new library at Eton College, forming part of the Memorial buildings, is on these lines. The library at Bristol and the competition just decided for the Mitchell at Glasgow are the only recent examples of large scale planning. The latter offered an interesting problem—viz., the storage of 250,000 volumes within reach of the delivery counter of a library meant solely for reference purposes. Mr. Greenslade concluded by urging architects to consider more fully the architectural quality of planning as well as mere convenience.

The discussion was continued by Messrs. A. H. Belcher, Lovegrove, Hamp, Nicholson, and Collins. Mr. Cecil Davis, Librarian of Wandsworth, pointed out how planning and site are influenced and bound by the limits of the penny rate. He finds the news-room still useful, and that its defects can often be removed by tactful supervision. Lavatories for public use were condemned utterly. While pointing out the objections to librarian's residence on the premises, he personally preferred the system. Fire risk, lighting, ventilation, and heating—low pressure preferable for latter—were mentioned. He supported the general adoption of linoleum as a floor surface, and preferred iron bookcases to wood. Open access was not favoured for fiction issue, and in any case needed as much supervision as the indicator system.

The discussion was summed up by Mr. H. T. Hare, who emphasised the point that bad sites being the rule, and not the exception, cramped planning was becoming general. Except for reference purposes, one large hall subdivided formed the best library. Open access, if merely considered as tending to spaciousness, was the better system. The lending library usually had to hold too many books; 10,000 to 12,000 were quite enough, if storage was arranged. He considered that the news-room would soon be obsolete. The best floor as yet was linoleum on granolithic. He agreed with every speaker in condemning sanitary provision for the public, and equally disliked the provision of a librarian's house as part of the library. Lending libraries might very well be put upstairs, beside the reference, thus bringing all the library staff together. A porter would then take charge of all the public ground floor rooms. As to price, 8d. per foot was the minimum, 9d. and 10d. being more usual for detached libraries.

Mr. Towse shortly replied. After votes

of thanks had been passed to the architect, and to Mr. Hare for his attendance, the meeting terminated.

## SEVENTH INTERNATIONAL CONGRESS OF ARCHITECTS.

The seventh International Congress of Architects is to be held in London from July 16 to July 21 of next year, under the auspices of the Royal Institute of British Architects; their President, Mr. John Belcher, being the acting President also of the Congress, the Prince of Wales being Honorary President.

It is to be hoped that a large number of English architects, both in London and the Provinces, will become members of the Congress and take an active part in endeavouring to render it a success in the eyes of our foreign visitors.

The complete programme, and the question of the place or places of meeting and of the visits and entertainments which will form part of the proceedings, is still in preparation, and details will no doubt be furnished for publication in our pages later on. In the meantime, however, the Executive Committee have drawn up the following list of subjects for discussion:—

1. The Execution of Important Government and Municipal Architectural Work by Salaried Officials.
  2. Architectural Copyright and the Ownership of Drawings.
  3. Steel and Reinforced-Concrete Construction: (a) The general aspect of the subject; (b) With special reference to aesthetic and hygienic considerations in the case of very high buildings.
  4. The Education of the Public in Architecture.
  5. A Statutory Qualification for Architects.
  6. The Architect-Craftsman: How far should the Architect receive the theoretical and practical training of a Craftsman?
  7. The Planning and Laying-out of Streets and Open Spaces in Cities.
  8. Should the Architect have supreme control over other Artists or Craftsmen in the completion of a National or Public Building?
  9. The Responsibilities of a Government in the Conservation of National Monuments.
- The Executive Committee will be glad to receive papers on any of the above subjects for presentation to the Congress. Papers may be written in English, French, or German.
- Each paper must be accompanied by an abstract of not more than 1,000 words.*
- Papers and abstracts must reach the Executive Committee before April 30, 1906.*
- All communications to be addressed to the Secretary of the Executive Committee, 9, Conduit-street, London, W.

## THE SURVEYORS' INSTITUTION.

The opening meeting of the Surveyors' Institution for session 1905-06 was held on Monday at No. 12, Great George-street, S.W., Mr. Charles Bidwell, M.A., President, in the chair.

The minutes of last meeting having been read by the Secretary, Mr. Goddard, and confirmed,

Mr. Percivall Curry, Hon. Secretary, announced that a long list of donations to the Library and the Library Fund had been received, and these having been taken as read, a vote of thanks was accorded to the donors.

### New Hon. Members.

The President then announced that, at a meeting of the Council that afternoon, the following gentlemen had been unanimously elected as Hon. Members of the Institution, i.e.,—Judge Wheeler, K.C., Judge Hare, Hamilton, and Mr. Julian C. Rogers, the late secretary, who had served the Institution so faithfully for so many years.

### The Council's Gold Medal.

He also stated that the Council's gold medal for the best paper read during last session had been awarded to Mr. E. Norton, barrister-at-law, for his paper entitled "Surveyors' Reports and Certificates."

### President's Address.

The President then read his address, in the course of which he dealt at some length



with several matters affecting agriculture. In reference to the fall in the value of land, he said that in thirty years, after making every allowance for the absorption of land in the neighbourhood of large towns for building purposes, the depreciation in the capital value of lands assessed to Schedule A of the income-tax had approximated very closely to the total of our national indebtedness. What that meant to the large class of owners, whose estates were burdened with settlements or mortgages imposed in better times, he needed no words of his to describe. There were, no doubt, many minor causes which help to account for this great decrease in the value of landed estate, but the chief factor was, undoubtedly, the reduced value of agricultural produce. It might be a half statement to commit oneself to, but he was of opinion that we have touched bottom, and that landowners and farmers, having been through the fire of adversity, are rapidly adapting themselves to the changed condition of affairs.

#### Imperial and Local Taxation.

Another very serious question affecting materially the value of landed estates was the increase in the burden of imperial and local taxation upon all kinds of property. As to local burdens, he said that the present system of valuation and assessment under the Rating Act of 1874 was most unequal and unsatisfactory, and he trusted the time was not far distant when a well-thought-out Government measure, on the lines of the majority report of the Royal Commission on Local Taxation, would be introduced, dealing with the whole question of the rating of real estate for both imperial and local taxation. The rates and taxes on properties had gone up by leaps and bounds in the last twenty years. We have now, in addition to the poor rates, the County Council rates (embracing roads, bridges, lunacy, &c.), education rates, and other local burdens, such as water supply, sanitation, &c.

#### Main Roads and Motorists.

Mr. John Hibbert, in an address to the County Council's Association in May last, gave the following figures showing the increased cost of the maintenance of main roads:—

	1894.	1904.
Bedfordshire .....	£ 40,000	£ 84,000
Buckinghamshire .....	47,000	93,000
Gloucestershire .....	18,000	38,000
Wiltshire .....	62,000	66,000
Devonshire .....	11,000	61,000
Gloucestershire .....	136,000	147,000
Wiltshire .....	49,000	54,000
Devonshire .....	9,000	14,000
Wiltshire .....	23,000	56,000
West Riding, Yorkshire .....	146,000	168,000

the speaker thought it would be stated on all hands that the main roads of the country were vastly improved, and are now maintained with some degree of efficiency in the several counties, but rather those who pay the immensely increased cost of this improvement reap a proportionate benefit from it was open to question. He suggested that a system should be initiated whereby the owners of motor-cars and motor bicycles should be made to contribute some quota towards the cost of maintaining main roads and bridges. The country towns and villages suffer, not inconspicuously, from the dust and small created by these machines, and the general public who use the highways were subject to considerable risk from the frequent reckless driving of motorists. These annoyances must be apprehended, he urged patiently, but meanwhile, it was somewhat unfair that motorists should have the use of the roads practically free of charge, particularly as the great increase in the cost of their upkeep was largely due to the demand which had arisen for a condition of surface far superior to many cases to the needs of the district in which the increased expenditure must fall. In his view, motorists might fairly be asked to contribute by means of licences to an extent which would provide the means of paying the cost of upkeep beyond that necessary for the normal traffic of the district; the sum to be levied to be handed over to the local authorities in the same manner as other government contributions.

#### Education.

The President also dealt with the subject of education, and in speaking of the advantages which he trusted would accrue to many young men joining their ranks from the scholarships which the Council had decided to offer to students at the Universities of Cambridge, Durham, and Wales, he said that, as a member of Cambridge University, it was his pleasing duty to inform them that the Vice-Chancellor, on behalf of the University authorities, had desired him to say how pleased they were that the scholarships would bring the University in touch with the Institution. The object that the Council had in view was to give a future surveyor the opportunity of studying at a University technical subjects which would be useful to him in following his profession. A year of his articles as a pupil might run concurrently with the last year of his University course, so that he would not be losing time in preparing for his future career, and surely the cultivation and development of the mind, which should be the result of three years well spent at the University, should enable the graduate to hold his own, if not to outstrip and pass his colleague, whose time had been given only to the acquisition of a purely technical knowledge of his profession.

#### Expenditure of Local Authorities.

As to the burdens upon real property, the following figures went to show the large and steady increase which had taken place in the expenditure of local authorities in England and Wales during the last thirty years:—

	Average Amount of Rates raised per Head of Population.	Average Amount of Loans outstanding per Head of Population.
1874-1875 ..	£ s. d. 0 16 2	£ s. d. 3 18 3
1879-1880 ..	0 17 6	5 7 11
1884-1885 ..	0 19 1	6 8 8
1889-1890 ..	0 19 6	6 19 8
1894-1895 ..	1 2 6	7 16 4
1899-1900 ..	1 5 7	9 4 4
1902-1903 ..	1 10 6	11 4 8

Average Rates raised per £ of Valuation.			
	s.	d.	
1874-1875 . . . .	3	8	} per £ of Ratable Value.
1879-1880 . . . .	3	9 3	
1884-1885 . . . .	3	8 8	
1889-1900 . . . .	3	8 2	
1894-1895 . . . .	4	2 4	
1899-1900 . . . .	4	11 8	} per £ of Assessable Value, Agricultural Land assessed at one-half.
1902-1903 . . . .	5	7 4	
Total Amount of Rates raised.			
			£
1874-1875 . . . .	10,198,570	1894-1895 . . . .	33,855,283
1879-1880 . . . .	22,160,099	1899-1900 . . . .	40,734,219
1884-1885 . . . .	23,696,552	1902-1903 . . . .	50,328,412
1889-1890 . . . .	27,713,409		

These figures did not represent the total receipts, e.g., in 1902-03 there were twelve and three-quarter millions obtained from local taxation duties and Government grants; thirty millions obtained from market tolls, gas and water undertakings, &c.; and thirty-five millions borrowed for water works, tramways, and other municipal undertakings. It was somewhat startling to find that the total rates, taking no account of the subventions, had risen nearly 200 per cent. in the past thirty years, and this brought home to them the importance of impressing their representatives on local councils with the necessity for the exercise of true economy in their expenditure.

#### Depopulation of Rural Districts.

A subject which at the present was causing considerable anxiety in the country, and upon which a great deal of discussion had taken place, was the depopulation of the rural districts and the influx of labourers and their families into the towns. This was a matter which seriously affected the future of the landed interest and the nation at large. That there was at present a serious lack of employment in urban districts was patent to all, and this might be calculated to have its effect in checking the exodus from the country of the more thoughtful-minded of the rural labourers. In 1899 the Board of Trade labour returns showed an average of 2.4 per cent. unemployed for the year. In 1894 the percentage was 6.5 per cent.; the present year, starting with about 7.6 per cent., was reduced in the summer

months to 5.25 per cent., but this want of employment was almost sure to be intensified as the winter approaches, unless the stoppage of the recent war gave a very pronounced impetus to trade. At any rate, the building trade, which perhaps most seriously affected the ranks of the unemployed, was, he understood, in a very depressed condition, largely owing to the most prosperous centres of population being over-built during the good times.

#### The Unemployed.

The distress of last winter, and the shortness of work since, led to the Unemployed Workman's Act being passed last session. As originally introduced, it contained the new and socialistic proposal that the unemployed had the right to look to the ratepayer for work. This principle of the Bill was amended, but even now the thin end of the wedge was introduced, he understood, by allowing local authorities to acquire, out of the rates, land for the formation of labour colonies. The difficulty in dealing with the problem of the "unemployed," and the remedies to be adopted was one, the seriousness of which it was impossible to over-estimate, and he rejoiced to see that the matter had been referred to a strong Royal Commission, whose inquiry would be pushed forward with all speed, and whose report would be waited with anxiety. If we were to retain the young intelligent labourer on the land we must provide him with a decent cottage, a fair-sized plot of ground (say, not less than twenty poles), and the fruit trees with which to plant it. But the impossibility of building decent cottages without an annual loss to the landowner was within the experience of every member of that Institution. If the money be borrowed of any of the improvement companies, it could not be obtained at less than 4½ per cent., including repayment of principal spread over forty years, and in addition there were the fees of the Board of Agriculture for passing and certifying the outlay.

#### Cheap Cottages Exhibition.

What the country needed, and what, in his inspecting the Cheap Cottage Exhibition at the Garden City, Letchworth, and the exhibition had no doubt accomplished some important results. It had called the attention of the public to the better housing of the labourer; it had proved that for an outlay of 150l., under certain conditions, a cottage suitable for a labourer and his family could be built by a landowner. It had shown that restrictive by-laws must seriously impede the building of rural homes; and it had given examples of cottages built with various patent materials, and had introduced to their notice numerous modern and patent fittings. Many of the cottages were, however, in his opinion, quite unfitted for the homes of agricultural labourers, and he ventured to suggest that the life of some of these cheap cottages would not bear comparison with a pair of good substantial cottages in brick and slate, or brick and tile, costing from 350l. to 400l. the pair, including out-buildings. At the same time he recognised that the exhibition had done great good, and that there was much to be learnt from it.

What the country needed, and what, in his judgment, would be better in the interests of the nation, was not so much a cheap class of cottage as cheap money with which to erect decent cottages. The Small Holdings Departmental Committee, of which he had the honour to be a member, had had some very striking evidence before them on the matter of labourers' cottages, and this question would no doubt be dealt with in their report. Ireland, as was so often the case under recent legislation, was in a better position than the rest of Great Britain with regard to the provision of public money for the erection of labourers' cottages, for sect. 17 of the Labourers Act, 1883, empowers rural district councils to borrow money for the purposes of the Labourers Acts on the credit of the rates, and sect. 18 of the same Act enables the Board of Works, Ireland, to issue, with the sanction of the Treasury, the required loans. The period for repayment of the loans issued by the Board of Works and the rates of interest charged were fixed by Treasury minute, and had varied at different times since the passing of the first Labourers Act (1883).



*Cottages Built in Ireland.*

The following is the number of cottages built or being built in Ireland with public money up to March 31, 1905:—

Province.	Valuation of Rural Districts.	No. of Labourers' Cottages.		Amount of Loan.	
		Built.	In course of construction.	Sanctioned.	Received.
	£			£ s. d.	£ s. d.
Ulster .....	3,406,022	1,247	423	331,401 17 1	240,270 10 0
Munster .....	2,964,000	10,021	720	1,536,556 0 1	1,410,628 18 3
Leinster .....	3,485,358	7,594	391	1,290,196 4 6	1,139,612 8 1
Connaught .....	1,373,911	299	108	56,918 0 3	50,447 2 10

Under the Irish Land Act, 1903, imperial funds had been made available for the purchase of their holdings by private persons on still more favourable terms, so that the Irish occupier might now become owner of his farm on payment of 3½ per cent. of its capital value for sixty-eight years.

Possibly such advantageous terms could not properly be expected on the security of a more perishable form of property, such as labourers' cottages, but, in view of the immense importance to the nation that the country population should be suitably housed, and not forced to migrate to centres already overcrowded, he would strongly urge legislation empowering English and Scotch landowners to borrow Government money for the erection of cottages on terms somewhat approximating those already granted to the Irish tenant under the 1903 Act.

*Rural By-laws.*

A kindred question was that of rural by-laws, which had recently been before the Institution and the general public. He did not propose to re-open the controversy, especially as the question had been dealt with under the Public Health Acts (Amendment) Bill of last session by a Select Committee of the House of Lords, whose report was published in the form of a short amended Bill of five clauses, the principal clause (2) of which was to exempt buildings sufficiently isolated from the operation of existing and future building by-laws. He could only state from his own experience, that the rural by-laws at present in force were in many cases too arbitrary, and quite impracticable for dealing with building in country districts. We want a simple code of rural by-laws which should be fairly elastic and not oppressive, and he should prefer to see any disputes, which may arise under them in rural districts, referred to the Board of Agriculture and Fisheries, rather than to the Local Government Board.

*Water Supply of Small Country Towns.*

There was another subject which was of paramount importance to the country districts—that was, the water supply of small country towns and villages, which, in many places, had become an urgent question. In his judgment it was a matter of national importance, and one which must be dealt with without much delay, and he trusted the time was not far distant when they should see, either a Central Water Board in London, or the country divided up into large areas, each with a representative Water Board empowered to deal with all questions affecting the water supply of its own district, e.g., the storage of water, the pollution of the rivers and streams, and the abstraction of water from a particular district by large cities situated at a considerable distance from the source of supply. Our present system, or rather, want of system, engendered waste, friction, and public loss and inconvenience.

*London Building Acts Amendment Act.*

The President then touched on the question of the food supply of the country, after which he referred to the London Building Acts (Amendment) Act, 1905. The Council opposed, in the Commons, the many drastic and undesirable provisions contained in the Bill as introduced, making it clear, however, that their opposition was disinterested, and actuated only by the desire to secure legislation which might prove of real value to the Metropolis. In both Lords and Commons considerable weight was evidently attached to the suggestions put forward by

the Institution, and, while many improvements of lesser importance were effected, it was satisfactory to be able to report that, as it now stands, all requirements under the

done was to place the administration of the Factory Acts in the hands of the local authority. Dr. Roberts, Medical Officer of Birmingham, declared that if ventilation were improved cases of phthisis would decrease considerably. Under the present circumstances he thought that often an open window did more harm than a shut one. The Chairman, in concluding the discussion, referred to the emphasis laid upon the need of ventilation, which ought to be as distinct from lighting. He also suggested impervious floors for factories.

*Rural Housing.*

On Tuesday evening this week a discussion took place at the Institute premises, Parkers Museum, Margaret-street, W., on the subject of "Rural Housing." Colonel J. Lane Nottter presiding.

Dr. John F. J. Sykes, M.D., D.Sc., said he had been asked, in conjunction with Mr. T. W. Aldwinckle, to visit the Exhibition of Cheap Cottages at the Garden City, Leetchworth, and to write a paper introducing a discussion upon "Rural Housing." Mr. Aldwinckle had undertaken to deal with the matters of greatest interest to the architect and the builder, and he (the speaker) proposed to deal with the subject from the medical and sociological point of view. The increase of population at the last three census periods was found to be 14.11, and 12 per cent., respectively. Yet, during the last thirty years, it had been estimated that the rural districts had lost one quarter of their population, while the towns have more than correspondingly gained.

As to the question of the return to the land, it was not necessary to make the city less attractive, but rather to make the country equally attractive. The first great attraction must be the possibility of earning a living wage.

In considering the erection of a modern rural cottage, the first and most important question to settle was—how much land will the cottage require? The answer to this question would depend upon whether there was (1) a water-supply system, (2) a sewerage system, and (3) a scavenging system. If the first did not exist the other two would not. If the first did exist, the second will sooner or later follow, because it was known that when the water main was substituted for the well, the quantity of water used was enormously increased. If the first and second exist, the water carriage of excreta would also exist, and if all solid refuse be burnt, there would only be the ashes to dispose of, whether a scavenging system exist or none. Assuming that neither of these systems are available, it would be necessary to provide each cottage with about a quarter of an acre of land. This would almost preclude the construction of cottages in terraces, because, assuming the frontage of a cottage plot to be 25 ft. in width, the plot would require to be 435 ft. long, a proportion of almost 18 to 1. Therefore, cottages to be erected under such conditions must be either detached or semi-detached, or in a group not exceeding three or four, and have about them, respectively, a quarter, a half, three-quarters, or a whole acre of land, to properly dispose of their liquid and solid refuse. In addition to this a well must be sunk, the rain water must be stored, an earth-closet must be used, to which the tenant must regularly attend, as well as to the disposal of the solid refuse. The amount of land required where all refuse had to be disposed of on the premises by the tenant himself, could not safely be reduced below the fifth of an acre. If all the refuse could be removed, then, instead of four or five cottages to the acre, the number could be increased to eight or ten, and still remain a garden village.

There were two ways of approaching the subject of necessary accommodation. The wrong way was to erect a structure and then fit human beings into it; the right and humane way was, firstly, to ascertain the requirements of human beings, and then to provide for them accordingly in the structure about to be erected. The most necessary requirements to be provided for in the human dwelling were: sitting, sleeping, food storage, cooking, warming, allation, clothes drying, clothes drying, fuel storage, deposit of refuse and excretion. The clothes would be dried in the garden of the cottage. The sanitation

Act are subject to appeal to the Tribunal of Appeal, whether they apply to new or existing buildings. The Institution was much indebted to a small Committee of the Council, experts in this particular work, for the trouble and time they gave to drawing up objections and proposing amendments to the complicated clauses of the Bill. The heavy expenditure to which the Institution had been put in opposing the measure in its original crude and impracticable form had been abundantly justified, not only by the simplification of the work of the surveyor in dealing with the Act as it now stands, but still more so by the advantages which had been secured to the public in retaining for them an appeal from requirements which might, in some cases, have proved both drastic and uncalled for.

In conclusion, the President congratulated the members upon the present successful position of the Institution.

On the motion of Mr. G. Langridge, seconded by Mr. Howard Martin, and supported by Mr. Morton, a hearty vote of thanks was accorded to the President for his address, and the President briefly replied.

The meeting then terminated. The next meeting will be held on the 27th inst., when a discussion will take place on the paper read in May on the "Licensing Act of 1904."

#### THE ROYAL SANITARY INSTITUTE: SANITARY CONDITIONS IN FACTORIES.

A PROVINCIAL session of the Royal Sanitary Institute was held in the Town Hall, Northampton, recently, when Colonel J. Lane Nottter, chairman of the council, presided. Mr. Charles Travier Wright, H.M. Inspector of Factories, dealt with the "Health of the Workers Employed in the Boot and Shoe Industry," and Dr. Beattie, Medical Officer of Health for Northampton, gave a paper on "The Mortality Statistics of the Boot and Shoe Workers in Northampton." A discussion followed, initiated by Mr. W. Beale, chairman of the Northampton Boot and Shoe Manufacturers Association. Dealing with the temperature of clothing rooms, he pointed out that it was always more necessary to keep that department warmer than others, because the task of the workers was less laborious. In improving the conditions of health, workmen could play their part; the gradual disappearance of the habit of having lunch in factories—which had in the past meant dirty rooms—was a good sign. Mr. John Hill said that more fresh air was needed in the factories; he had never been in a factory where there had been anything like a complete system of ventilation. Possibly much of it was due to the working men themselves; there was a great divergence of opinion as to whether a draught was worse than a vitiated atmosphere. Dr. C. K. Millard, Medical Officer of Health for Leicester, gave a number of statistics relating to the experience of that borough. There was a much too great indifference to the vital importance of fresh air. At Leicester part of the isolation hospital was devoted to consumptive patients; he did not see why an authority should ignore consumption and pay such attention to the more trivial disease of scarlet fever. Alderman Poulton declared that in no factory was ventilation adequate, and the time was ripe for legislation empowering authorities to see that greater attention was devoted to the question. Mr. Frank White, Sanitary Inspector, Northampton, considered that the first thing to be



circumstances would be approached from the  
open or from an open lobby. The portable  
receptacle and the fuel store would  
be situated also in an open lobby, or in a  
properly-protected space adjoining the cot-  
tage. Within the cottage proper would be  
the wash-house and scullery, the food store,  
the kitchen, and the sitting and sleeping-  
rooms. Here we came to the debatable ques-  
tion of the number of habitable rooms to be  
provided in a cottage. Amongst other objects  
of housing the working classes in the country  
was to compare with the town was that of pro-  
viding them with more dwelling room; there-  
fore, the restricted accommodation of the  
densely-packed town must not be taken as a  
standard for the country. Further, the  
cottage must be constructed to house a  
family, and not a single man and woman,  
or part of a family, or the smallest family,  
but rather the average sized, and even a large  
family. It would be said that if a cottage  
was constructed to house an average  
family, when occupied by a small family  
the inevitable lodger would be taken in.  
But when the family increased in size the  
lodger might easily find accommodation else-  
where, whereas the family would have much  
greater difficulty in moving, and if all cot-  
tages were constructed of the smaller size the  
difficulty would become an impossibility. It  
must be pictured that the family would  
consist of three or four, the boys, and the married  
wife, and this meant the use of three rooms  
— sleeping-rooms; if, therefore, there be only  
two bedrooms, the kitchen would inevitably  
be used as a sleeping-room, whereas, if there  
were three bedrooms and the family be small,  
two of the bedrooms might be used as a  
bathroom. In any case, we might take as a  
standard that there should be in the cottage  
at least three habitable rooms—a kitchen,  
two bedrooms, and preferably four habitable  
rooms.

The materials available for construction were  
various. The choice of materials had to be  
only to suit the locality and to satisfy  
demands of health, but also to have  
regard to cost, and cost was of two  
kinds—immediate and deferred. If to the  
initial cost of material, putting together,  
erecting, and finishing, the after cost of  
maintenance and repair had to be added, it  
could not be found that the apparently  
cheapest material was, in the end, the most  
economical. Therefore, durability made for  
relative cheapness. There was the further  
object that early dilapidation and decay  
might bring certain sections of the Public  
Health and Housing Acts upon the scene.  
The locality must act upon its own judg-  
ment in the construction of a cottage must be  
based upon the materials available on the  
spot, obtainable from the shortest distance,  
and thus regard to health and well-being.

If a cottage was situated in a hollow it  
might be more desirable to place the bed-  
rooms in an upper story to obtain more air-  
ing, and to avoid rising mists, but if  
situated on a hill one story would present  
less surface to the cold blasts of winter.  
The upper story would keep the rooms below  
at a more equable temperature, and in these  
the two-thirds of the twenty-four hours  
when spent divested of heavy out-door cloth-  
ing, and unstimulated by out-door exercise;  
on the other hand, when the rooms were all  
on one ground-floor level some of the outer  
walls of the living-rooms were kept warmer  
than the rooms being placed at the side instead  
of the end. The same effect of equability  
of temperature of some of the outer walls  
was obtained by party walls in semi-detached  
cottage, and groups of three or four cottages  
constructed in two stories.

In an isolated building the minimum of  
wall with the maximum of inclosed  
space was obtained by the circular form, but  
there were obvious objections; the  
minimum was the polygonal form,  
which was equally objectionable. And the next  
best was the square form, which possessed many  
advantages over other possible forms.  
But there was less outer wall in a semi-  
detached than in a wholly detached cottage, and  
less still in a terraced cottage than in a  
detached one. Greater protection from  
extreme temperatures was afforded to the  
rooms when the roof space of a  
cottage was entirely inclosed  
than when it was only partly so.  
In fact, or there was no ceiling at all. In

fact, the simplest and most effectual method  
of obtaining equability of temperature was to  
inclose a layer or body of still air, which was  
the best and cheapest non-conductor. In this  
manner an upper story made the tempera-  
ture of a lower story more equable.

The situation of the fireplaces was another  
factor that influenced the temperature obtain-  
able. In a detached cottage, if they were  
situated against the outer walls, a large part  
of the heat was dissipated and lost to the  
interior, whereas, if situated against inner  
walls, or centrally, more of the heat was  
retained in the building. This did not apply  
in the same manner to semi-detached or  
terraced cottages if the fireplaces were  
situated against party walls. It should be  
taken as a rule that every habitable room  
should have a window and a fireplace and  
flue for proper lighting and ventilation. In  
a bedroom a fireplace was indispensable for  
heating in case of sickness or nursing, and it  
should be regarded as an exception to permit  
a bedroom to be constructed without a fire-  
place, and then only when more than two  
bedrooms were provided. Of course, in the  
kitchen the fireplace was intended mainly for  
cooking, and should be provided with a  
proper range.

As to the position of the fireplace, window,  
and door in relation to each other in a room, if  
they were all situated on one side of a room  
the ventilation, and especially the through  
ventilation or perfilation, would certainly  
suffer, and the heating or the lighting would  
suffer, and possibly both. This unusual  
arrangement was simply described by way of  
illustrating the importance of relative posi-  
tions. The ideal condition was that the fire-  
place, window, and door should each be  
separately situated in one of the four walls.  
The more centrally in the wall the window  
was situated the better would be the distri-  
bution of light, and the more directly the  
fireplace faced the centre point of the room  
the better the heat would be distributed.  
This admitted of a fireplace in one of the  
angles, but the further the fireplace was away  
from the window and door the better the  
distribution of ventilation. The same applied  
to the door when situated near an angle of  
the room, and especially in relation to the  
window, as it was through door and window  
that perfilation took place.

It should be fully realised that ventilation  
of an inhabited room was not sufficient to  
make it healthy; it also required to be per-  
fated or through ventilated daily, in order  
forcibly to blow away the organic emanations  
that cling so persistently to surfaces  
and give the characteristic odour of humanity  
to rooms continuously inhabited.

In regard to the vertical situation of the  
window of a room, it was an axiom that the  
top of the window should reach as near as  
possible to the ceiling, so as to throw the  
light as far as possible into the room, and to  
ventilate to as high a point as possible. The  
latter possibility was dependent upon whether  
we ventilate by the lower, middle, or upper  
part of the window, and whether the window  
opening would be an inlet or an outlet.  
Window openings were nearly always inlets,  
particularly if there be a fireplace in the  
room. The objection to low windows was  
not so much on the ground of ventilation, as  
this could be otherwise provided for, but that  
they render a room dark and gloomy, and  
even lateral extension did not relieve the  
mental depression. They were more suited  
to semi-tropical climates, where sunshine and  
brilliant daylight were less welcome visitors  
than here. The height and width of the  
window were dependent upon whether the  
sash or guillotine window or the casement  
window be adopted. If the casement window  
be adopted, a louvred window above would  
overcome some of the objections to the casement.  
In an upper story the window might  
be situated at three different heights in re-  
lation to the room, that was, of three kinds:  
a wall window, a dormer window, and a sky-  
light window. The skylight window was  
obviously in the least desirable form. With  
regard to the wall window, in a room half  
in the roof, with overhanging eaves, it was  
very gloomy and depressing, apart from the  
question of ventilation, and it was only  
possible to remedy this by adding a dormer  
window, and this would be generally said  
of construction. It might be generally said  
that, where windows would serve for admit-  
ting the outer air without draught, other

kinds of wall inlet ventilators were an un-  
necessary expense.

There was something also to be said about  
the third most prominent feature of a room—  
the prosaic door. Although the door should  
be so situated as to assist through ventila-  
tion, it was not desirable to multiply the  
number of doors to a room to the extent of  
rendering it almost uninhabitable, not only  
by reason of the numerous draughts created,  
but also by leaving so little room for furni-  
ture. In a large, active family in a moderate-  
sized room, with a window, fireplace, and  
three or four doors, it must be a puzzle to  
find a draughtless, warm, and undisturbed  
sitting-place in winter time. Again, in a  
small lobby or passage, the too close  
proximity of two or more doors awkwardly  
hung was very likely painfully to impress a  
person in more senses than one. From per-  
sonal experience in one case, it was necessary  
to pass through a lobby into a room, and  
then back again and shut the outer door  
before being able to go upstairs.

And yet, again, an outer door that gave  
entrance directly into the kitchen and living-  
room was likely to admit such a winter's  
blast as to make the occupants shudder. An  
external porch or internal lobby to temper  
the wind was almost a necessity.

The height and the area of rooms were,  
within limits, debatable points. The object  
of increasing the height was to obtain more  
cubic capacity or air space and better ven-  
tilation, the object of diminishing the height  
was to save expense, and the practical course  
must be a compromise, somewhere between  
7 ft. and 9 ft., say 8 ft. or thereabout, with  
a modification for the upper story over parts  
of the area to allow of the inclination of  
the roof. A good human working standard  
to take was that the ceiling should be at  
such a height that a tall man standing on  
the floor could not touch it with upstretched  
hand. The area of the kitchen and living  
room must be large enough to accommodate  
the whole family at the same time, at least  
150 sq. ft., better still 200, and best of all  
250; in case this might be thought excessive,  
they should remember that such inclosed  
areas, 8 ft. in height, would only provide  
sufficient cubic space for three, four, and  
five persons, respectively, at 400 cubic ft.  
per head, and even if diminished to  
300 cubic ft. per head, for four, five, and  
six persons, omitting furniture.

The model by-laws for houses let in lodg-  
ings or tenements required a minimum of  
300 cubic ft. per head in a room exclusively  
used for sleeping, and, if not used exclu-  
sively as a sleeping apartment, 400 ft. Some  
authorities had wisely adopted a single  
standard of 400 cubic ft. in all circumstances  
for dwelling purposes. The sufficiency of  
cubic space was dependent upon the means  
and the use of the means of ventilation, and  
the greater the cubic space the more readily  
the means of ventilation would be put into  
use. At the census and in housing schemes  
a standard of two persons per room was  
adopted. As the person constructing a cot-  
tage cannot guarantee that an intended bed-  
room shall never be used by a tenant for  
any other purpose he must estimate at  
400 cubic ft. per head and two persons per  
room at the least; that was to say, he must  
provide at least 800 cubic ft. of space, this  
with 8 ft. in height would require 100 sq. ft.  
of floor space or thereabout. Increase of  
size, of course, meant increase of expense,  
and here, again, we must compromise. As  
a good working standard, the desirable area  
for a bedroom might be taken to be 100 sq. ft.  
or thereabout, and for a living room double  
this area. If only the occupants would learn  
and practise the virtues of the fresh-air  
treatment and additional bed clothing there  
would be little fault to find with the size  
of such bedrooms. Any considerable lower-  
ing of the minimum suggested for original  
construction, as, for instance, providing  
cubic space sufficient only for one person,  
would permanently hamper ventilation, leave  
no margin, and ultimately lead to over-  
crowding. A bed-recess in a sleeping-room  
was an unhealthy inclosed space in which to  
spend eight hours of slumber, unless possess-  
ing a window opening on the external air.  
On other grounds, in a family dwelling bed-  
recesses were undesirable. For similar  
reasons it was undesirable that one  
bedroom should be approached through  
another. Cutting off a slice of a bedroom to



form a passage-way to one or more bedrooms beyond showed a clumsiness of design, but where a passage, corridor, or lobby was essential, it must be sufficiently lighted and ventilated.

The food-store, larder, or pantry, should face as near north as possible, have hard impervious surfaces, have a permanent direct opening into the external air, and be carefully protected against the entrance of flies from without by closing wire netting, and from within by an accurately fitting door. A water-butt served two very useful purposes: by intercepting the rain-water it provided soft-water for washing purposes, and where there was no sewerage system, diminished the amount of liquid to be disposed of upon the garden surface in wet weather.

When the wash-house or wash-house and scullery was situated in the main building the steam from the copper during clothes washing should be excluded from the house by a door, and provision should be made for its escape from the upper part of the wash-house, either through the upper part of a window or by a special opening. The provision of a special bath and hot-water system was a considerable additional expense, and a large quantity of water could be heated in a copper. A portable slipper, or hip bath, or the homely tub had this advantage that it could be moved about, and a hot bath could be taken in either of the bedrooms in greater privacy and under more comfortable conditions than in a scullery or wash-house, the carriage of water being the only trouble. The sanitary convenience should not only be approached from the open or an open lobby and be sufficiently lighted and ventilated, but it should also not have any possible aerial communication with the food-store.

In dealing with the question of cost, Dr. Sykes said that the most important question that awaits an answer, or series of answers, was, in regard to each particular cottage plan—What was the relative cost of erection and cost of maintenance of the same cottage repeated and constructed in different materials? There was a further question of some importance, namely—For what amount can the cottage be mortgaged? This would probably be about the fairest test of true relative value.

In regard to rural building by-laws, he said that a return issued by the Local Government Board showed that in England and Wales there were 668 rural districts, in 246 of which there were no by-laws at all for the control of new buildings. In 106 districts and in parts of thirty-two districts there were by-laws based on the rural model; in 169 districts and in parts of 114 districts there were by-laws based on the urban model. If by-laws and building acts were based more upon the zone system, as in Germany, and varied more according to the proximity and height of houses, upon a sliding scale, many of the present difficulties would be overcome. The hopelessness of framing general by-laws to suit the seasons caused them to be framed on the winter model. But one was tempted to ask whether it was not possible to relax or set aside the by-laws for temporary dwellings occupied only during the summer, just as relaxations or exemptions were allowed for temporary buildings. The principal by-law of the urban and old rural model code to which exception had been taken was that which required "walls to be constructed of good bricks, stone, or other hard and incombustible materials." Nevertheless, it was a remarkable fact that of the cottages at the Letchworth Exhibition about 60 per cent. were of "brick" and about 10 per cent. of "other hard and incombustible materials." The reason obviously was that this made for durability, as well as prevention of fire. Such durable materials were not only proof against fire, but also against vermin and other inconveniences. Special provisions against fire were quite unnecessary for detached buildings if only one story in height, or even of two stories if there be an easy drop from the windows. Instant escape was necessary from an upper floor constructed of wood, or lined with wood, as the wood in time becomes so dry that it burns like "wild fire"; no time was left to think, and only enough to drop to safety.

In speaking of the exhibition of cottages

at Letchworth, he said that there was a catalogue classification of temporary buildings and permanent structures, but in the latter were to be found some structures no less temporary than those in the former. It must be admitted that it was difficult to draw a sharp line, as it was dependent upon durability of materials and combination, and the test of time had yet to be applied. Still, classification was possible under the heads of brick and other incombustible materials, and it was remarkable that of the cottages about 60 per cent. were in the former and 10 or more per cent. in the latter category, so that over 70 per cent. conform in this respect to the urban by-law as to main walls. Ten per cent. or more were wooden cottages entirely or mainly, and the rest were of various combinations and composite materials. The half-dozen or so of entirely wooden cottages gave an excellent demonstration of the modern style of cottage in this material. Some of the wooden or partly wooden cottages were not only fit for inland use, but also should make admirable fishermen's cottages on the sea coast in the gaps protected from wind and driving rain.

It would be valuable to know the resistance and durability or life of building materials, especially for outer walls and roofs, and the Royal Sanitary Institute could not undertake a more useful task than in endeavouring, by tests and trials, to ascertain the relative merits of the different materials in the market, not only from the point of view of life of the substances, but also of the health of those who might have to live surrounded by them. It was comforting to see that in about one-third of the cottages the fireplaces and flues were more or less centrally grouped, and in about another third that they were placed in inner walls or party walls, or mainly so. In the remaining approximate third they were uncompromisingly in or against outer walls. He was struck by the small consideration in some cases paid to warmth—thin walls, thin roofs, large window spaces, and many doors to the rooms, absence of entrance-lobby or protected porch. In some cottages the staircases were not only dangerous on account of the absence of hand-rail to the straight run from top to bottom, but were also appalling in their steepness.

[Our report will be concluded next week.]

#### THE "QUIETER LONDON" MOVEMENT.

At a meeting of the Street Noise Abatement Committee, held at 1, Finsbury-circus, on Saturday, it was stated that the Society intends to promote a Bill in Parliament next session which will give the police power to suppress organ-grinding and street cries. The County Council by-laws have proved quite ineffectual for the protection of the public, as the organ-grinder can take refuge under the clause that makes his removal subject to reasonable objection. In these cases the police have no power to prosecute, but the householder who objects must himself summon the offender, and few people care to spend the time necessary for putting the law into operation.

The new Bill will give the police power to summon the grinder and street crier, and will, in fact, make their action a common nuisance, to be as much amenable to the law as obstructing the traffic. It is hoped that the Bill will be considered uncontentious, and thus pass into law with the least possible delay. In the course of the meeting it was stated that "No-organ" notices were now placed up in about 200 localities, and that considerable relief from the unwelcome noise had thus been effected. Applications for further similar notices were being received faster than they could be dealt with by the Association, and it was thought probable that at least a thousand notices would be required for the residential districts of the Metropolis.\*

INGRAM HOUSE, STOCKWELL.—In the description of this building in our last issue we state that the wrought-iron balustrade and wrought-copper outside lamps were made by Messrs. Gittins & Co. It should have been "Gittins, Craftsmen, Ltd.," of Birmingham. The mistake was not ours.

\*On this subject, see our Note on page 522.

#### ARCHITECTURAL SOCIETIES

LIVERPOOL ARCHITECTURAL SOCIETY.—At the 6th inst. Mr. A. Needham Wilson lectured before the Liverpool Architectural Society on the subject of "Sketch Plans and Working Drawings." He advised young architects, while keeping in sight the study of the beautiful, to guard against the temptation to overdo the idealism or to up structural problems. As a body architects should take a far larger share in the education of workmen, so that technical details might be certain to pursue a right course. Many public buildings and most railway stations offered flagrant examples of current evils in construction. Mr. Wilson lectured on the same subject before the Architectural Association in London, and a full report will be found in our issue for April 1, 1905.

MANCHESTER SOCIETY OF ARCHITECTS.—The third meeting of the students of the Manchester Society of Architects was held last Tuesday evening, and presided over by Professor Copper, of the Manchester University, who, after a few preliminary remarks, called upon Mr. B. Pendleton to give a lecture entitled "Two Great Cistercian Abbeys of Yorkshire." The lecture was illustrated by sketches and photographic views of Fountains and Kirkstall Abbeys, with Furness, Tintern, and several smaller abbeys for comparison. The lecturer dealt very minutely with the history of the Monkish orders, in order to show the coherence of the buildings with their requirements, and the development of the typical plan which they adopted.—The following awards in the students' competitions were announced at a recent meeting of the Society:—Mr. Beaumont's prize for drawings for the sketch-book, J. T. Cockler; special prize, F. Dyer. Society's prizes for sketches: 1, J. T. Halliday; 2, J. Cockler. Society's prizes for measured drawings: 1, J. H. Goldsmith; 2, F. Hearne; special third prize, J. T. W. Brooke. Prizes for best work done in the School of Art architecture classes (including examination results): Second and third year students, S. Birckett and G. H. Goldsmith (equal). First year students: 1, J. H. Roberts; 2, D. Sherlock.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The opening meeting of the session of the Edinburgh Architectural Association was held on the 8th inst. in the Association Rooms, 117, George-street, Mr. H. O. Tarbolton, President of the Association, presiding. After the formal business Mr. John Keppie, F.R.I.B.A., Glasgow, read a paper on "Moorish Architecture in Spain." The paper was written after a visit several years ago to Spain, and Mr. Keppie described some of the principal buildings in Madrid, Cordova, Granada, and Seville. Moorish architecture, he said, referring more especially to the Alhambra, spoke to the senses rather than to the mind; it pointed to voluptuousness rather than to thought. It resembled a brilliant charm, a captive of the senses, who might be imagined to have transported themselves in the network of stone, in the delicate openwork, light tracery, embroideries, etc. The Alhambra, he added, was an Oriental poem. The lecture was illustrated by lantern slides.

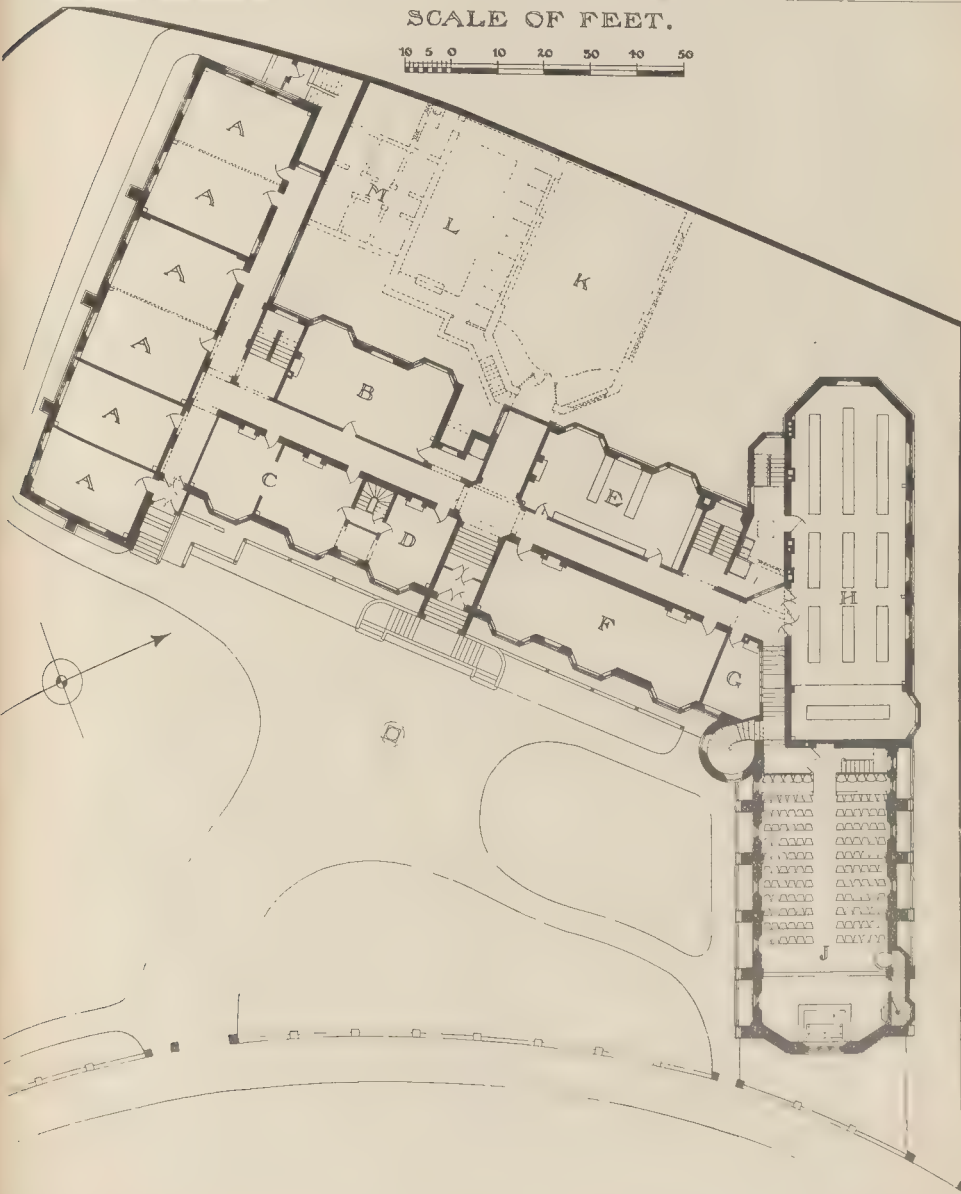
ARCHITECTURAL ASSOCIATION OF IRELAND.—The annual report of the Committee for the session 1904-1905 states that the last session has been one of the best since the Association was re-established in 1896. The class attendances were in most cases far above the average, and the enthusiasm shown by the members was strongly evidenced by the work in the classes, and the number of drawings submitted for the class prizes. Fifteen new members have joined during the session, and five have resigned, leaving a total increase of thirteen. One associate member was elected under the new rules, bringing the membership up to 138. It was decided that the increase of subscription decided on last year has had anything but a demoralizing effect. The Committee, realizing that the Association had out-grown the quarters kindly provided, free of rent, in former years by Sir Thomas Drew, decided to take by Sir Thomas Drew, a house in 15, South Fawcett-street, formed part of the premises No. 15, North Fawcett-street. These premises comprise a large lecture-hall and two rooms on the ground floor, which may eventually be turned into a museum, and four rooms on the upper

floor, now in use as a library, reading-room, committee-room, etc. The rental of these premises was rather heavier than the Committee would have wished, but they appeared so adaptable that negotiations were at once completed, and the rooms have been in constant use during the session. The liability thus incurred has been partly met by the donation of sixty guineas by the past-President of the R.I.A.I., Mr. Geo. Ashlin. A successful series of visits were paid during the spring to the following buildings in progress:—The "Iveagh" House, Dublin; the Northern Bank; the Abbey Theatre; the fire brigade station, Ballsbridge; the disinfecting station, South Lotts-road; the new store at Messrs. Guinness's, James's-street; and the

Surgical Home, Lr. Mount-street. The competition for the numerous and valuable prizes offered was again disappointing. The President's and Vice-President's prizes produced only one competitor each; the Traveling Studentship two; and the Institute Prize three. The drawings, designs, and models, were of considerable merit, and indicated an improvement in the standard of draughtsmanship and design of the younger members. The following is the list of prize winners:—Architectural Association of Ireland Traveling Studentship, Mr. H. T. O'Rourke; Architectural Association of Ireland Traveling Studentship, special prize, presented by Mr. A. E. Murray, Mr. D. G. Boucher; the Institute Prize, Mr. H. G. Leask; President's

Prize, Mr. A. W. Reid; Vice-President's Prize, Mr. W. Stainer. Architectural History Class, 1st, Mr. H. J. Lyons; 2nd, Mr. J. W. Beckett; special, Mr. T. F. Strahan. Building Construction Class, 1st, Mr. T. F. Strahan; 2nd, Mr. P. J. Munden. Class of Design, 1st, Mr. A. W. Reid; 2nd, Mr. J. W. Beckett. The annual excursion was held at Galway, where Mr. Tighe, one of their members, acted as guide to the interesting architectural features of the locality. The smoking concert was held as usual at the Grosvenor Hotel, but, owing to financial reasons, the Committee decided not to hold the annual dinner this session. The report records with regret that no steps have as yet been taken by the senior body to establish an

SCALE OF FEET.



St. Gabriel's Training College, Camberwell. Plan. (See next page.)

A—Classroom.  
B—Lecturers' common room.  
C—Principal's suite.  
D—Principal's office.

E—Library.  
F—Students' common room.  
G—Secretary and muniment-room.  
H—Dining hall.

J—Chapel.  
K—Gymnasium (and examination-room over).  
L—Swimming bath.  
M—Music-rooms.



Irish examination for qualification as a member of the R.I.A.I., and which they had hoped would have the effect of aiding the Association in its educational work. So many points had, however, been raised in connexion with the Registration Bill at present under consideration by a committee in England, that it was fully recognised that any alteration of the existing system in Ireland at the present moment might lead to unsatisfactory results.—The following prizes are offered for competition during the ensuing session:—Architectural Association of Ireland Traveling Studentship, 10*l.*; the Institute Prize, 10*l.* 10*s.*; Mr. P. J. Lynch's Prize, 5*l.* 5*s.*; the Downes' Bronze Medal; the Vice-President's Prize, 2*l.* 2*s.*; Architectural History Class, 1st, 2*l.*; 2nd, 1*l.*; Building Construction Class, 1st, 2*l.*; 2nd, 1*l.*; Class of Design, 1st, 2*l.*; 2nd, 1*l.*

#### ENGINEERING SOCIETIES.

**INSTITUTION OF CIVIL ENGINEERS.**—At the ordinary meeting on Tuesday, November 14, Sir Alexander R. Binnie, President, in the chair, the paper read was "On Waterways in Great Britain," by Mr. John Arthur Saner, M.Inst.C.E. The paper began with a short historical sketch, giving dates of inception of some of the earlier navigations, and also describing such improvements as have been made in recent years. The author then went on to discuss the comparative advantages of waterways and railways, and their main differences of construction and use; pointing out where up-to-date canals were owned by independent companies they could in many cases show a reasonable profit, but where the railway companies owned them the profits appeared to be much less. In regard to the difficulty of working through traffic on account of variations in gauge, he showed how, if a standard gauge could be fixed upon, the means of communication would be vastly improved. The question of a standard gauge was discussed, and the author gave his opinion as to the best standard to adopt, in view of the existing arrangements in this country. In this connexion longitudinal sections, showing the mileage and heights above sea level, were given of the following main routes:—1, Hull to Liverpool; 2, Liverpool to Midland district; 3, Bristol to Midland district; 4, Hull to Midland district; 5, London to Midland district. There were also tables showing the necessary measures for, and giving the probable cost of, improving the connexions between the main ports and the Midland district. Water supply and towing were then considered, the various means now available being described, and reasons for and against different proposals being given. The relative merits of railways and waterways as to speed of travel were also discussed. The author then dealt briefly with the question of tolls and charges and the cost of upkeep, showing how difficult it was to compare the costs of different systems. Finally the paper described the best routes for ship canals across country, and concluded by discussing the different ways of raising the necessary money for reconstructing the waterways. The paper was accompanied by a large map of waterways, with reference tables, giving the navigable dimensions.

**THE JUNIOR INSTITUTION OF ENGINEERS.**—As the annual dinner of the Institution of Electrical Engineers has been fixed for Friday, December 8, it has been decided to postpone the reading of the paper on "Electrical Mains for Power Transmission Work," by Professor John T. Morris, M.I.E.E. (member), to the following Friday, December 15. In connexion with the paper a visit has been arranged to Messrs. Johnson & Phillips's Works at Charlton on Saturday morning, December 16.

**MEMORIAL PULPIT, ST. GEORGE'S CHURCH, WORCESTER.**—An oak pulpit has been placed in this church in memory of the late Dr. Sheppard. It was designed by Mr. A. H. Parker, and was executed by Mr. Haughton.

**MEMORIAL SCREENS, ST. MARY MAGDALENE'S, MUNSTER-SQUARE, LONDON.**—It has been decided to proceed with the erection of six screens in the north and south aisles of this church, as a memorial to the late Rev. W. H. H. Jervois, Mr. J. T. Micklethwaite, F.S.A., is preparing the plans.

### Fifty Years Ago.

FROM THE *Builder* OF NOVEMBER 17, 1855.

He was of opinion, however, that Gothic architecture was too fashionable in England; and he sincerely regretted it—partly, perhaps, because of early teaching, and perhaps because his recent visit to Italy had revived his old impressions. Classical architecture appeared to be almost forgotten by English students; and he had been exceedingly struck by the fact that in a clever and well-written book, by an architect, on "The Gothic Architecture of the North of Italy," classical architecture was ignored and despised. This was a sign of the times which, as an architect, he was bound sincerely to regret. At one time English architects had been mad for Grecian architecture; but now the great works of Wren, Palladio, Inigo Jones, and the great architects of Italy were neglected; and one gentleman (Mr. Ruskin) admired to the very echo the Ducal Palace at Venice—a feeling which he regretted should exist among the architects of England. The writer of the book to which he referred had engraved, as a beautiful example, a window in the very angle of the main story of one of the principal palaces: to effect this the angle was cut through, and the upper part, of very heavy architecture, was supported on corbels only a few inches thick. He had himself been taught that the weight should be carried consistently and honestly; and so violent a departure from that rule as this, and many other instances he could quote in Venice, he could not consider consistent with architectural truth.—*Presidential address at Institute of Architects.*

### Illustrations.

#### DESIGN FOR DECORATION OF A STAIRCASE IN A TOWN HOUSE.



THE illustration represents some sgraffito work that is to be carried out in a town house in London.

The artist is Chevalier Cesare Formilli, and the drawing was exhibited at the Royal Academy this year.

#### ST. GABRIEL'S TRAINING COLLEGE.

This college for pupil-teachers for the Canterbury and Rochester Dioceses has a

fine situation facing Myatts Fields, in Camberwell.

The main block, which was planned for eighty residential and eighty non-residential students, was opened on October 9, 1900, at a cost of 32,953*l.*

The chapel, which was subsequently built at a cost of 5,280*l.*, was dedicated on May 9, 1903.

The swimming bath, lecture theatre, gymnasium and music rooms shown on plan and forming part of the original scheme have not yet been built.

The circular turret in the angle between the chapel and the main block is intended in the future to be carried up to a greater height for a clock.

The materials used externally are Messrs. Thomas Lawrence & Sons' red facing bricks, laid in alternate broad bands of two slightly different shades, and a sparing use of Portland stone. The projecting bay windows are rough casted, and have copper roofs. The main roofs being covered with green Westmoreland slates.

The heating is by low-pressure hot water and fireplaces.

Inside the chapel at the entrance end is an oak screen with stalls in front and a gallery above for the organ. There is also a carved oak pulpit with a stone base. The floor and steps of the sacristy are of marble.

Messrs. J. Garrett & Son, of Balham, were the contractors for the work, the architect being Mr. Philip A. Robson, of Westminster.

#### NEW PREMISES, MAYFIELD, SUSSEX.

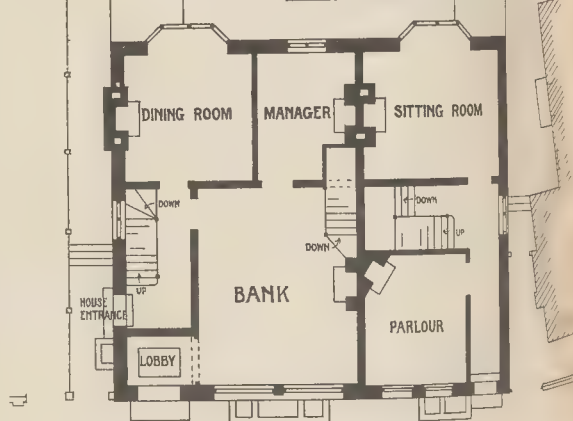
THESE premises are now in course of erection in High-street, Mayfield, and have been designed to harmonise with the many interesting old houses in the place. They comprise a bank for Messrs. Barclay & Co., with manager's residence attached, and another separate residence. From the south side a magnificent view is obtained over the hills towards Heathfield.

Best kiln stocks from the Crowborough Brick Company are being used for facing and above the string course the walls are cemented. The roof will be covered with hand-made tiles resembling old ones from the Rotherfield Brick Company.

The contract is being carried out for the owner, Mr. H. Lester, of Mayfield, by Messrs. Peerless, Dennis, & Co., of Eastbourne, and the architect is Mr. Percy K. Allen, of Tunbridge Wells.

### NEW PREMISES, MAYFIELD, FOR MR. H. LESTER.

SCALE = 0 5 10 20 30 FEET



#### GROUND PLAN

HIGH STREET

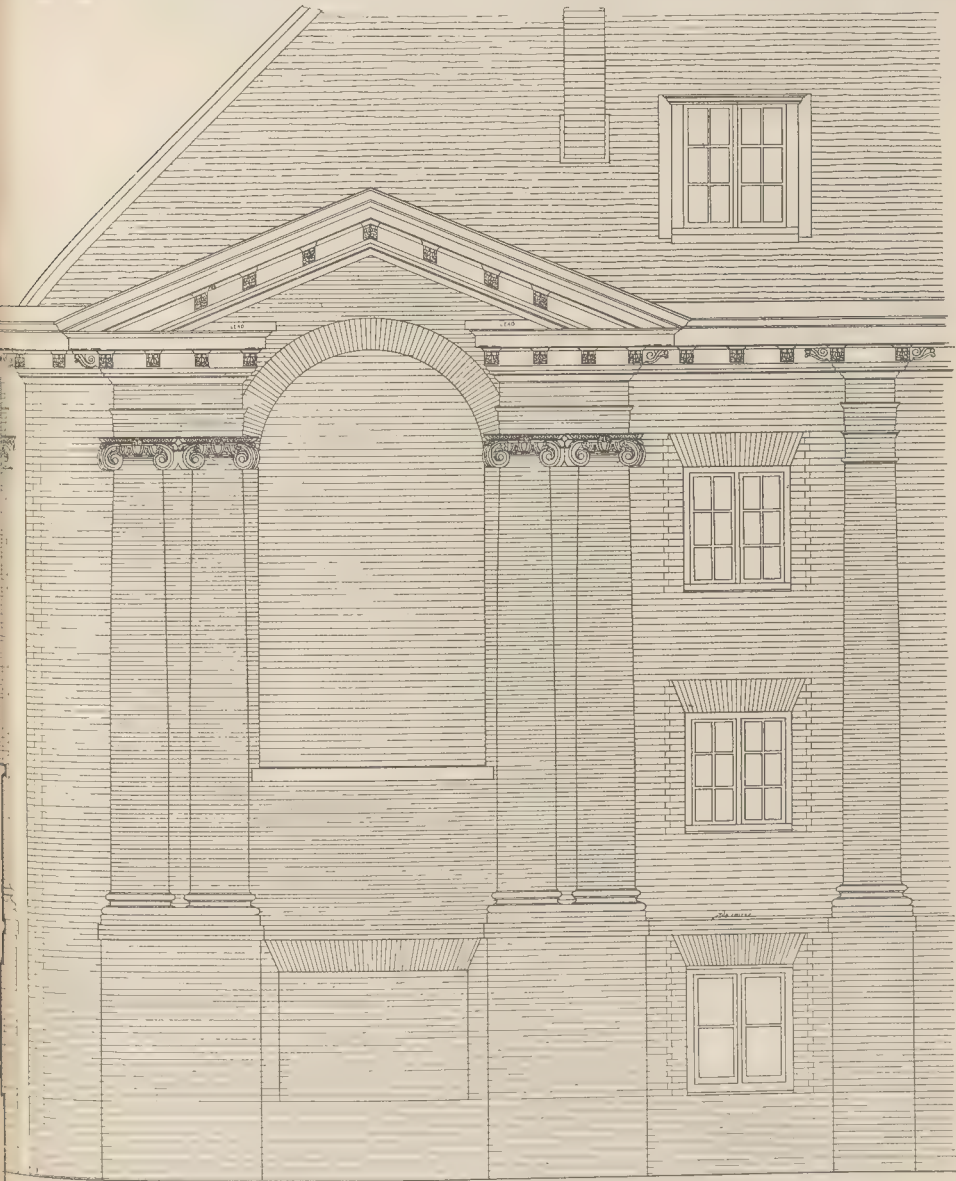
THE STOCKS," WITTERSHAM, KENT. This is an old Kent cottage, the interior of which has been restored, and part of the partitions shown on the plan carried out. The internal arrangements of the cottage comprised two tenements when the work was first undertaken, and the process of restoring it to the purposes of a single occupation was based upon the evidences found in walls and ceilings. The original building was wholly timber framed, but at some subsequent period, probably late XVIIIth century, the ground story was replaced by brick walls. The principal rooms have all the oak joists as well as much of the timber framing exposed to view. The fireplaces are of the

open-recessed order, having large oak lintels. In course of the repairs new ground floors and other works incidental to making the house dry were carried out. Messrs. Ellis Brothers, of Rye, were the builders, and Messrs. Forsyth & Maule the architects, for the work.

CHRIST'S HOSPITAL, NEWGATE-STREET.

The portion of the school buildings shown was designed by Sir Christopher Wren in the year 1672, and carried out under his supervision. It had a frontage of 158 ft. to

the burial-ground and entrance to Christ Church, Newgate-street, and an average width of 35 ft. On the ground floor were the remains of the cloister which formed part of the ancient monastery buildings of the Grey Friars, erected about 1327. In erecting his school offices Sir Christopher carefully retained these ancient remains, although to do so meant putting his building out of the square. On the first floor was the large fourth-form room of the school, and on the top floor were the lavatories and a bandroom. The front elevation was of red brick with rubbed brick pilasters, caps, bases, string arches, and quoins, and was crowned with



SECTION. DETAIL OF ELEVATION TO CHURCHYARD.

Old Christ's Hospital.

Alfred Pugh  
Measured June 1872



a wood cornice and wood pediments. The roof was covered with red tiles.

The details of this front were very typical of Wren's work, and, toned with age as it was, it formed a very fine yet simple piece of brick architecture, and it is a matter of great regret that it should have been pulled down. It was in excellent preservation, with the exception of parts of one or two caps, and part of the wood cornice.

The portion over the entrance from Christ Church-passage had been removed to Horsesham before the survey was made, together with many other objects worthy of preservation.

This survey had to be carried out under great difficulties, as the house-breakers were already demolishing before the work was commenced.

A. J. PEYTO.

#### METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of the Managers of the Metropolitan Asylums District was held on Saturday last week at the offices, Victoria Embankment.

Among the correspondence received were letters from the Local Government Board sanctioning the plan of the additional coal storage and pump and heater-room at the South-Eastern Hospital, and the plan relating to the proposal to provide storage for coal and coke at the Southern Hospital.

**Darenth Asylum.**—The Finance Committee submitted an estimate of 6,215*l.* for the construction of new industrial workshops at the Darenth Asylum.

**Leavesden Asylum.**—The same committee further submitted an estimate of 5,380*l.* for iron bridges at this asylum.

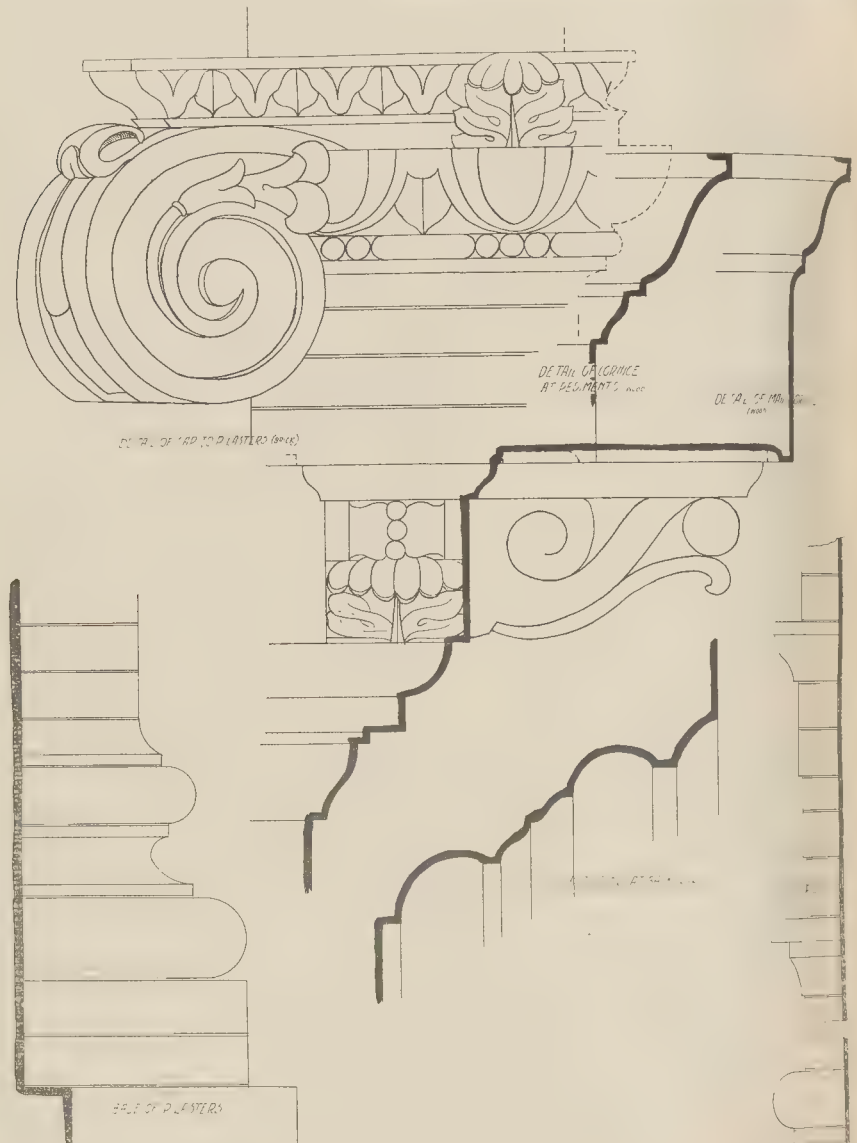
It was agreed to apply to the Local Government Board for sanction to the expenditure of both amounts.

**Bacteriological Laboratories.**—The Works Committee reported that they had appointed Messrs. T. W. Aldwinckle & Son as architects for the proposed bacteriological laboratories and stables at Peckham and Sutton respectively.

#### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring-gardens. S. A. E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to loan Poplar Borough Council 15,312*l.* for paving works; 2,497*l.* for electric lighting purposes and 1,650*l.* for construction of footbridge and approaches; Camberwell Borough Council 1,495*l.* for housing purposes; Hackney Borough Council 500*l.* for contribution to



Old Christ's Hospital. Details one-sixth full size.

reconstruction of bridge; Guardians of St. George's Union 6,771, for poor law purposes; and Wandsworth Borough Council 10,215, for street improvements.

**Tramways.**—The Highways Committee recommended, and it was agreed:—

(a) That the supplemental estimate of expenditure on capital account of 19,780, submitted by the Finance Committee, be approved, in addition to the amounts authorised in the votes on April 4, 1905, and June 25, 1905, in respect of cables and cable-dots for the Battersea, Wandsworth, and Garret-tramways, the New Cross to Rushy Green line, and the Greenwich to Blackwall Tunnel lines.

(b) That the estimate of expenditure on capital account of 4,500, submitted by the Finance Committee, be approved, in respect of the provision of cables and cable-dots for the Vauxhall Bridge-road and Vauxhall Bridge tramways.

**Speed of Motor-cars.**—The Public Control Committee recommended that the clerk of the Council do inform the Royal Commission on Motor-cars that, in the opinion of the Council, it is not desirable that any speed limit for motor vehicles should be prescribed for the County of London.

Mr. Verney moved an amendment to add the following words:—"And that the Council is of opinion that the safety of the public would be best consulted by prohibiting for some definite period the use of a car whose owners or drivers have been twice convicted of dangerous driving, any subsequent conviction to be punished by imprisonment without the option of a fine."

The amendment was not carried, and the recommendation of the Committee was adopted.

**The Subway Trams.**—Mr. Allen Baker, in reply to a question by Mr. E. Smith, stated that the Highways Committee hoped to have the trams running through the subway from Aldwych to the Angel at Islington before the end of the year.

**Supply of Electrical Energy.**—The Council proceeded to consider the reports of the Highways Committee and the Finance Committee on the proposal to promote a Bill in the next session to enable the Council to supply electrical energy in London and certain surrounding districts in bulk.

Capt. Hemphill, on behalf of the Highways Committee, formally moved:

"That authority be sought in the session of Parliament of 1906 (1) to enable the Council to supply electrical energy in London and certain surrounding districts on the lines indicated in the report of the Highways Committee, dated October 23, 1905, to confer upon the Council power to carry out any necessary works, including the erection of buildings, the laying of mains, etc., necessary to the effect to such powers; (2) to empower the Council to make arrangements with local authorities and others having power to supply electrical energy, and to enter into agreements to give effect thereto; and (3) to confer upon the Council any general powers which may be necessary to enable it to carry out the scheme."

The costs and expenses of promoting the resolution referred to in the foregoing resolution be charged out of the County Fund.

Mr. Percy Harris contended that the Council should not rush into any project which was not demanded by the public, and which might involve the financial credit of the Council and its credit as a business body.

His recommendation be referred back to the committee for further consideration, with an intimation to the committee that the Council is unwilling to promote a Bill relative to the supply of electrical energy in London which is not based upon any definite scheme, or upon any agreement with any borough councils or existing companies, or upon any estimates which would enable the Council to judge of the financial responsibility to be incurred by the ratepayers; and further, that it be an intimation to the committee to consider the whole matter, and in particular to report whether, in view of the heavy commitments of the Council, and the speculative nature of the proposed enterprise, the Council's efforts should not be directed to securing the supply of electrical energy by a new or existing undertakers on terms and conditions which would safeguard the public interests."

Mr. R. A. Robinson, in seconding the amendment, dealt with the present position of the ratepayers of London.

After considerable discussion, the Council divided, with the following result:—For the amendment, thirty-six; against, seventy-nine. The amendment was accordingly not carried.

Francis Mowatt moved a further amendment to add the following words to the main resolution:—

"Provided that, before the introduction into Parliament of any Bill opportunity shall be afforded for a full discussion in the Council of its provisions, and of any effect the financial consequences of the scheme."

Mr. McKinnon Wood seconded the amendment, which was carried on a division,

seventy-nine voting for, and thirty-two against.

The main resolution as amended by Sir Francis Mowatt was thereupon adopted, the second paragraph being passed without challenge.

**Sites for Car-sheds and Sub-stations.**—The Highways Committee recommended, and it was agreed, that authority be sought in the session of Parliament of 1906 to enable the Council to acquire compulsorily the undermentioned properties required as sites for the erection of buildings in connexion with the electrical working of the Council's (Northern) Tramways, namely:—

Description of Site.	Interest (if any) at present held by Council.	Purpose required for.
(i.) Property known as Nos. 191, 193, and 195, Abbott-road, Poplar	Freehold ..	Car-shed (approach).
(ii.) Property at Stamford-hill	None .....	Car-shed.
(iii.) Parkhurst-road, Holloway, tramways depot and open space, with Nos. 66 and 67 (part of), Parkhurst-road	Leasehold ..	Car-shed.
(iv.) Warkent-road, Holloway, tramways depot	Leasehold ..	Sub-station.
(v.) Property at Holloway	None .....	Car-shed and sub-station.
(vi.) "Angel," Islington, tramways depot, Pentonville-road	Yearly tenancy	Sub-station.
(vii.) Property at Islington	None .....	Sub-station.
(viii.) Property known as Nos. 1 to 15 (odd), Wellington-road, Bow	None .....	Car-shed.

It was also agreed:—

"That authority be sought in the session of Parliament of 1906 to enable the Council to construct junction lines between the tramways in East India Dock-road and Upper Clapton-road and the car-sheds proposed to be erected at Poplar and Stamford Hill respectively.

That authority be sought in the session of Parliament of 1906 to enable the Council to make such alterations in the route of the subway authorised by the London County Council (Subways and Tramways) Act, 1902, and to acquire such further property as may be necessary, to enable a station to be constructed in the subway immediately to the south of the Strand, under Wellington-street."

**Improvements.**—The adjourned report of the Highways and the Improvements Committees in regard to Lewisham High-road to Forest Hill tramway, and Malpas-road to Stanstead-road improvement was brought up, and the following recommendations were agreed to:—

"That application be made to Parliament in the session of 1906 for authority to construct along Shardeloes-road, instead of along Malpas-road, a portion of the tramways between Lewisham High-road and Forest Hill authorised by the London County Council (Tramways and Improvements) Act, 1904.

That application be made to Parliament in the session of 1906 for authority to widen Shardeloes-road in general accordance with the plan presented to the Improvements Committee on October 25, 1905, and that provision be made in the Bill to give effect to the Council of the Metropolitan Borough of Deptford will contribute one-third of the net cost of the improvement."

That so much of the resolution of December 20, 1904, as relates to the approval of an estimate of 104,000, in respect of the Malpas-road to Stanstead-road improvement be rescinded.

That the estimate of 99,000, [in substitution for the estimate of 104,000, approved on December 20, 1904] submitted by the Finance Committee in respect of the widening of Shardeloes-road, Brockley-rise, Brockley-road, and Stanstead-road, be approved.

That expenditure on capital account up to 99,000, be authorised for the widening of Shardeloes-road, Brockley-rise, Brockley-road, and Stanstead-road."

**School Sites.**—The Education Committee recommended, and it was agreed, to acquire, at an expenditure not exceeding 4,000, a portion of the site in Craster-road, Norwood, and additional property adjoining the Thomas-street site, Limehouse.

**Schools.**—The Education Committee recommended, and it was agreed, to expend 4,133, on the erection of a school for the accommodation of sixty physically defective children on the "Friern" site, Dulwich. It was also agreed to carry out the work without the intervention of a contractor. It was also recommended and agreed:—

"That the estimate of expenditure on capital account of 3,513, submitted by the Finance Committee in respect of the erection of a school for the accommodation of sixty physically defective children on the "Hatcham" site (Brockton) be approved."

That the work be done without the intervention of a contractor; and that the drawings, quantities, specification, and estimate of 3,551, be referred to the Works Committee for that purpose."

The same Committee also proposed, and it was agreed:—

"That the estimate of expenditure on capital account of 3,278, submitted by the Finance Committee in respect of the enlargement by 300 places of the new school on the Sellin-court-road site (Wandsworth), be approved."

That the work be done without the intervention of a contractor; and that the drawings and specification be referred to the Works Committee with a view to the work being done at the schedule of prices for the first portion of the school."

**Conditions of Contract.**—The Education Committee reported as follows:—

"At the request of the General Purposes Committee we recently forwarded a copy of the standing orders relating to contracts, together with the schedule of rates of wages and hours of labour, to each of the contractors on the list of selected firms taken over from the late authority. The attention of each contractor was drawn to the Council's conditions of contract, and he was asked whether he would comply with them. Subjoined is a summary of the replies received in response thereto:—

(i.) 317 firms state that they are prepared to observe the conditions laid down in the standing orders relating to tenders and contracts.

(ii.) Seventeen firms ask that their names may be removed from the list.

(iii.) Twenty-eight firms have not replied, although a second communication has been forwarded to them.

We are of opinion that the 317 firms referred to above should be retained on the selected list, and that the names of the remaining firms should be removed from the list. There are also four other firms whose names for various reasons should be removed from the list. The names and addresses of the firms in question will be laid upon the table.

We recommend:—

(a) That the names of 317 firms specified on the list (marked A) of contractors selected to tender for works to the Council's schools who have intimated their willingness to observe the conditions laid down in the standing orders relating to tenders and contracts be retained on such list.

(b) That the names of forty-nine firms specified on the list (marked B) be removed from the list of contractors selected to tender for works to Council's schools."

The recommendations were agreed to.

**Workmen's Trains.**—The Housing of the Working Classes Committee recommended, and it was agreed:—

"(a) That His Majesty's Government be asked to introduce a Bill in the next session of Parliament providing for the amendment of the Cheap Trains Act, 1883, in conformity with the conclusions and recommendations contained in the report, dated July 27, 1905, of the Select Committee on Workmen's Trains."

That the Board of Trade be requested to call upon the London railway companies concerned to give immediate effect to recommendations 5 and 7 of the Select Committee on Workmen's Trains dealing with the conditions under which workmen's tickets are issued, and the reservation of carriages for work-women where the traffic is heavy."

**List of Rates of Wages and Hours of Labour.**—The Works Committee reported as follows:—

"Revised working rule agreements have been made between the London Master Builders' Association and the bricklayers, carpenters and joiners, stonemasons, plumbers, general smiths and fitters, and the working hours during the year have been altered so as to provide that 48 hours a week shall be worked throughout the thirteen weeks of winter, except in the case of plumbers, who will work 44 hours a week for the first ten weeks of winter. Under standing order No. A 244 (c) the Council's list of rates of wages and hours of labour should be amended in accordance with the terms of the agreement."

The revised working hours will come into operation as from November 13, 1905, and we propose that the alteration in the list should be made as from that date. There are no working rule agreements between the association and the mill sawyers, painters', and labourers' societies, and we shall report later, if necessary, as to any alterations in the hours of labour of these trades. The existing working rule agreement between the association and the plasterers' society does not terminate until March 3, 1906, and consequently no alteration is made in the working rules of that trade.

We think it desirable that the trades of timbermen and scaffolders and of mill sawyers, who are now classified in the list of rates of wages under the heading "building trades," should be placed under the heading "building trades," and that the rate of pay for overtime worked by the two former trades should be the same as labourers and navvies. We recommend:—

(a) That the undermentioned trades be classified in the Council's list of rates of wages and hours of labour under the heading "building trades":—Timbermen, scaffolders, mill sawyers, and wood cutting machinists.

(b) That the rate of pay for overtime, when worked at the request of employer, inserted in the Council's list of rates of wages and hours of labour for the trades of timbermen and scaffolders, be amended as regards payment for overtime worked until 8 p.m., and be as follows:—

"After 7 p.m. until 8 p.m.—Time and a half."

(c) That the hours of labour of the undermentioned trades inserted in the Council's list of rates of wages and hours of labour be amended, and be, during the thirteen weeks of winter, commencing on the second Monday in November, 44 hours per week:—

Carpenters, joiners, bricklayers, bricklayers (cutting and setting gauged work), masons (fixing), masons (granite work), masons (smiths, fitters, gas-fitters, etc. (in shops, general smiths and fitters to work summer hours throughout the year, should the employer desire it).

(d) That the hours of labour of the undermentioned trades inserted in the Council's list of



wages and hours of labour be amended, and be during the first ten weeks of winter, commencing on the second Monday in November, 4½ hours per week, and for the next three weeks 4 hours a week.—  
Plumbers, plumbers' mates."

The recommendations were agreed to, and the Council then adjourned.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

*Erection of Buildings on the South-west Side of Finchley-road and North Side of Lymington-road, Hampstead.*

*Hampstead.*—(a) That the resolution of May 16, 1905, consenting to the erection of buildings on the south-west side of Finchley-road and north side of Lymington-road, Hampstead, be rescinded. (b) Buildings upon a site abutting upon the south-western side of Finchley-road and northern side of Lymington-road, Hampstead (Mr. J. D. Hunter for Mr. W. F. Cave).—Consent.

*Kensington, South.*—That the resolution of November 1, 1904, consenting to the erection of a one-story studio at the rear of No. 34, Addison-road, Kensington, be rescinded.—Agreed.

#### Dwelling-houses on Low-lying Land.

*Woolwich.*—That a licence be granted under section 122 of the Act, 1894, to Mr. Patterson, for the erection of a shop and dwelling-house with stable and coach-house at the rear, on low-lying land situated at the corner of Abbey Wood-road and Bostal-lane, Woolwich (Mr. E. J. Bennett).—Consent.

*Southwark, West.*—That a licence be granted under section 122 of the Act, to Mr. W. Sumpton for the erection of two blocks of dwellings on low-lying land situated at the corner of Webber-street and Barron's-place, Southwark (Mr. W. Hobson).—Consent.

#### Lines of Frontage and Projections.

*Hammersmith.*—Buildings (public baths and wash-houses) on a site abutting upon the north side of Scotts-road and west side of Lime-grove, Hammersmith (Mr. J. E. Franck for the Council of the Metropolitan Borough of Hammersmith).—Consent.

*Kensington, South.*—A conservatory at the rear of No. 86, Holland-park, Kensington, to abut upon Holland-park-avenue (Messrs. Stimpson & Chambers for Mr. C. Wilkinson).—Consent.

*Wandsworth.*—A church on a site abutting upon the southern side of Mitcham-road and eastern side of Rookstone-road, Wandsworth (Messrs. Gordon & Gunton).—Consent.

*Bethnal-green, North-east.*—One-story shops and a one-story addition at the rear of No. 379, Bethnal-green-road, Bethnal-green, to abut upon Teesdale-street (Mr. C. M. Shiner for Mr. W. A. Balls).—Refused.

*Lewisham.*—A building on the east side of Torrison-road, Lewisham, to abut upon the north side of Hazelbank-road (Messrs. A. C. & R. A. Blake).—Refused.

*Strand.*—A new iron and glass shelter at the Comedy Theatre, Panton-street and Oxenden-street, Haymarket (Messrs. Gillow & Co. for the proprietors of the Comedy Theatre).—Refused.

#### Width of Way and Line of Frontage.

*Dulwich.*—Six houses with bay-windows on the west side of Vestry-road, Peckham-road, Camberwell (Messrs. E. Crosse & Co. for Mr. G. Pedley).—Refused.

#### Width of Way.

*Lewisham.*—A one-story building at the rear of No. 37, Ladywell-road, Lewisham, to abut upon a passage out of the west side of Church-grove, Lewisham (Mr. G. Kimble for Mrs. F. Kimble).—Consent.

*Finsbury, Central.*—A boundary wall at the "Hugh Myddelton" schools, on the north side of Sens-walk, Finsbury (Education Committee of the Council).—Consent.

*Width of Way, Line of Frontage and Space at Rear.*

*Kennington.*—A workshop on the northern side of Richmond-terrace, Clapham-road, Kennington, westward of No. 90, Clapham-road (Messrs. J. A. J. Woodward & Sons for Mr. C. Blatchford).—Refused.

#### Formation of Streets.

*Fulham.*—That an order be issued to Messrs. Cluttons sanctioning the formation or laying out of a new street for carriage traffic to lead from Napier-avenue to Cromwell-avenue, Fulham, and in connexion therewith the widening of portions of Napier-avenue and Cromwell-avenue (for the Ecclesiastical Commissioners).—Consent.

*Bethnal-green.*—That an order be issued to the Council of the Metropolitan Borough of Bethnal-green, sanctioning the formation or laying-out of a new street for carriage traffic to lead from

Gawber-street to Cyprus-street, Bethnal-green.—Consent.

*Hammersmith.*—An extension of the period within which the conditions contained in the resolution of September 8, 1903, sanctioning the formation or laying-out of new streets on the east side of Wood-lane, Hammersmith, at the corner of North-pole-road, Hammersmith, were to be complied with (Messrs. Weatherall & Green).—Refused.

#### Cubical Extent.

*Greenwich.*—A deviation from the plans approved for the erection of a building on a site abutting on the River Thames and approached from Blackwall-lane, Greenwich (Messrs. Mark Fawcett & Co.).—Consent.

#### Means of Escape from Top of High Buildings.

*City of London.*—Means of escape proposed to be provided on the fifth (top) story of Nos. 22 and 23, Fenchurch-street and No. 2, Rood-lane, City (Mr. E. B. Ellis for Messrs. Kleinwort Sons, & Co.).—Consent.

#### Working-class Dwellings.

*Camberwell, North.*—Dwelling-houses to be inhabited by persons of the working class, and proposed to be erected on a site at the rear of dwellings on the north side of Picton-street, Camberwell (Messrs. J. & J. Woodward & Sons for Mr. J. Dennis).—Refused.

The recommendations marked † are contrary to the views of the local authority.

#### COMPETITION.

CENTRAL FIRE STATION FOR WILLESDEN.—The Works Committee of Willesden Urban District Council reported on Monday having appointed a sub-committee to consider as to the premiums to be offered for competitive designs for the erection of a central fire station in Harlesden-road, and to draw up conditions of competition.

#### BOOKS RECEIVED.

PLASTERING: PLAIN AND DECORATIVE. By William Millar, Plasterer and Modeller. Third edition. (B. T. Batsford. 18s.)

A HISTORY OF THE DEVELOPMENT OF ARCHITECTURE. By F. M. Simpson, Professor of Architecture, University College, London. (Longmans, Green, & Co. 12s. 6d.)

STUDIES IN ARCHITECTURE. By Reginald W. Blomfield, A.R.A. (Macmillan & Co. 10s.)

THE EARL OF MAR'S LODGING, STIRLING. By Ex-Baillie Ronald. (Eneas Mackay, Stirling.)

#### Correspondence.

##### LONDON'S WATER SUPPLY.

SIR,—Having seen a letter in your paper on the above subject, and more especially in relation to the acquirement of water storage sites in Wales, I thought that this had been under consideration several years ago. Having been in the United States the last four years, I was unable to follow the progress of the proposed works, and was much surprised on my return to find them dropped, instead of in a fair way to completion.

Liverpool and Birmingham are already in the Welsh mountains for their water supply, and there is nothing to prevent other large towns much nearer than London acquiring the pick of the remaining sites, and leaving this city, which certainly requires the best ones, to make the best of what remains.

The quality of the present supply is, I believe, extremely good, and it is more than likely that the great strides in the question of sewage purification have had, and still have, a great deal to do with the present high standard. But is it right to the people of this city that the largest source of supply should be from a river which has such a closely populated watershed, with its dangers of sewage and other contamination? What would happen if the amount of water used even approached the amount considered necessary in American cities? The Thames and all its tributaries would be entirely inadequate. In Denver, Colorado, during the dry season the demand often runs up to 42,000,000 imperial gallons a day, and that to a population of only about 180,000, and the least demand is about 22,000,000 gallons.

To cope with this great demand when the supply is smallest the company supplying the town have just completed the second highest dam in the world, 236 ft. from foundations

to top of parapet walls, creating a reservoir having an available capacity of over 20,000,000 gallons, or over a year's supply at maximum requirements. This gives them ample storage capacity for years to come, and shows that there is no lack of foresight in that, to most of us, out of the way place.

Are the water supply authorities going to leave things till they are absolutely necessary, and then make pay-as-you-go under a constant fear of shortage till the works are carried out, which works are a matter of years, not weeks?

G. FRED. VOLLMER.

\*\* We have pleasure in publishing Mr. Vollmer's outspoken and sensible letter. It shows what are the views of adequate water supply entertained in even secondary cities in the United States, while in England we are hampered by the restricted and antiquarian ideas of water engineers whose sole idea of water supply seems to be to find out to how small a supply a population can be screwed down.—Ed.

#### THE EDUCATION OF THE ARCHITECT AND THE PUBLIC SCHOOLS.

SIR,—Mr. Belcher, in his excellent Presidential address, refers at some length to the education of the youthful architect, announcing the support the Royal Institute of British Architects has given to the scheme of the new Board of Architectural Education has established.

But does the Institute or the Architectural Association go quite to the root of this important matter of the early education of the architectural student, without taking into account the public schools?

Efforts have been made with success in one or two of our public schools to give some practical training in elementary architecture, but in most of the schools nothing whatever is done. If the new Board of Education can awaken a desire in these schools for architectural knowledge, the public apathy towards the beauty of building, which Mr. Belcher deplains, would soon be removed.

Surely also parents have a right to expect that the same advantages of teaching and equipment that are at present provided for boys training for the army, medical, and engineering professions should be extended to those boys desirous to become architects. The Architectural Board of Education might reasonably press this matter, and a representative of the public schools on the Board would be useful in this direction, and should be considered. In addition, the introduction of more architectural knowledge in the preliminary examination of the Institute of British Architects would urge schools to take serious notice of a neglected subject.

A course of study in architecture can be easily arranged without any serious encroachment on the usual school curriculum. A reasonable amount of architectural drawing, combined with a course of history on the evolution of architecture, carrying a boy through his preliminary examination and enabling him to prepare while at school some of his drawings for the intermediate examination, should be expected.

At present most boys leave school, and at times the University, without the smallest architectural education, either as a branch of aesthetics or as the necessary equipment of a cultivated person, and the deficiency is the more keenly felt by the youth who selects architecture as his profession.

MARTIN A. BUCKWORTH.

\*\* If our correspondent turns to the paragraph on "Art and Education," under the heading of "Notes," in our issue of September 9 (page 268), he will see that we have anticipated his suggestion. That Note was not without its practical effect, inasmuch as it led to a request from one Headmaster to the Editor of this Journal to come and give a Saturday evening lecture to the boys on architecture; which function comes off this week.—Ed.

MUNICIPAL BUILDINGS, TOTTENHAM.—In the paragraph on these buildings in our last issue, the names of Mr. Arnold S. Taylor and Mr. A. R. Jenmett should have been given as joint architects, instead of that of Mr. Jenmett alone. We are not responsible for the error.

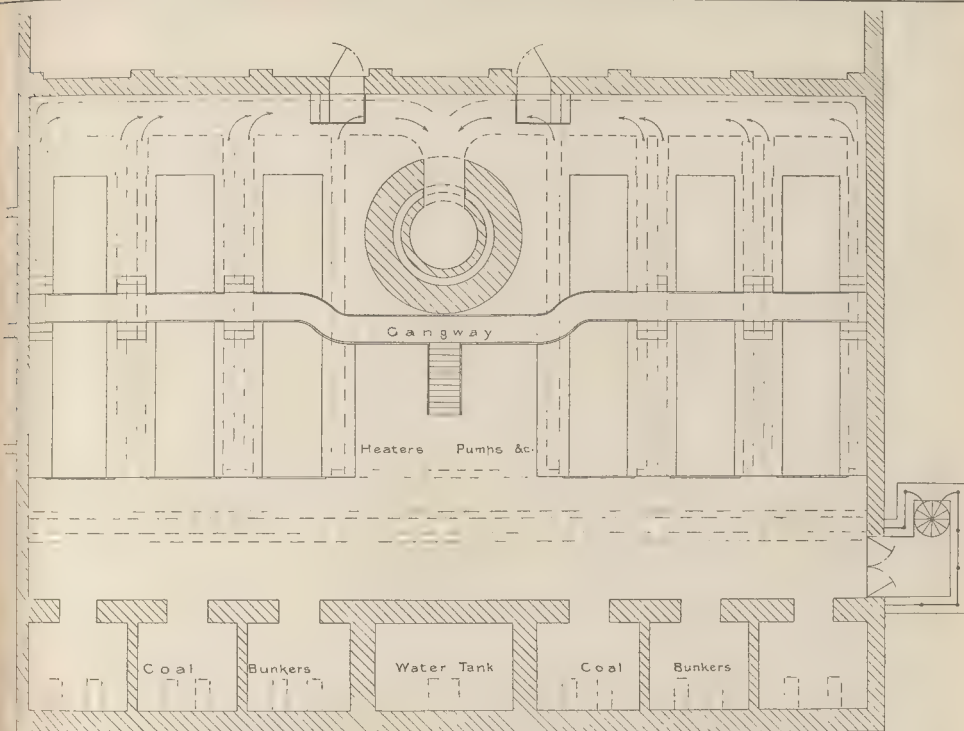


Fig. 59.

# The Student's Column.

## STEAM BOILERS AND PIPES.—XX. BOILER-HOUSE PLANT AND PIPE SERVICES.

NO general rule can be laid down for the arrangement of apparatus in a boiler-house. The designer must use his discretion, keeping before him the necessity of placing each item of the plant in a position where it will not be liable to accidental injury or exposed to hostile influences, where it can be connected with a minimum quantity of piping, and where it can be examined or disconnected in time of need with a minimum amount of trouble; finally, he must bear in mind the convenience of the staff by whom the installation will have to be used.

When an entirely new building has to be designed the problem of evolving a suitable boiler-house arrangement is comparatively simple, especially if the site is of ample area. On the other hand, when the plant has to be accommodated in an existing building, or the extension of an existing building, it is generally difficult to arrive at an ideal scheme of arrangement.

For instance, the place most suitable for the pump-room may have to be occupied by the coal store, for reasons connected with the disposition of other portions of the building, the only permissible site for the chimney may necessitate the erection of the economiser in the least convenient position for the pumps and water heaters, and, owing to special circumstances, the engine-room may have to be situated just where the designer would like to place some parts of the boiler-house equipment. In such cases the system ultimately adopted represents a compromise between the desirable and the attainable. Difficulties of the kind are frequently aggravated by the boundaries of the available building site, and compromise becomes still more necessary.

Figs. 59 and 60 are plans of boiler-houses representing the two sets of conditions—(1) under which the designer had free scope, and (2) under which his hands were more or less tied by the narrowness of the site and other circumstances.

Fig. 59 is a plan of the boiler-house for an electricity generating station in the North of England. Between the two groups of boilers shown in the drawing a convenient place is provided for the feed pumps and water heater. The two main flues behind the boilers meet at the chimney inlet, and exhaust steam from the engine-room—placed parallel with the boiler-house—passes by one side of the chimney to the water heater. A gallery running above the two sets of boilers and over the pump-room is very convenient for the regulation of valves and the examination of the boiler mountings and steam pipes. The boiler-house floor is a few feet below the outside ground level, thus facilitating the direct delivery of coal into the two rows of bunkers, the position of which is excellent for convenience in stoking. A cold-water storage tank is situated between the coal bunkers. The feed main and blow-off pipe are in the continuous pit along the front of the boilers, branches being taken to the feed-valves, scum-cocks, and blow-off cocks.

As an example of symmetrical arrangement the plan in Fig. 59 is good, although presenting two manifestly undesirable features. One is the omission of fuel economisers, which may justly be regarded as absolute essentials in an installation of this character, and the other is the situation of the chimney-shaft in a position where its weight cannot but affect the foundations of the surrounding building, and particularly the wall immediately behind the main flues.

In this particular the designer appears to have sacrificed principles of sound construction to a desire for symmetry. If he had carried a main flue beneath the engine-room at the back of the boiler-house, or had continued the line of flue through one end of the boiler-house, the chimney could have been built with an entirely separate foundation, thus avoiding the risk of causing unequal subsidence of the soil supporting the foundations of the building and machinery.

Fig. 60 is a plan containing a diagrammatic representation of the steam generating plant and boiler-house pipe services for a public institution in the Midland Counties. As this is a class of installation more likely to interest

our readers than the equipment of power-houses for electricity stations, we subjoin details of the apparatus included, and a description of the pipe system connected therewith.

**Boilers.**—The boilers are of the Cornish type, each measuring 15 ft. long by 5 ft. diam., worked at 80 lb. pressure, and fitted with mechanical stokers in order to reduce smoke production to a minimum, this being particularly desirable owing to the proximity of a residential quarter of the town.

**Economiser.**—The economiser consists of one battery of twenty-four pipes, the arrangement of the flues being such that the furnace gases can be delivered direct to the chimney-shaft when this course is necessary for permitting the examination or cleaning of the economiser.

**Pumps.**—In the small pump-room at the front of the boiler-house a Worthington boiler feed-pump is fixed, and a Worthington automatic pump and condense receiver for collecting and dealing with water of condensation gravitating through a system of condense mains and branches from the adjacent buildings. As the ground slopes down from these buildings no difficulty occurs in connexion with the return flow, and the pump-room floor is level with that of the boiler-house.

A boiler feed-tank, 3 ft. by 3 ft. by 3 ft., built of ½-in. steel plate, is fixed on rolled steel supports above the boiler-house floor at a suitable height, and furnished with the following fittings:—

- One 1-in. flange for cold water supply.
- One ¾-in. equilibrium ball valve.
- One 1½-in. flange for delivery pipe from automatic pump and receiver.
- One 1½-in. internal standpipe, with strainer 4 in. above bottom of tank, and external flange for suction pipe of boiler feed-pump.
- One 1½-in. flange on bottom for wash-out pipe.
- One 1-in. flange for overflow pipe.
- One 2-in. flange on top for vent pipe.
- One set of water gauges.
- One altitude gauge, on the dial of which may be read the exact depth of water contained in the tank, fixed on the wall of boiler-house, and this gauge is connected with the tank by a ½-in. diam. pipe.

**Storage Tank.**—A cold-water storage tank, capacity 600 gals., of ½-in. steel plate, is



fixed on rolled steel supports over the store next the engine-room. It has a loose cover of steel in two parts, and the following fittings:—

- One 13-in. flange for cold water supply.
- One 13-in. equilibrium ball valve.
- One 24-in. internal standpipe, with strainer 6 in. above bottom of tank, and external flange for service pipes.
- One 13-in. flange for overflow pipe.
- One altitude gauge with pipe and connexions, as provided for boiler feed tank.

**Blow-off Sump.**—In the yard to the left of the boiler-house, a cast-iron blow-off sump is placed in a brick pit, the sump being 3 ft. deep by 2 ft. diam., having a flanged top and cover secured by bolts, and jointed by means of a metallic gasket. It has a 3-in. diam. inlet flange, the centre of which is about 6 in. below the top of the sump. At the opposite side is a 3-in. flanged outlet, with an internal siphon pipe extending to about 6 in. above the bottom. At right angles to the line between inlet and outlet a 2-in. flange is provided for the connexion of a ventilation pipe.

**Steam Engine.**—The engine is of the vertical type, developing 12 brake horse-power when running at 230 revolutions per minute with steam at 80 lb. per square inch.

**Exhaust Steam Heater.**—The heater fixed in the engine-room is of the vertical type, fitted with blockings for exhaust and live steam, for circulation pipes, and for condense pipes.

**Hot Water Tank.**—This tank has a capacity of 300 gals., being built of  $\frac{1}{8}$ -in. steel plate. It is fixed above the engine-room floor on rolled steel supports, and is provided with the following fittings:—

- One supply cistern with 14-in. equilibrium ball valve.

- One 14-in. flange for cold water supply.
- Two 2-in. flanges for circulation pipes from heater.
- One 13-in. flange for ventilation pipe.
- One set of water gauges.
- One altitude gauge and connexions, as previously described for boiler feed tank.
- One live steam heater for use when exhaust steam is not available.

**Steam Pipes.**—The 3-in. junction valve on each boiler is fixed with the outlet facing at right angles with the axis of the boiler, and upon the outer flange of the junction valve is fixed a special 3-in. diam. wrought-steel spring bend of sufficient length and radius to permit free expansion and contraction.\* Next to each bend a 3-in. back-pressure valve is fixed, these being connected with the 3-in. outlets of a 4-in. steel collecting pipe, closed at each end with a blank flange.

The collecting pipe is fitted with a 1-in. automatic drain-valve for the removal of water while pressure is off, and connected with a 1-in. Sirius steam trap for the removal of water while pressure is on. These two fittings discharge into the condense receiver in the pump-room.

The steam mains over the boilers are supported by cast-iron pillars resting on the crown of each boiler, the flanged bases of the pillars being curved to fit the circumference of the boilers; and the tops of the pillars are adjustable with a concave curve to fit the pipes.

From the left-hand end of the collecting pipe, a 3-in. steam main, with stop-valve, is carried as far as the entrance to a pipe conduit near the pump-room, this conduit accom-

\* In cases where this arrangement is inconvenient, expansion joints or pipes must be used.

modating a steam main which runs for a distance of some 400 ft. to the adjacent buildings.

From the right-hand end of the collecting pipe a 3-in. steam main, with stop valve, is carried into the engine-room, where a steam dryer, or separator, is fixed, together with a 1-in. Sirius steam trap and drain pipe.

Beyond the separator a 2-in. branch from the upper side of the main is taken to the steam engine. A 14-in. high-pressure branch with stop valve, is taken from the main, and then come a stop valve, pressure-reducing valve, and safety valve, the waste pipe from the safety valve being connected up to the drain pipe from the steam trap of the separator, and the two drain pipes merging into one of 14 in. diam., which discharges into the condense receiver in the pump-room.

A 1-in. branch on the low-pressure main beyond the reducing valve supplies a 4-in. pipe carried to the live steam heater in the hot-water tank, and a 3-in. pipe to the exhaust steam heater, each of these pipes having a stop valve of corresponding size. By means of the last-mentioned pipe the exhaust steam heater is rendered available for use as a live steam heater at times when the engine is not running.

Some of the exhaust steam from the engine is used for heating a drying chamber, and the balance enters the water heater through a branch pipe on the exhaust main. A by-pass arrangement is provided so that all the exhaust may be delivered either to the drying chamber heater or to the exhaust steam heater, or discharged direct to the atmosphere. The by-pass valves are designed so that they will open automatically under a

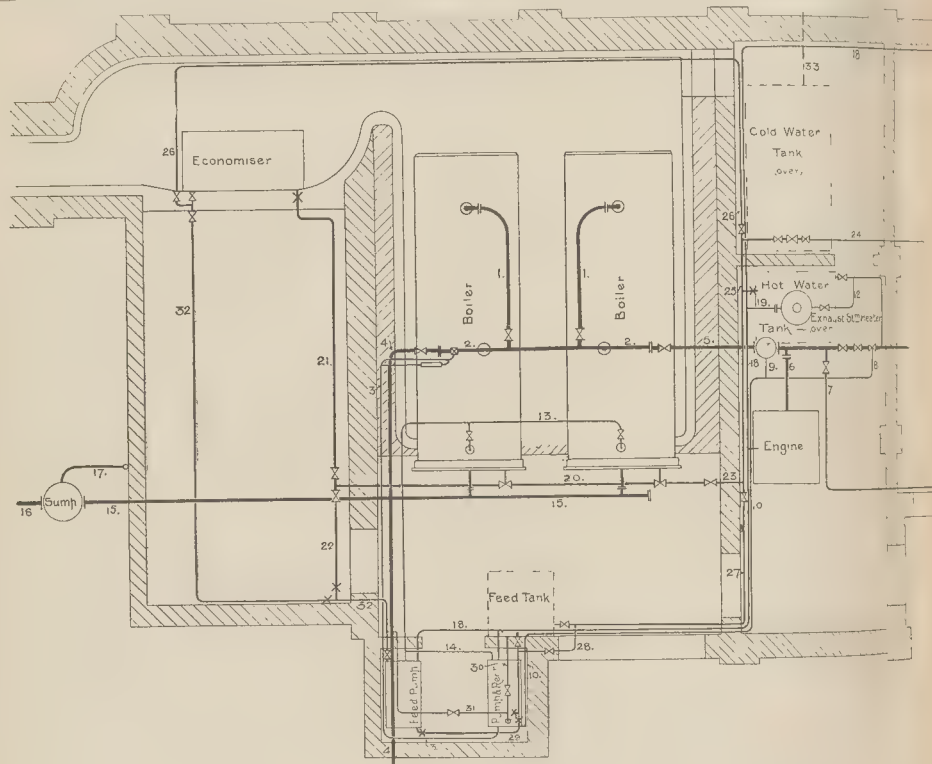


Fig. 60.

1. Steam from boilers.
2. Steam collecting main.
3. Drain from steam main.
4. Steam main to adjacent buildings.
5. Steam main to engine room.
6. Steam branch to engine.
7. High-pressure steam branch.
8. Drain from safety valve.
9. Drain from steam dryer.
10. Combined drain from (8) and (9).
11. Low-pressure steam to heater and hot-water tank.

12. Steam branch to heater.
13. Steam supply to pumps.
14. Steam branch to automatic pump.
15. Blow-off from boilers.
16. Discharge from blow-off sump.
17. Vent from blow-off sump.
18. Exhaust from pumps and engines.
19. Exhaust steam to heater.
20. Boiler feed main.
21. Delivery from economiser to feed main.
22. Delivery from feed pump to feed main.

23. Cold water connexion to feed main.
24. Cold water to laundry.
25. Cold water to boiler-house and hot-water tank.
26. Cold water to economiser.
27. Cold water to feed tank.
28. By-pass to feed tank down pipe.
29. Down pipe from feed tank to pump.
30. Delivery from automatic pump to feed tank.
31. Branch from (30) to feed pump.
32. Delivery from feed pump to feed tank.
33. Overflow from cold-water tank.

pressure of 5 lb. per square inch, the object being that the exhaust steam shall always be able to gain access to the outer air, even if all the valves should be closed simultaneously.

Water resulting from the condensation of exhaust steam is delivered from steam traps and discharged through suitable pipes to the nearest drains, instead of being collected in the condense receiver, the object being, of course, to avoid the risk of grease in the feed-water for the boilers. Circulation pipes are connected between the exhaust steam boiler and the hot-water tank, but these do not require further notice, as the tank is not for boiler feeding purposes.

From two 3-in. flanges riveted on the pumps a 2-in. steam pipe is taken to the pumps, where 1-in. branches are carried to the feed and automatic pumps. A 3-in. stop valve is provided close to the flange on each pump. This arrangement permits the pumps to be used when the main steam valves are closed.

**Blow-off Pipes.**—The blow-off main extends along the pit in front of the boilers, is supported on brick pillars. The main is of cast-iron, 3 in. diam., with flanged joints. The right-hand end of the blow-off pipe is terminated with a blank flange, and the other end is continued through a wall of the boiler-house, and connected up to the blow-off sump. Suitable outlets are provided for the connexion of the pipes from the blow-off cocks of the boilers.

On the 3-in. outlet flange of the sump a short piece of flange and socket cast-iron pipe is fitted, from which connexion is made with a nearest drain. Commencing at the third flange on the sump, a 2-in. venting pipe, galvanised wrought-iron is carried up the side wall of the boiler-house, and finished with a galvanised weather cone at a height of about 4 ft. above the eaves.

From the blow-off cock of the economiser a 1-in. pipe is taken to the nearest drain.

**Water Pipes for Valves and Cocks.**—All water cocks on the pumps and cocks on the boilers are fitted with copper drain pipes leading down to 3 in. above floor level, and turning over gullies where these are available.

**Exhaust Steam from Pumps.**—Exhaust steam from the feed pumps is collected in an exhaust pipe of 1 in. diam., and delivered to the exhaust pipe from the steam engine. The pipes fitted on the exhaust pipes are carried to the nearest drains.

**Boiler Feed Main.**—The feed main for the boilers, of 2 in. diam., is carried above the tops of the boilers with vertical branches of 1 in. diam. to the feed valves of the boilers, each branch being controlled by a stop valve next to the outlet on the main. The 1-in. by 14-in. T-piece is fitted at the left-hand end of the feed main, the 14-in. end being connected with the delivery pipe from the economiser, and the 1-in. outlet end with an alternative delivery pipe from the feed pump. The right-hand end of the feed main is connected up to a 14-in. cold water pipe from the storage tank. Stop valves of suitable sizes are provided and fixed at the above-mentioned outlets and at the main points.

**Water Pipes.**—From a stop valve on the side of a water storage tank a 14-in. main is carried direct to the boiler feed main.

From this 14-in. main a 1-in. branch, with stop valve at each end, is connected up to the economiser, and a 1-in. branch, with stop valve, to the boiler feed tank. A down pipe, of 1 in. diam., is carried in 14 in. diam. from the feed tank to the boiler feed pump, and a by-pass arrangement between the cold water branch and the feed tank down pipe, so that the boiler can be fed directly from a cold-water tank, if desired, at any time. The down pipe can also deliver into the automatic pump receiver if required.

A 14-in. delivery pipe from the automatic pump and condense receiver is carried up to the feed tank, with an alternative branch leading the delivery pipe from the boiler feed pump. Stop valves are fitted so that either branch may be used in case of need.

A 14-in. delivery pipe, with stop valve, is taken from the boiler feed-pump to the economiser, and connected up to the inlet valve, with a branch, with stop valve, is taken from the delivery pipe direct to the boiler feed tank for alternative use.

A 14-in. overflow pipe is fitted to the cold-

water storage tank discharging outside the building.

From the boiler feed tank, a 14-in. wash-out pipe, with stop valve, is carried to the nearest drain, a 1-in. overflow pipe to the outside of the building, and a 2-in. vent pipe through the roof to a height of 4 ft. above the eaves, and finished with a galvanised weather cone.

From the outlet valve of the economiser a 14-in. delivery pipe is carried to and connected with the stop valve at the end of the feed main.

**Identification of Pipes and Valves.**—All valves in the boiler-house are furnished with labels stating the use for each valve, each label bearing a distinctive number. A framed and glazed diagram shows all pipes and valves in connexion with the boiler-house, the use of each pipe and valve being clearly stated, and the valves indicated by their distinctive numbers.

The foregoing particulars and the explanatory plan have been placed at our disposal by an engineer of much practical experience in the design of steam-power plants, and we believe they will serve the purpose of making clear, better than a lengthy collection of abstract rules and maxims, the manner in which the pipe systems of a boiler-house and connected departments should be arranged to provide for uninterrupted service under all circumstances.

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**GENERAL BUILDING NEWS.**

**ST. SIMON'S CHURCH, PLYMOUTH.**—The foundation-stone of the Church of St. Simon, Plymouth, was laid on the 8th inst. The plan of the new church will be based on the Devonshire type of triple aisles, having a nave 89 ft. long, and chancel 49 ft., the total width of interior being 58 ft. There will be accommodation for about 750, including the choir. The chapel and organ will be on the north and south sides respectively of the choir. Advantage will be taken of the sloping ground to provide clergy and choir vestries, as well as heating chamber and blowing-engine-room, in an undercroft, the wardens' vestry and the church being approached therefrom by an ample staircase. Local stone will be used for the walls and main gables, with free stone dressings. The architect is Mr. Harbottle Reed, of Exeter. Messrs. Wakeham Brothers provided the foundation-stone and made the arrangements for the laying ceremony.

**BAPTIST CHAPEL, CARDIFF.**—The opening services were held recently in connexion with a Baptist mission station at Cathays, close to the Gladstone Council Schools. The scheme when complete will include a large chapel, school, and classrooms. The part now erected is a school-chapel to seat about 450, with two small galleries over transepts so designed that the lower part can be divided into classrooms by movable partitions. The back portion of the building is divided into classrooms, three being on the ground floor and three on the first floor. The building has been designed by Mr. W. Beddoe Rees, Cardiff, and erected by Messrs. E. R. Evans & Brothers, contractors, Cathays.

**SCHOOLS, CARDIFF.**—The Lord Mayor of Cardiff recently opened the new Allensbank Council Schools in Llanishen-street. The new schools are situated upon a site about 14 acres in extent. The plans were prepared by Messrs. Veall & Sant, architects, to provide accommodation for 400 boys, 400 girls, and 400 infants, together with a caretaker's house, etc., and at the end of 1903 the contract was let to Messrs. Lattey & Co., Ltd., at 14,331, 12s. 3d. The boys are accommodated on the first floor of the two-story block to the east of the site, there being a central hall, 57 ft. by 28 ft., approached by a staircase from the main entrance in Llanishen-street, with a similar staircase from the playground at the rear. Around the hall are arranged the classrooms, of which there are eight—six for fifty scholars, one for sixty, and one for forty. The girls' department on the ground floor is practically a duplicate of the boys' department, and the infants' department is planned on the same principle.

**CLUB PREMISES, WIGAN.**—A new pavilion has been erected by the Wigan Bowling Club at New Lodge, Wigan-lane. The work was carried out under the superintendence of the architects, Messrs. Heaton, Ralph, & Heaton, by Mr. D. A. Abbott, of Wigan.

**LAMBETH MUNICIPAL BUILDINGS.**—At the meeting of Lambeth Borough Council last week the General Purposes Committee reported having received a communication from the architects for the new municipal buildings to the effect that they anticipated that the quantities would be ready by the 18th inst., after which date copies would be ready for tenderers. It was incumbent, therefore, upon the Council to decide by what method, whether open or select, tenders should be obtained for the erection of the buildings.

The ordinary practice of the Council was to throw contracts open for public tender, and the Standing Orders provide that tenders for the execution of works exceeding 100l. estimated cost shall be advertised "unless otherwise ordered by the Council." In the present case the committee were of the distinct and unanimous opinion that a departure should be made from the ordinary practice, and that it would be in the best interests of the Council for the tenders to be invited upon an approved list of selected builders. They were influenced in arriving at this opinion by the special character and magnitude of the work involved in the contract, and also—and perhaps more especially—by the fact that the usual experience in large contracts is that the best firms will not enter for public competitions, inasmuch as they are not disposed to waste their time in getting out the necessary figures on the mere chance only of obtaining the work. When the construction of the proposed embankment at the wharf was first under consideration in February, 1903, the Council then departed from the usual practice and asked six selected firms to tender for the work. With regard to the actual selection of the firms, however, the committee did not think the precedent to which reference has just been made should be strictly followed. On that occasion the committee concerned published in its report the names and addresses of the six particular firms from whom they recommended tenders should be asked; but in the present case there are reasons, which would doubtless occur to the Council, why the selected list should not be openly published. The committee had carefully gone into this matter, and had unanimously agreed upon a list of twenty-four builders of high reputation, whom, should the Council adopt the report, the committee proposed to ask to submit tenders, but whose names they propose to regard as confidential until the tenders have been duly delivered. This is the course which not only the architects but also Mr. Hare, the assessor, strongly advised the Council to adopt. The committee proposed that tenders should be delivered not later than noon on Thursday, December 21, and formally opened and initialled in accordance with the Standing Orders at the meeting of the Council on that day; and, unless there should be unforeseen difficulties in the way, the committee hoped to be in a position to bring up a recommendation to the Council at its first meeting after the Christmas recess, on January 18, 1906. The report and the committee's recommendations were adopted, and it was further resolved, in order that financial matters might be placed in train, that application be made to the London County Council for its consent to a preliminary loan of 35,000l., which would be sufficient to satisfy outgoings under the contract for some time.

**HOTEL, SANDSEND.**—A new hotel is in course of erection at Sandsend, from the designs of Mr. F. A. Tugwell, architect, of Scarborough. The builders are Messrs. John Braim & Sons.

**LIBRARY, CHADDERTON.**—Mr. A. R. Groom writes to say that the architects of this building were himself and Mr. Grant, under the style of "Groom & Grant," not Mr. Lindsay Grant alone.

**COUNTY COURT AND INLAND REVENUE OFFICES, CARDIFF.**—New County Court and Inland Revenue offices, adjoining the post-office, Westgate-street, Cardiff, have just been erected. The architect of the building is Mr. H. N. Hawks, his Majesty's Office of Works, London, and the contractor is Mr. James Allan.

**THEATRE, CARDIFF.**—A new theatre is in course of erection at Cardiff. The work is being carried out from the designs of Messrs. Ernest Runtz & Ford, architects, by Messrs. James Allan & Sons, contractors.

**BRANCH LIBRARY, EDINBURGH.**—The Morning-side branch of the Edinburgh Public Library has just been opened. The building was designed by Mr. Morham, the City architect, and cost about 6,000l.

**RAILWAY STATION, FENTON.**—A new railway station has been opened at Fenton. The work was planned in the office of the North Staffordshire Railway Company's Engineer, Mr. Crosbie Dawson, and has been carried out by Mr. T. R. Yoxall, contractor, of Stoke, under the supervision of Mr. Adams.

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**FOREIGN.**

**FRANCE.**—The bust, in bronze, of Jules Cousin who was the founder and organiser of the historic collections of the Paris Municipality, has been placed in the Carnavalet Museum. The bust is the work of M. Chas. Jaquot. —A nephew of the late M. Henner has offered to the city of Paris a certain number of works by the eminent painter, including the "Nympha Endormie," which figured in the Salon of 1903. The pictures will be placed in the Petit Palais in the room next to the Ziem collection, where will be placed also the bust of Henner by M. Dubois. The demolition of the Galerie des Machines at Paris is to be commenced shortly; it was built, as will be remembered, from the plans of M. Dutert, to form the machinery gallery of the 1889 exhibition. —The new hospital for contagious diseases, at Aubervilliers, is shortly to be opened. It is







one portion of the block thus formed  
as a common lodging-house for 118  
persons. The other portion was licensed for 104  
persons. At the date mentioned the renewal of the  
license was refused on the ground that the building  
was not suitable for the purposes of a common  
lodging-house. The premises were at least  
20 years old, and were mainly composed of wood.  
The cellars were dark. The rooms on the  
upper floors were on different levels. There were  
narrow doorways and small windows. In  
fact it was the most mixed-up set of buildings  
ever seen, and he felt quite at a loss for  
words in which to describe them. The  
building was like, in fact, a rabbit warren with little  
rooms and dark corners, and if a fire occurred  
it was used as a common lodging-house  
it was too terrible to think of must happen,  
everything connected with the building was  
in a state of decay. The women's kitchen was  
in a long, and until recently was always crowded,  
narrow kitchen. Women dressed and undressed  
in the kitchen, and cooked their food in the same  
place. There was little natural light and scarcely  
any air. The men's kitchen was in the basement.  
It was almost dark, and even in the daytime it  
was illuminated by means of four gas jets.  
The kitchen there was a huge fireplace with an  
immensely large chimney, which was supposed  
to have enabled Jack Sheppard, to escape from  
street runners who were trying to bring him  
justice. In the event of fire the men and  
women would have to escape by crawling over  
the roof between their respective quarters. He  
(Mr. Belling) suggested that the magistrate  
should inspect the premises and see their con-  
dition for himself.  
Mr. S. Gamble, second officer of the Metro-  
politan Fire Brigade, said that, so far as he could  
ascertain, the building was at least 20 years old.  
It was built of brick, and had been worn out  
for a long time. Owing to the peculiar  
arrangement of the place smoke (which was often  
heard than fire) was likely to permeate the  
building before flames were discovered. It  
was a very difficult building to escape from  
in case of fire, one reason being that it was chiefly  
composed of wood.  
The inquiry was adjourned to enable the  
magistrate to inspect the building in question.—  
Daily Post.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.\*  
1,904.—J. W. WADKIN and D. J.  
DARR: *Wood-working Machines.*  
This relates to a wood-working machine, and  
consists of centrally-pivoted counter-balanced  
arms, in which the cutter spindle head is carried,  
each for locking said arm on a dead horizontal  
position, means for locking said arm to any desired  
position and means including a crank or other  
mechanism for moving the arm to a definite  
angle of inclination, where it is self-locking.  
1,904.—A. H. BARKER: *Apparatus for*  
*circulating Water and Circulating the Heated Water.*  
This relates to an apparatus for heating and  
circulating water, the heater comprises a  
vertical expansion tank or reservoir situated at  
about the highest part of the apparatus, a  
system of circulating pipes leading from  
bottom of said tank or reservoir to said  
heater, and a rising main or pipes leading from  
top of said tank or reservoir, the said  
expansion tank or reservoir containing a series  
of perforated trays, and a steam pipe supplying  
heat at or about atmospheric pressure into said  
expansion tank on one side of the same, the exhaust escaping  
to opposite side.  
1,904.—J. M. NICHOLLS: *Ventilators for*  
*Windows and other Openings, Metal Safes, and*  
*other Purposes, also as Window Blinds.*  
This relates to a ventilator for windows and  
other openings, and consists of a double frame  
or middle frame, each covered with a finely  
perforated material, for forcing the ventilating  
air to pass through the air.  
1,904.—L. STANWELL: *Apparatus for use*  
*in Manufacturing Mosaic Tiles, and the like.*  
This invention relates to an artificial stone press,  
consists of an intermittent rotating press  
carrying moulds, in combination with an  
upper frame arranged above the press table, and  
divided with transverse partitions, dividing it  
into compartments corresponding to the mosaic  
tiles, a bottom frame with transverse  
partitions also dividing it into similar compart-  
ments, flexible partitions connecting the parti-  
tions of the upper frame with those of the bottom  
frame, and means for lowering the bottom frame  
into empty mould on the press table, and  
raising it again after the mosaic material has been  
pressed on the bottom of the mould.  
1,904.—E. GORBE: *Rotary Kilns for*  
*burning cement.*  
This relates to a rotary kiln for burning cement-  
material, and consists in the combination  
of these applications are in the stage in which  
they are to the grant of patents upon them can

of a gas producer so arranged as to receive the  
burnt hot cement-making material, to which  
coal is added in suitable quantities for the opera-  
tion of the kiln, this coal being burned by a  
mixture of steam, or steam and air, so as to  
produce gas, giving a more intense heat than the  
gas from ordinary producers owing to the calories  
supplied to the gas by the hot cement-making  
material.  
27,817 of 1904.—A. E. WYNN: *Ventilation of*  
*Water-closets.*  
This relates to water-closets having an air inlet  
or inlets to the basin provided close beneath the  
seat, and air outlets from the basin to a ventilat-  
ing pipe or passage, and is characterised by the  
provision of a deflecting rim or flange opposite  
said inlet or inlets on the inner side of the rim of  
the basin, and the arrangement of air outlets  
mainly near to, but also at some distance above  
the bottom of the pan or basin, whereby the  
ventilating air current through the basin is  
deflected away from the user, and traverses the  
whole of the basin, and provision is also made  
for avoiding any suction of the water up the  
outlet ventilating passage of the basin.  
27,972 of 1904.—P. KEMP: *Swinging Window*  
*Sashes.*  
This invention relates to window sashes of the  
kind that are swung inwards on their frames for  
the purpose of cleaning the outer side of the glass  
from within an apartment, and consists of a  
window sash pivoted by means of a hinge part to  
a vertical rod secured on the batten rod in such  
a manner that the window may be raised to a  
limited extent, and when so raised a plate or the  
cross rail of the sash is brought above the level of  
a corresponding shelf or angle plate projecting  
from the batten rod, so that when the window  
sash is swung inwards its weight is in part sup-  
ported by the plate on the rail resting on the  
shelf plate.  
8,019 of 1905.—H. ALTY: *Dies for Making Bricks,*  
*Tiles, and the like.*  
This relates to dies for making bricks, tiles, and  
the like, and consists in making them at the  
larger end where the clay enters, with rounded or  
concave corners, and these corners arranged to  
diminish and gradually become more acute  
towards the front or smaller end of the dies, until  
finally at the front, where the clay leaves the dies,  
they become sharp rectangular corners.  
15,189 of 1905.—GANN & Co.: *Retaining Device*  
*for Automatically Rising Closet Seats.*  
This relates to a retaining device for automati-  
cally rising closet seats, and is characterised by  
having the rising seat held fast by a bolt or other  
stop which so co-operates with the closet door  
that the seat is released on opening or closing of  
the said door.  
16,052 of 1905.—A. HOLTZHEUER: *Top for*  
*Chimneys, Ventilators, and the like.*  
This relates to a top for chimneys, ventilators,  
and the like, and consists in making such top in  
the form of a flexible tube, which tube, owing to  
its flexibility, bends more or less from its original  
position, under the lateral pressure of the wind,  
and as the wind ceases resumes its original  
position.  
19,380 of 1905.—J. I. MOSS: *Self-acting Window*  
*Locks.*  
This invention relates to self-acting window  
locks, and consists in combination a bearing for  
attachment to the lower sash, a rectangular  
plate for attachment to the upper sash, said  
rectangular plate having an integral cheek, an  
extension of said cheek, a hole in said cheek, a  
sector or guide made integrally with the said  
rectangular plate, a shoulder on said sector or  
guide, a lug protruding from the rectangular  
plate, a hole in said lug, a pivot passing through  
and resting in the hole in said lug, and in the  
hole in the cheek, an elongated slot in the rectan-  
gular plate, which slot is bridged by the said  
pivot pin, a semi-circular disc suspended by the  
said pivot pin, and capable of a radial movement  
between the said cheek and the said sector or  
guide, said semi-circular disc having its outer  
half lightened and provided with strengthening  
ribs, and its inner portion of heavier construction  
than the outer portion, and a stop upon the top  
of said inner portion.  
23,435 of 1904.—T. F. BRAINE and J. H. BRAINE: *Sanitary Buckets.*  
This relates to sanitary buckets having a band  
or belt formed out of the surplus material of the  
blank of sheet metal, and in which the central  
portion of the blank is utilised for forming the  
body of the sanitary bucket, and consists in the  
combination with the body of the said bucket,  
of an abutment also formed out of a portion of  
the said surplus material, and the arrangement  
of the said abutment upon the outside of said  
body.  
25,093 of 1904.—C. R. LLOYD: *Fencing.*  
This relates to the making of barbed wire for  
fencing purposes, and consists in fixing independ-  
ently-made barbs to the wire by clinching  
them thereon as and when desired.

27,087 of 1904.—J. C. BUSBY and A. E. ELMES: *Valves for Controlling Hot and Cold Water*  
*Supply to Public and other Baths, and the like.*  
This relates to a combined hot and cold water  
supply apparatus, and comprises a pair of spring-  
pressed valves arranged in axial alignment  
within a single casing, adapted to be opened and  
closed in opposite directions, and provided with  
means for preventing their too sudden or violent  
closure, and cam mechanism interposed between  
the ends of the valve spindles, and adapted to  
act on the opposed ends of the respective spindles,  
the casing being formed in one with a central  
chamber in free communication with the bib or  
delivery pipe and communicating with the water  
supply inlets under the control of the valves.  
28,678 of 1904.—A. T. MIRZA: *Automatic Sluice*  
*Gates.*  
This relates to an automatic sluice gate, having  
an axis of suspension or support which increases  
its distance from the lower edge of the gate as  
the gate opens.  
4,296 of 1905.—W. HALL: *Inverts or Blocks for*  
*Sewers, Pipes, and the like.*  
This relates to inverts or blocks for sewers, pipes,  
and the like, and consists in forming the usual  
cavities as tunnels arched over, the arch forming  
the arc of a circle, or being formed of two arcs  
described from different centres, the piers or  
intermediate pieces being vertical.  
5,202 of 1905.—C. A. P. TURNER and J. WUNDER: *Steel Skeleton Construction for Concrete Building.*  
This relates to a concrete construction and  
comprises column moulds and floor beam or  
girder moulds, the latter supporting the floor  
mould and wherein all of the moulds are removable  
and connected to form, when filled, an integral  
concrete structure.  
5,376 of 1905.—J. J. DUNNE: *Exits from Theatres,*  
*Factories, Hotels, and the like.*  
This relates to an exit and consists of a fireproof  
tube or tunnel of any suitable configuration.  
The base or floor of the tubes or tunnels is such as  
to enable the occupants of a building to descend  
to the street in a sitting or other convenient  
posture, the necessary impetus assisting the  
descent being obtained by building the tube or  
tunnel at an angle of 45 deg. more or less, or at  
any less angle consistent with the length of the  
same.  
5,511 of 1905.—J. SMITH: *Flushing Cisterns for*  
*Water-closets, Latrines, and the like.*  
This relates to flushing cisterns for water-closets,  
latrines, and the like, and consists of a siphon  
pipe having an inner wall, which separates the  
outlet from the inlet passages thereof, and a  
hinged or loose jointing to couple said outlet  
passage to the discharge pipe, so that the retain-  
ing and discharging of the contents of a cistern  
to which they are applied may be effected with-  
out the employment of a valve.  
6,040 of 1905.—J. S. OWENS and G. H. CASE: *Method of Constructing Groynes, Breakwaters,*  
*and the like.*  
This relates to the construction of groynes,  
breakwaters, and the like, and consists of the  
combination of a series of reinforced concrete  
tiles fixed at intervals apart, and such intervals  
closed by reinforced concrete slabs fitted to and  
free to slide up or down between the tiles by  
means of longitudinal grooves or projections  
moulded upon the tiles and corresponding pro-  
jections or grooves moulded upon the ends of the  
slabs, there being no other attachment between  
the tiles and slabs.  
8,395 of 1905.—J. MOWLEM & Co., LTD., and  
E. J. BURT: *Centerings for Conduits.*  
This relates to centerings for conduits, and com-  
prises a pair of sectors hinged together at the  
lower end, a series of transverse struts or stretch-  
ers supported upon longitudinal ledges or channels  
provided on the sectors, the said ledges serving  
to stiffen the sectors, and having stops for deter-  
mining the position of the struts.  
15,972 of 1905.—H. JOHN: *Cutting of Girders.*  
This relates to an apparatus for cutting girders,  
and is characterised by two pairs of cutters of  
U-shape, each consisting of a driven upper and  
fixed lower cutter similarly arranged and adapted  
to co-operate with each other, and a pair of  
straight cutters, also comprising an upper and a  
lower cutter, arranged parallel to the arms of the  
U-shaped cutters, the last-mentioned cutters  
cutting the flanges and the straight cutters the  
webs, for the purpose of enabling the girder to  
be cut at both ends without being turned.  
17,883 of 1905.—H. ANDERS: *Artificial Stones,*  
*Blocks, or Slabs for Building Purposes.*  
This relates to artificial stones, blocks, or slabs  
for building purposes, and consists of any desired  
material, having one or more dovetail or under-  
cut grooves, a channel passing around its edges,  
and provided with an impermeable layer of tar  
or similar material, said channel being adapted  
to receive a hempen or like rope impregnated  
with such material, and the grooves with cement  
to bind the centres or the like together.



SOME RECENT SALES OF PROPERTY:  
ESTATE EXCHANGE REPORT.

Nov. 2.—By HAMPTON & SONS (at Newbury). Newbury, Berks.—The Sharn Estate (outlying portions), area 370 a. 2 f. (in numerous lots). £12,775	
Nov. 4.—By WRIGHT & SCRUBY (at Cambridge). Balsham, Cambs.—"The Queen's Head Inn and three cottages adjoining, f. .... 825 "The Fox and Hounds" b.h.l. .... 170 Trumpington, Cambs.—Fifteen freehold building plots ..... 594	
November 6.—By BRIDGMAN & SON. Cheshunt, Herts.—63, Crossbrook-st., f., y.r. 177. 24 and 64, Crossbrook-st. (s.), f., y.r. 484. .... 290 30 and 32, Crossbrook-st., f., y.r. 581. 8a. .... 790 Waltham Cross, Herts.—High-st., "The Wheat-sheaf" b.h.l., f., y.r. 231. 8a. .... 865 231 to 171 (odd), High-st., f., y.r. 129. .... 1,150 253 to 259 (odd), High-st., f., y.r. 581. 10a. .... 2,470 186, 188, 192, and 194, High-st. (s.), f., y.r. 1404. 113, High-st. (s.), area 0 a. 2 r. 5 p., f., y.r. 701. Cheshunt, Herts.—1 and 2, Rowlands-rides, f., w.r. 271. 6a. .... 2,965 Andrews-la., freehold building land, 6 a. 1 r. 20 p. .... 1,700 Waltham Abbey, Essex.—20 and 21, Silver-st., f., w.r. 211. 8a. .... 520 Waltham Cross, Herts.—1 to 20, Cecil-rd., f., w.r. 325. 16a. .... 150 Cecil-rd., a piece of building land, 0 a. 3 r. 0 p. .... 3,800 Cheshunt, Herts.—Crossbrook-st., "The Ives" and "Ivy House," f., y.r. 1354. .... 190 118, Crossbrook-st. and 0 a. 1 r. 4 p., f., w.r. 201. 18a. .... 3,850 129, Crossbrook-st. (s.), f., y.r. 251. .... 600 By ST. QUINN & SON. Limehouse, "Narrow-st., "Flaxmill Wharf," area 2,500 ft., f., y.r. 1281. .... 610	
By WEATHERALL & GREEN. Clackenwell.—20, 21, and 22, Great Bath-st. (s.), area 1,600 ft., f., y.r. 117. .... 2,050 By G. P. PRICE & T. V. PRICE (at Bulth Wells). Aberedw, Radnor.—"Trevaughan Farm," 209 a. 1 r. 3 p., f., y.r. 1401. .... 2,150 "Pontney" (residence), or other copyhold, Garreg Farm, 83 a. 1 r. 30 p., f., y.r. 1001. Llanbedr Painscastle, Radnor.—"Pencommon" holding, 19 a. 1 r. 19 p., f., y.r. 161. .... 3,100 November 7.—By ANDREWS & RICH. Upper Caterham, Surrey.—Spencer-rd., f.g. rents 30l., reversion in 97 yrs. .... 3,000 By CROFTS & CO. Tooting.—4 and 6, Brightwell-cres., f., w.r. 461. 18a. .... 400 By E. & A. SWAIN. Hampstead.—Elm-row, "Elm House," f., p. .... 900 Notting Hill.—23, Lansdowne-rd., f., y.r. 1101. .... 2,025 November 8.—By BAXTER, PAYNE, & LEPPER. Bickley, Kent.—Page Heath-la., Orpington. "The Knoll" and "Elizabeth Cottage," f., y.r. 2551. .... 2,950 Beckenham, Kent.—2 and 4, Chancery-la., u.t. 913 yrs., R.R. Ch., w.r. 591. 19a. .... 455 Brondesbury.—2, Christchurch-av., u.t. 67 yrs., g.r. 181, y.r. 851. .... 690 By R. W. MANN & SON. Leyton.—2 and 4, Abbott's Park-rd., u.t. 891 yrs., g.r. 121, y.r. 551. .... 400 Hornsey.—53 to 59 (odd), Sidney-rd., u.t. 54 yrs., g.r. 161. 8a., w.r. 1401. 8a. .... 785 By MATTHEWS, MATTHEWS, & GOODMAN. Kentish Town.—6, Castle-rd. (s.), u.t. 201 yrs., g.r. 61, y.r. 431. .... 355 64, Southampton-rd. (s.), u.t. 46 yrs., g.r. 51, y.r. 321. 10a. .... 285 Nov. 10.—By FISHER, STANHOPE, & DRAKE. Finsbury Park.—40, Woodberry-down, u.t. 60 yrs., g.r. 211, p. .... 1,650 By W. A. HEAD. Wimbledon.—151, 153, 155, and 157, Hartfield-rd. (s.), u.t. 98 yrs., g.r. 281, y.r. 1651. .... 1,400 By G. PIERCE & CO. St. John's Wood.—35, Hamilton-ter., u.t. 33 yrs., g.r. 21, e.r. 1301. .... 1,550 By THOMAS PIERCE & MILLS. Trowbridge, Wilts.—The Silver Street Brewery and two Tied Houses, f. .... 6,850	

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gns. for gardens; yd. for yard; g.r. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; et. for court.

## MEETINGS.

FRIDAY, NOVEMBER 17.  
Architectural Association.—Mr. J. A. Gutch on "Old Manor Houses," 7.30 p.m.  
Royal Sanitary Institute.—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse," 7 p.m.  
The Institution of Mechanical Engineers.—The seventh report to the Alloys Research Committee on the properties of a series of iron-nickel-manganese-carbon alloys by Dr. H. C. H. Carpenter, Mr. R. A. Hadfield, and Mr. Percy Longmuir, 8 p.m.  
SATURDAY, NOVEMBER 18.  
Junior Institution of Engineers.—Visit to Messrs. Barclay, Perkins, & Co.'s Anchor Brewery, Park-street, Southwark Bridge, 8.30 p.m.  
MONDAY, NOVEMBER 20.  
Royal Institute of British Architects.—Mr. A. D. Donell on "American Methods of Erecting Buildings," with lantern illustrations, 8 p.m.  
London Institution.—Sir William H. White, K.C.B., on "Submarines," illustrated, 5 p.m.

TUESDAY, NOVEMBER 21.  
Architectural Association Camera and Cycling Club.—Mr. Edwin Gunn on "The Southern Border Towns of Suffolk," 7.30 p.m.  
Institution of Civil Engineers.—Paper to be further discussed, "On Waterways in Great Britain," by Mr. J. A. Saner, 8 p.m.

WEDNESDAY, NOVEMBER 22.  
Architectural Association Discussion Section.—Mr. H. Passmore on "Village Schools," 7.30 p.m.  
Edinburgh Architectural Association.—Mr. J. A. Morris on "An Old Scottish Town," illustrated by lantern slides, 8 p.m.  
Society of Arts.—Mr. F. Martin-Duncan on "The Cinematograph and its Applications," 8 p.m.  
Northern Architectural Association.—(1) Opening meeting of session. Address by the President. (2) Mr. W. Milburn will exhibit a number of lantern slides illustrating buildings of architectural interest in Italy, Rome, etc. 7.30 p.m.

THURSDAY, NOVEMBER 23.  
Institution of Electrical Engineers.—Colonel H. C. L. Holden, R.A., F.R.S., on "The Applications of Electricity in the Royal Gun Factory, Woolwich Arsenal," 8 p.m.

SATURDAY, NOVEMBER 25.  
Royal Sanitary Institute.—A provincial sessional meeting in the Council Chamber, Town Hall, Hastings. A discussion will be opened on "Water Filtration—The Health Aspect," by Mr. A. Scaryn Wilson, D.P.H., M.O.H.; "Pressure Filters," by Mr. Philip H. Palmer, M.Inst.C.E.; and "The Chemical Aspect," by Mr. H. F. Cheshire, B.Sc., F.I.C.

## TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other communications, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any communication to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

## PRICES CURRENT OF MATERIALS.

\*.\* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	
Hard Stocks	£ s. d. 1 7 0 per 1000 alongside, in river.
Rough Stocks and Grizzlies	1 4 0 " " " "
Facing Stocks	2 0 0 " " " "
Shippers	2 0 0 " " " "
Flettons	1 5 0 " " at railway depôt.
Red Wire Cuts	1 11 0 " " " "
Best Fareham Red	3 12 0 " " " "
Best Red Pressed	5 0 0 " " " "
Best Blue Pressed	5 0 0 " " " "
Staffordshire	4 1 0 " " " "
Do. Bullnose	4 6 6 " " " "
Best Stourbridge	3 15 6 " " " "
GLAZED BRICKS.	
Best White and Ivory Glazed	12 0 0 " " " "
Stretchers	11 0 0 " " " "
Headers	11 0 0 " " " "
Quoins, Bullnose, and Flats	16 0 0 " " " "
Double Stretchers	19 0 0 " " " "
Double Headers	16 0 0 " " " "
One Side and two Ends	19 0 0 " " " "
Two Sides and one End	20 0 0 " " " "
Spalls, Churn-ferred, Squints, and Best Dipped Salt Glazed Stretchers and Headers	12 0 0 " " " "
Quoins, Bullnose, and Flats	14 0 0 " " " "
Double Stretchers	15 0 0 " " " "
Double Headers	14 0 0 " " " "
One Side and two Ends	15 0 0 " " " "
Two Sides and one End	15 0 0 " " " "
Spalls, Churn-ferred, Squints, and Second Quality White and Glazed Salt Glazed	2 0 0 " " less than best

BRICKS, &c. (continued).  
Thames and Pit Sand ..... 6 9 per yard, delivered  
Thames Valley ..... 5 3  
Best Portland Cement ..... 28 0 per ton, " "  
Best Ground Blue Lias Lime ..... 3 4 " " "

NOTE.—The cement or lime is exclusive of ordinary charge for sacks.  
Grey Stone Lime ..... 11a. 0d. per yard, delivered  
Stourbridge Fireclay slates 27a. 0d. per ton at rly.

STONE.  
BATH STONE—delivered on road wag- g. d.  
gons, Paddington Depôt. .... 1 0 6 per ft. cub.  
Do. do. delivered on road waggon, Nine Elms Depôt. .... 1 1 4  
PORTLAND STONE (30 ft. average).  
Brown Whitbed, delivered on road waggon, Paddington Depôt, Nine Elms Depôt, or Finslow Wharf ..... 2 1  
White Bashed, delivered on road waggon, Paddington Depôt, Nine Elms Depôt, or Finslow Wharf ..... 2 2

Anacaster in blocks 1 0 6 per ft. cub. 1st class  
Beer ..... 1 8 " " "  
Greschill ..... 1 0 " " "  
Darley Dale in blocks 2 4 " " "  
Red Corshill ..... 2 2 " " "  
Closeburn Red Freestone 2 0 " " "  
Red Mansfield ..... 3 4 " " "  
YORK STONE—Barns Head Quality.  
Scrapped random blocks, 2 10 " " "  
6 in. sawn two sides land- ings to sizes (under 40 ft. super.) ..... 2 3 per ft. super.  
6 in. rubbed two sides ditto, ditto ..... 2 6 " " "  
3 in. sawn two sides slabs (random sizes) ..... 0 11 1/2 " " "  
2 in. to 2 1/2 in. sawn one side slabs (random sizes) ..... 0 7 1/2 " " "  
14 in. to 3 in. ditto, ditto 0 " " " "

HARD YORE.  
Scrapped random blocks, 3 0 per ft. cub.  
6 in. sawn two sides land- ings to sizes (under 40 ft. super.) ..... 2 8 per ft. super.  
6 in. rubbed two sides ditto ..... 3 0 " " "  
3 in. sawn two sides slabs (random sizes) ..... 1 2 " " "  
2 in. self-faced random slabs ..... 0 5 1/2 " " "

Hopton Wood (Hard Bed) in blocks 2 0 per ft. cub. deliv. rly. depôt.  
" " " 6 in. sawn both sides landings 2 7 per ft. super. deliv. rly. depôt.  
" " " 3 in. sawn both sides random slabs 1 0 " " "  
" " " 2 in. do. do. 0 8 " " "

SLATES.  
In. In. £ s. d.  
20x10 best blue Bangor 13 2 6 per 1000 of 1200 sq. ft. d.  
20x12 " " " " 13 17 6 " " "  
20x10 first quality " " 13 10 " " "  
20x12 " " " " 13 15 0 " " "  
16x8 " " " " 7 5 0 " " "  
20x10 best blue Port- 12 12 6 " " "  
madoc ..... 6 12 6 " " "  
20x10 best Eureka un- 15 17 6 " " "  
fading green ..... 15 17 6 " " "  
20x12 " " " " 13 15 0 " " "  
18x10 " " " " 13 5 0 " " "  
16x8 " " " " 10 5 0 " " "  
20x10 permanent green 11 12 6 " " "  
18x10 " " " " 9 12 6 " " "  
16x8 " " " " 6 12 6 " " "

TILES.  
Best plain red roofing tiles, 42 0 per 1000 at rly. depôt.  
Hip and Valley tiles ..... 3 0 per doz.  
Best Broseley tiles ..... 3 0 per doz.  
Do. Ornamental tiles ..... 3 6 " " "  
Hip and Valley tiles ..... 4 0 per doz.  
Best Ruabon red, brown, or brindled do. (Edwards) ..... 3 0 per 1000  
Do. Ornamental do. .... 3 6 " " "  
Hip tiles ..... 4 1 per doz.  
Valley tiles ..... 3 1 per doz.  
Best Red or Mottled Staffordshire do. (Peakes) ..... 3 0 per 1000  
Hip tiles ..... 3 4 per doz.  
Do. Ornamental do. .... 3 6 " " "  
Valley tiles ..... 3 1 per doz.  
Best " Rosemary " brand plain tiles ..... 4 0 per doz.  
Best Ornamental tiles ..... 4 0 per doz.  
Hip tiles ..... 3 8 " " "  
Valley tiles ..... 3 8 " " "  
Best " Hartshill " brand plain tiles, sand-faced ..... 3 0 per doz.  
Do. pressed ..... 3 0 " " "  
Do. Ornamental do. .... 3 0 " " "  
Hip tiles ..... 3 1 per doz.  
Valley tiles ..... 3 1 per doz.

WOOD.  
Deals: best 6 in. by 11 in. and 4 in. by 11 in. 10 0  
" best 3 in. by 9 in. and 2 in. by 9 in. 10 0  
Battens: best 2 1/2 in. by 7 in. and 2 in. by 7 in. 11 0  
" 8 in. and 5 in. by 7 in. and 4 in. by 7 in. 11 0  
Battens: best 3/4 in. by 6 in. and 3/4 in. by 6 in. 10 0  
Deals: seconds ..... 9 0  
Battens: seconds ..... 9 0  
2 in. by 4 in. and 2 in. by 6 in. 8 10  
2 in. by 4 in. and 2 in. by 5 in. 8 10  
Foreign Sawm Boards 1 in. and 1 1/2 in. by 7 in. 10 0  
3 in. 10 0





## CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
INFANT SCHOOL, ST. ALBANS.....	Herts C.C. Education Committee .....	County Surveyor, County Surveyor's Office, Hatfield .....
ENTRANCE GATES, HORSHAM WORKHOUSE .....	Horsham Guardians .....	The Clerk, P. Carfax, Horsham .....
Alterations at Cattle Folds at East Mains, Dufus .....	Enfield U.D.C. ....	J. Witter, Architect, Elgin .....
Street Works, Beaconfield-road, Enfield Lock .....	East India Railway .....	R. Collins, Surveyor, Public Office, Enfield, Middlesex .....
Wood Screws, Nails, etc., Bolls, Nuts, and Rivets .....	do. ....	C. W. Young, Secretary, Nicholas-lane, London, E.C. ....
Stores .....	North-Eastern Railway Co. ....	do. ....
Stationmaster's House at Annfield Plain .....	Manchester Corp. Cleaning Com. ....	W. Bell, Architect, Central Station, Newcastle-on-Tyne .....
Parcel Office Extension, East End, Central Station .....	Ashton-under-Lyme Sanitary Com. ....	do. ....
Line and Line Ashes, etc. ....	Bournemouth Town Council .....	E. Williamson, Town Hall, Manchester .....
Closets, Conversion of, to Water Carriage .....	Blackburn Guardians .....	J. Lome, Sanitary Surveyor, Health Dept., Town Hall, Ashton .....
Sewering Portland and York Roads .....	Bournehead Purposes Com. ....	P. W. Lacey, Borough Engineer, Municipal Office, Bournemouth .....
Sewering Musciffe-road .....	do. ....	do. ....
Street Works, Eccles .....	Eccles Highways Committee .....	Borough Surveyor, Town Hall, Eccles .....
Paving (3,000 yds. cement indurated flag) .....	Erith U.D.C. ....	Surveyor to Council, Bazley-road, Erith .....
Road works, Stanfield-road and Sedgely-road .....	Bournemouth Town Council .....	F. W. Lacey, Borough Engineer, Municipal Office, Bournemouth .....
Workhouse Alterations .....	Blackburn Guardians .....	F. C. Ruddle, Architect, 4, King-street, Blackburn .....
Railing, Smallbridge Rectory, Ground (400 lin. yds.) .....	Rochdale General Purposes Com. ....	S. S. Platt, Borough Surveyor, Town Hall, Rochdale .....
Villa, Station-road, Newtonmore, N.B. ....	do. ....	A. Mackenzie, C.E., Architect, Kingsdale .....
Alterations in Stonebreaking Shed at Workhouse .....	Dorchester Guardians .....	G. H. Brown, Workhouse Master, Dorchester .....
SEW, DRAIN, & RD.-MAK., WES, ISLEWOETH .....	Spring Grove House Estate .....	W. B. Hill, 31, Above Bar, Southampton .....
School (temporary), Shotton .....	Flintshire Education Committee .....	County Surveyor's Office, Mold, Flintshire .....
Fencing (oak), Hove Park .....	Education Committee .....	W. H. Dashedwood Caple, Architect, Church-st., chambers, Cardiff .....
School Alterations, Merrywood School, Southville .....	Hove Corporation .....	H. H. Scott, Borough Surveyor, Town Hall, Hove .....
Roads, Footpaths, Foundations, etc., Birtley Fell Hos. ....	Birtley Education Committee .....	P. Addie, Council House, Birtley .....
Acetylene Gas Lighting Installation, Birtley Fell .....	Chester-le-Street R.D.C. ....	J. H. Mole, Surveyor, Chester-le-Street .....
Water Main between Herrington and Old Fenshaw .....	do. ....	do. ....
REPAIR, TAP-PAV, AT LADYWELL WORKHOUSE .....	Houghton-le-Spring R.D.C. ....	W. Morley, Surveyor, 29, Edwin-street, Houghton-le-Spring .....
Street Improvements, Strawberry Dale .....	Bermansley Guardians .....	Clerk to the Guardians, Guardians' Office, 233, Tooley-street, S.E. .....
Street Works .....	Harrogate Corporation .....	J. B. Langley, Architect, 49, Deansgate, Manchester .....
Mills (Raising Fold Head Mills, Miredale) .....	Stockport Corporation .....	R. Atkinson, Borough Surveyor, Stockport .....
Tramway Maintenance .....	Aston Public Works Committee .....	J. Kirk & Sons, Architects, Huddersfield .....
Premises .....	Holyhead Co-operative Society .....	G. H. Jack, Borough Engineer, Council House, Aston Manor .....
School Alterations, Boys' School, Redwell-rd., Belvedere .....	Erith Education Committee .....	R. Pritchard, Co-operative Society, Holyhead .....
Sch. Boys, Brook-st. Infants', Northumberland Heath .....	Erith Education Committee .....	W. Egerton, Architect, 12, Queen's-road, Erith .....
TECH. INST. AND SECOND SCHL., BELVEDERE .....	Messrs. Shaw & Halliwell .....	do. ....
Eight Hses., Spring-gdn., Burnley-rd., Sowerby Bldg. ....	bbw Vale U.D.C. ....	Matthews & Coleman, 11, Old Queen-street, Westminster, W.C. ....
Incanescent Lamps .....	do. ....	H. Thompson, Architect and Surveyor, Post Office-chambers, Strand .....
Free Wiring .....	Leeds Corporation Gas Committee .....	R. P. Wilson, Consulting Engineer, Council Office, Rotherham .....
Fire Goods .....	Newcastle-under-Lyme Baths Com. ....	R. M. Townsley, Gas Department, East Parade, Leeds .....
Glazing (patent), King's Memorial Baths, Brunswick-st. ....	St. Anne's-on-the-Sea U.D.C. ....	The Surveyor, Council Office, St. Anne's-on-the-Sea .....
Stormwater Overflow .....	Bucks Education Committee .....	Clerk of Works, Education Office, Aylesbury .....
*NEW ELEMENTARY SCHOOL, ICKFORD .....	Manchester Education Committee .....	School of Technology, Sackville-street, Manchester .....
*ALTERS, AND NEW BUILDING, WHITEFIELD .....	Public United Tramways Co. ....	A. Hills, Central Office, The Hayes, Cardiff .....
Generating Plant, Whitechurch Asy. Electric Lighting .....	Mr. D. Hopkins .....	R. S. Trusilian, Secretary, 9, Upper Sackville-street, Dublin .....
Stores .....	Altofts U.D.C. ....	P. L. Thomas, Architect and Surveyor, Bridgend .....
Caretaker's House at Sewage Works .....	Millport Town Council .....	A. E. Greaves, 26, Wood-street, Watfield .....
Pier Widening, etc., Millport .....	Saffron Walden Gas Committee .....	J. Cowan, C.E., 179, West George-street, Glasgow .....
Wrightwork Filings, Packard's District Library .....	Billericay R.D.C. ....	J. R. Rhind, Architect, 67, Hope-street, Glasgow .....
Water-mains (three miles of 4-in. and 3-in.) .....	Hornsey Town Council .....	Merryweather & Son, Ltd., Engineers, Greenwich-road, S.E. ....
Sewer (9-in. Stone, Pipe), Fortis Grn.-rd., Muswell Hill .....	Newport Corporation .....	B. J. Lovgrove, Municipal Offices, 99, Southwood-lane, Highgate .....
Root Strengthening (Filter Ho., Llanvaches reservoir) .....	Lanark District Committee .....	A. H. Forbes, Gasworks Manager, Saffron Walden .....
Sewers etc. (5,200 lin. ft.) Bishopbriggs & Auchinairn .....	do. ....	Borough Engineer's Office, Town Hall, Newport, Mon. ....
Sewer Additions, etc., Rutherglen .....	Town Council of Eile, Liberty, etc. ....	Warren & Stuart, Engineers, 94, Hope-street, Glasgow .....
Rolling Stock .....	South Indian Railway Co. ....	J. & T. W. Currie, Architects, Eile, N.B. ....
Wheels and Axles .....	do. ....	H. W. Notman, 55, Gracechurch-street, London, E.C. ....
Spring (laminated bearing) .....	do. ....	do. ....
Roofing (150 tons) .....	Library and Technical Instruc. Com. ....	S. C. Hunter, Scottish Provident-buildings, Belfast .....
Library, Carnegie Branch, Falls-road, Bellahouston .....	London C.C. ....	Highways Section, Architect's Department, 13, Chancery-lane, S.W. ....
*CAR SHED IN LEVEN-ROAD, POPLAR .....	Borough of Bromley .....	J. S. Speakman, Kingsway, Victoria-st., Westminster, S.W. ....
*MAK. UP PAGE HTH. V.S., MOSSLEA, ETC. RDS., .....	Committee of Management .....	B. Shaw, Secretary .....
Colour, Paint, etc., Royal Bath Hospital, Harrogate .....	Ipswich Guardians .....	H. J. Wright, Architect, 4, Museum-street, Ipswich .....
Alterations, etc., St. John's Home, Ipswich .....	Harrington's Trustees .....	G. Midgley Taylor, Engineer, 27, St. George-street, Westminster .....
Sewers, Surf, Water, etc., New Roads, Leytonstone .....	Chatham Town Council .....	C. Day, Borough Surveyor, Town Hall, Chatham .....
Annual Contracts .....	Carmarthenshire County Council .....	C. H. Mounsey, County Surveyor, Carmarthen .....
Wall (Re-erection of Retaining), at Tenaces Bridge .....	Royal Blind Asylum and School .....	Henry & Maclelland, Architects, 7, South Charlotte-st., Edinburgh .....
Asylum and School Adds., Craigmillar-pk., Edinburgh .....	Chelmsford R.D.C. ....	J. Downist, Engineer, Avenue-chambers, Chelmsford .....
Pumping Machinery, Lagan stone Waterworks .....	do. ....	do. ....
Borehole Pump (taking out, altering, etc.) .....	Derbyshire Education Committee .....	D. Conroy, Architect, 21, Shipquay-street, Londonderry .....
Hall (Catholic Temperance), Lillimaddy, Ireland .....	Mulling R.D.C. ....	F. H. Fisher, Architect, The Mount, Kilmarch, near Sheffield .....
School Alterations, Benishw Council .....	do. ....	C. Sauter, Inspector of Nuisances, West Malling .....
Scavenging, Wouldham .....	do. ....	do. ....
Scavenging, West Malling and Dilton .....	Sleaford U.D.C. ....	Jesse Clare, Surveyor, Sleaford .....
Waterwheel and Pumps .....	Gt. Northern Railway Co., Ireland .....	T. Morrison, Secretary, Amiens-street, Terminus, Dublin .....
Motor-cars (six-steam rail) .....	South Hutton Coal Co., Ltd. ....	J. S. Speakman, Kingsway, Victoria-st., Westminster, S.W. ....
Colliery Stores .....	Widnes Corporation .....	J. R. Lambert, South Hutton, Sunderland .....
Engine (triple expansion) .....	Commissioners of H.M. Works, etc. ....	Isaac Carr, M.Inst.C.E., Widnes .....
*MILITARY SCHOOL, GUSTON, NEAR DOVER .....	Westminster City Council .....	H.M. Office of Works, etc., Storey's-gate, W.C. ....
*RETTING, ETC., SWIMMING BATH .....	H.M. Office of Works .....	R.M. Office of Works, Storey's-gate, Westminster, S.W. ....
NEW POST OFFICE AT HULL .....	Landover Town Council .....	A. S. Williams, Architect, Llandilo .....
Market Alterations and Renovations .....	Newton Abbot R.D.C. ....	Beatty, Son, & Nichol, Banch, .....
Sewerage Disposal, Bovey Tracey .....	Dunmow Advisory Sub-Committee .....	F. Whitmore, County Architect, Duke-street, Chelmsford .....
School Alterations, Great Bardfield .....	Carmarthenshire Education Com. ....	S. Giffard, Nursery-lane, High-street, Dunmow .....
Drain, (surf, water) and metal, Brynamman Playdrg. ....	do. ....	W. D. Jenkins, County Education Architect, Shire Hall, Carmarthen .....
Conveniences, Wall, etc., Pinedge Council School .....	do. ....	do. ....
Paving, Channelling, etc., Cwmbach Council School .....	do. ....	do. ....
School Repairs, Llanfyllfach Council School .....	do. ....	do. ....
School Alterations, etc., Llanwrda Council School .....	do. ....	do. ....
School Repairs, Pontypridd (Llanelli) Council School .....	do. ....	do. ....
Ventilation and Repairs, Alltwalis Council School .....	do. ....	do. ....
Stores .....	East Helton, Trimdon, etc., Collieries .....	Storekeeper, Trimdon Grange Colliery Co., Durham .....
School Additions, etc., Frampton, Cotterell .....	Gloucestershire Education Comm. ....	R. S. Phillips, Surveyor, Shire Hall, Gloucester .....
School Alterations, etc., Heston .....	Heston & Isleworth Education Com. ....	A. Harding, Architect, Council House, Heston .....
Cottages (two) and Stable, Trinity-street .....	Salsbury Municipal Charities .....	J. Harding & Son, Architects, 58, High-street, Salisbury .....
Repairs to Three Houses and the Star Inn, Brown-st. ....	Birkenhead Corporation .....	do. ....
Painting Market Hall .....	Middlesex C.C. ....	C. Brownridge, Borough Enggr. and Surv. Town Hall, Birkenhead .....
*MAGISTRATES' COURTS, ACTON .....	Kent County Asylums Committee .....	County Architect, Middlesex Guildhall, Westminster, S.W. ....
*ADDITIONS, ETC., TOWN HALL, BENTON .....	Edmonton U.D.C. ....	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury .....
*CON. COY. WAY, ETC., AT BARMING HTH. ASY. ....	do. ....	G. Sedes Reaches, Engineer, Town Hall, Edmonton .....
Lake and Two Bridges, Fyrmes Pk., Upper Edmonton .....	do. ....	do. ....

CONTRACTS.—Continued.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Transformed Concrete, part, Queen-st. Wharf & Jetty Staples and Jetty, Refin. Conn. Callop Dockyard Rail, Conserva., Stabling, Cecil Av., Estate, Baldon Two Cottages at Marshfield Road Lime Kilns at Hummanby Part of Docks, Barnfield-road, Exeter NEW COUNCIL SCHOOL, DARLSTON MATERIALS AND WORKS FOR WATER SUPPLY NEW TECHNICAL INSTITUTE	Auckland Harbour Board do. do. do. W. Page & Son Mr. R. C. Upright Staffs, C.C. Education Committee Congleton R.D.O. Rochester Corporation	W. & A. McArthur, Ltd., 150, Leadenhall-street, E.C. do. J. Harper Bakes, Architect, Calverley-chamb., Victoria-sq., Leeds J. Coates Carter, Architect, Bank-buildings, Cardiff Garlick & Flint, Architects and Surveyors, Brixton J. A. Lucas, Architect, Guildhall-chambers, Exeter Graham Balfour, Stafford W. Wyatt, Engineer, 99, Radford-road, Leamington Town Clerk, Guildhall, Rochester	Jan. 9 do. No date. do. do. do. do. do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
INSTRUCTORS, MANUAL TRAIN IN WOODWK. SENIOR ASSISTANT DRAUGHTSMAN TRAINING INSPECTOR AND CLERK OF WORKS SENIOR ASSISTANT	London C.C. Metropolitan Borough of Stepney Acton District Council Glamorgan C.C.	100% 140% per annum 150% per annum 27. 10s. per week	Nov. 27 do. Dec. 1 No date.

Those marked with an asterisk (\*) are advertised in this number.

Competitions, —.

Contracts, lv. vi. vii. x.

Public Appointments, xvii.

TENDERS.—Continued from page 543.

LONDON.—For the supply and laying of high and

medium cables, etc., for the London County Council:—

1.—Tenders for High-tension Cables.

Estimate of Exploitation des Cables

Electricquest ..... £24,664 10 6

N. Helms Cable Co., Ltd. .... 21,950 10 0

National Conduit and Cable Co., Ltd. .... 21,804 10 0

W. T. Glover & Co., Ltd. .... 21,572 9 7

Chadler's Cable and Construction

Co., Ltd. .... 21,396 5 0

British Insulated and Helsby Cables,

Ltd. .... 21,001 16 3

W. T. Hensley's Telegraph Works Co.,

Ltd. .... 20,719 6 6

Simmes Bros. & Co., Ltd. .... 20,670 16 6

Western Electric Co., London\* .... 20,549 18 0

2.—Incomplete tenders.

Tenders for low-tension Cables, feeder-pillars, etc.

Estimate of Exploitation des Cables

Electricquest ..... £45,169 5 0

National Conduit and Cable Co., Ltd.\* .... 40,197 0 0

N. Helms Cable Co., Ltd. .... 40,756 10 5

Chadler's Cable and Construction

Co., Ltd. .... 39,721 15 0

Western Electric Co., Ltd. .... 38,628 7 7

Simmes Bros. & Co., Ltd. .... 35,541 0 0

W. T. Hensley's Telegraph Works Co.,

Ltd. .... 38,154 13 9

British Insulated and Helsby Cables,

Ltd. .... 38,060 15 10

W. T. Glover & Co., Ltd., Manchester\* .... 37,890 0 0

3.—Incomplete tenders.

LONDON.—For cupboards in the bedrooms of

Marble Buildings, Leroy-street, Brompton, for the

London County Council:—

General Builders, Ltd. .... £199

H. T. Holloway ..... 173

Holloway Bros. (London), Ltd. .... 167

P. & T. Thorne ..... 147

W. Smith & Son, Eldon Works, Harleyford-

road, Kennington, S.E.\* .... 123

LONDON.—For providing and fixing glazed casement

frames to all openings in the disconnecting lobbies in the

houses on the Preston-road estate, Poplar, for the

London County Council:—

H. Hensley Bros. (London), Ltd. .... £490

General Builders Ltd. .... 477

H. T. Holloway ..... 390

P. & T. Thorne ..... 384

W. Smith & Son, Eldon Works, Harleyford-

road, Kennington, S.E.\* .... 300

NOTES.—For the supply and erection of hydraulic

rams and gear at the Falconbrook pumping-station,

London County Council:—

A. Goodwin & Son, Ltd. .... £1,020

Allen & Thos. Ltd. .... 1,012

Amson, Frost, & Co., Ltd. .... 953

Goodfield & Kennedy, Ltd. .... 847

J. Cochrane ..... 825

English & English ..... 780

J. Wakeborough & Sons, Brighouse\* .... 633

LONDON.—For engineers' tools and workshop apper-

atus and a two-phase electric motor at Western Revel-

lance, Fulham, for the Metropolitan Asylums Board:

W. T. Hatch, Engineer-in-chief:—

W. T. Hatch, Ltd. .... £498 3 7

W. T. Hatch and Electric Co., Ltd. .... 357 2 9

Speiser & Co. .... 323 16 0

W. T. Hatch, Ltd. .... 249 11 6

W. T. Hatch, Ltd. .... 247 9 6

W. T. Hatch, Ltd. .... 245 4 6

Robbitt, Way, & Co., Ltd. .... 240 15 2

W. T. Hatch, Ltd. .... 234 11 11

W. T. Hatch, Ltd. .... 234 8 0

W. T. Hatch, Ltd. .... 232 18 0

W. T. Hatch, Ltd. .... 228 16 0

W. T. Hatch, Ltd. .... 227 17 6

W. T. Hatch, Ltd. .... 218 18 0

W. T. Hatch, Ltd. .... 216 4 3

W. T. Hatch, Ltd. .... 192 19 0

W. T. Hatch, Ltd. .... 189 9 4

LONDON.—For wiring and fittings for electric light

installation, Lee-green Station, for the London County

Council:—

Barlow & Young. £240 0 National Electric

W. H. Johnson. 183 15 Construction Co.,

J. O. Grant & Co. Ltd. £157 0

Taylor. 175 0 J. Delme & Sons.

O. Clark & Co. 170 0 Ltd. 155 0

F. J. Coleby & Co. 164 10 Hooper, Neary, &

R. Dawson, Ltd. 160 0 Co. Trafalgar-

Durill & Co. 160 0 Greenwich, S.E.\* 141 10

2.—Exclusive of hot water.

LONDON.—For alterations to No. 1, Worship-street,

E.C., for "The Neophone Co." Mr. S. C. Hart, architect.

22, Philipot-lane, London, E.C. .... £223 10

W. Roberts. £598 0 W. Mathew, 223 10

Cordell & Sons. 549 0 Gavin Bros. 351 10

3.—Exclusive of hot water.

MANCHESTER (file of Ely).—For erecting a block of

elementary schools to accommodate 600 boys and girls,

for the Isle of Ely Education Committee. Mr. R. S. W.

Perkins, County Surveyor, Connor-road, Ely. Quantities

by Mr. F. T. Mullett, Cambridge:—

A. Christmas. £9,500 0 Oak Building Co. £8,590 0

C. Redhead. 7,395 0 Thackeray & Co. 9,500 0

H. Papworth. 7,350 0 W. Howard. 6,490 0

Kerridge & Shaw. 7,295 0 Page & Son. 6,490 0

H. J. Linzell. 7,197 0 Coulson & Lofts. 6,419 0

A. Bateman. 7,187 0 Parren & Son. 6,350 0

A. Negus & Son. 7,090 0 Rands & Son. 6,300 0

O. P. Dwyer. 7,017 17 R. Shanks. 6,190 0

Grimwood & Clarke & Son. 6,125 0

Sons. 6,883 0 Kettering Co-

J. G. Cowell. 6,800 0 operative

C. Roper. 6,800 0 Builders. 5,905 0

W. E. Champion. 6,704 0 G. W. Heath.

H. Feast. 6,649 10 March. 5,671 0

LONDON.—For construction of underground convenience, Waterloo-road, for the Lambeth Borough Council.

Mr. H. C. J. Edwards, Borough Engineer, 346, Kennington-road S.E.:

Builders' Work only.

Sanitary, Engineering and Plumbing.

Founders' Work.

The entire work.

£ s. d. £ s. d. £ s. d. £ s. d.

W. H. Hyde. 2,332 0 0

T. Almond & Son, Ltd. 2,332 0 0

J. Shelbourne & Co. 2,330 0 0

G. Jennings, Ltd., Lambeth, S.E. 2,330 10 6

Chambers Bros. 2,305 0 0

Martin, Wells, & Co., Ltd. 2,309 0 0

Spencer, Santo, & Co., Ltd. 2,400 0 0

W. Moss & Sons, Ltd. 2,460 0 4

B. E. Nightingale. 2,473 0 0

Doulton & Co., Ltd. 2,574 0 0

H. Kent. 2,577 0 0

W. J. Renshaw. 2,618 0 0

Safety Tread Syndicate, Ltd. 2,721 0 0

Davis & Bennett. 2,855 0 0

H. C. Payne. 2,888 0 0

P. W. Harris & Co., Ltd. 2,970 0 0

B. Finch & Co., Ltd. 242 10 0

G. & D. Musgrave, Ltd. 271 0 0

Adams, Ltd. 318 4 0

4.—If galvanised gratings are required over base channels, add £13, if Finch's No. 350 urinals are used, add £30.

5.—Price includes wrought-iron railings.

PENTNEY.—For erecting a new school for the Norfolk Education Committee. Mr. E. J. Trench, architect,

14, Upper King-street, Norwich:—

Schools.

Addition for Screen.

Total.

£ s. d. £ s. d. £ s. d.

A. W. Barnes & Co. 890 0 0

G. Jeffries, Swaffham. 30 0 0

A. S. Lincoln. 1,039 0 0

A. C. Taylor. 1,043 0 0

Guston & Palmer. 1,050 0 0

S. Hipwell & Co. 1,090 0 0

J. Medwell. 1,098 10 0

Clark & Sons. 1,119 10 0

Podd & Fisher. 1,120 0 0

A. D. Boddy & Sons. 1,120 0 0

W. Langley, & Co. 1,165 7 6

R. Shanks. 1,188 0 0

Oak Building Co. 1,199 0 0

R. Dye. 1,198 0 0

J. Needham. 1,195 0 0

Coulson & Lofts. 1,214 0 0

H. Blyth. 1,215 0 0

Read & Wilbur. 1,220 0 0

[Architect's estimate, £1,070.]



**MILTON ERNEST.**—For residence, Milton Ernest, Beds, for Mr. H. Curtis. Mr. H. Young, architect, Bedford:—

W. T. Sharpe & Son £5,449	C. E. Haynes .....	£4,095
W. Backwood .....	R. Marlett .....	4,885
A. J. Dawes .....	E. Brown & Son ..	4,800
S. Foster .....	Warton & Dunstall*	4,715
C. E. Bayes .....	R. Jeakings .....	4,517
J. P. White .....	.....	5,195

**ROTHERSAY.**—For the Rotherhay water undertaking, for the Town Council:—

Supply of Pipes.	
Macfarlane, Strang, & Co., Glasgow ..	£3,270 10 11
Supply of Valves, Hydrants, etc.	
R. Laidlaw & Sons, Ltd., Glasgow ..	170 13 6
Pipe Laying.	
W. Scott, Hamilton .....	705 7 8

**SELBY.**—For constructing an engine and boiler house, foundations for engine and pumping machinery, chimney shaft, etc., at waterworks, for the Urban District Council. Mr. P. Grimth, 54, Parliament-street, Westminster, and Mr. B. McGregor Gray, Council Offices, Selby, engineers:—

H. Arnold & Son, Doncaster .....	£2,925
----------------------------------	--------

**SOUTHALL.**—For surface water drain, South-all, for the Southall-Norwood Urban District Council. Mr. R. Brown, Engineer and Surveyor, Public Offices, Southall:—

S. Gibbons .....	R. W. Swaker .....	£186
J. Shelbourne & Co. 190	J. Etheridge .....	261
J. Macklin .....	A. & B. Hanson ..	156
Thomas & Thomas ..	T. Watson, jun., ..	154
Free & Sons .....	Southall* .....	153
Langley & Johnson ..	176 F. Benton ..	153

[Engineer's estimate, £184.]

**SOUTHALL.**—For making-up Pluckington-place, for the Southall-Norwood Urban District Council. Mr. R. Brown, Engineer and Surveyor, Public Offices, Southall:—

Thomas & Thomas ..	H. Morecroft .....	£238
J. Macklin .....	S. Gibbons .....	387
Mowlem & Co. ....	R. W. Swaker .....	378
T. Free & Sons .....	F. Benton .....	373
Langley & Johnson ..	T. Watson, jun., ..	368
J. Shelbourne & Co. 403	A. & B. Hanson ..	380
J. Etheridge .....	Southall* .....	380

[Engineer's estimate, £449.]

**SOUTH ELMSALL.**—For erecting branch stores, for Pontefract Industrial Society, Ltd. Messrs. Garside & Pennington, architects and surveyors, Pontefract. Quantities by architects:—

Brickwork: W. Walker, Castleford* .....	£300 0 0
Joiners: M. Dixon, Ackworth* .....	256 5 0
Plumber: G. Thomson, Leeds* .....	70 0 0
Plasterer: T. W. Senior, Pontefract* .....	11 10 0
Painter: S. Harrison, Pontefract* .....	15 12 6
Slaters: Stewart Bros., Pontefract* .....	38 12 6

**SPILSBY.**—For erecting a post-office. Mr. J. E. Butcher, architect and surveyor, Boston-road, Spilsby:—

J. H. Hunter ..	£1,316 12 0	J. Kime .....	£943 0 0
P. Rattenbury ..	1,130 0 0	C. T. Lettice ..	913 0 0
J. T. Turner ..	1,050 0 0	Som. .....	900 0 0
A. Wood .....	998 7 6	W. Walker, Spilsby* ..	879 10 0

**STOWMARKET.**—For erecting a depot in Milton-road, for the Urban District Council. Mr. H. G. Bishop, architect, Bury-street, Stowmarket. Quantities by Mr. G. W. Lingwood, Surveyor to the Council:—

G. Burgoyne ..	£1,047 7 0	C. Roper .....	£845 0 0
Murray ..	870 0 0	H. J. Linzell ..	799 10 0
Sherwin ..	870 0 0	W. H. Death ..	754 0 0
J. T. Gosling ..	869 4 9	E. Death, Stowmarket* ..	747 0 0
Robins ..	867 10 0	.....	.....

**SWINDON.**—For erecting eighteen houses at Bruce-street, Rodborne-road, for Mr. S. Bruce Morrison. Messrs. Drew & Sons, architects, Regent-circus, Swindon. Quantities by the architects:—

Tydemans Bros., Swindon* .....	£3,330
--------------------------------	--------

[Five Tenders received.]

**TUNBRIDGE WELLS.**—For roadworks, Manor-road, etc., for the Corporation. Mr. W. H. Maxwell, Engineer and Surveyor, Town Hall, Tunbridge Wells:—

W. Wilson, Ramsgate* .....	£2,321 6 1
----------------------------	------------

**TIPTON.**—For heating, etc., Burnt Tree, Dudley Port, Great Bridge, and Tipton Green Council schools, for the Urban District Council. Mr. A. Long, architect, 21, New-street, West Bromwich:—

FOR BUILDERS' WORK.	
Great Bridge School.	
S. W. Moore, Ocker Hill* .....	£154 0 0
S. W. Moore, Ocker Hill* .....	140 0 0
Burnt Tree School.	
T. Chapman, West Bromwich* .....	120 10 0
S. W. Moore, Ocker Hill* .....	160 0 0
FOR ENGINEERS' WORK.	
Burnt Tree School.	
Lucas & Co., Cradley Heath* .....	228 0 0
Lucas & Co., Cradley Heath* .....	249 0 0
Lucas & Co., Cradley Heath* .....	249 0 0
Dudley Port School.	
A. J. Kallaway, Birmingham* .....	251 0 0

**WALLASEY.**—For the erection and completion of the proposed new school at St. George's-road, Wallasey, for the Education Committee:—

R. Allen .....	£17,296	Alternative Tenders as per Bill of Quantities.
J. Bellis .....	14,900	14,400
Brown & Backhouse ..	14,433	14,212
W. Brown & Sons .....	15,300	14,230
S. Butterworth & Sons ..	15,771	15,293
T. F. Cooke .....	14,825	14,475
R. Constain & Sons .....	16,997	16,617
T. Cuthbert .....	16,970	16,441
C. W. Davenport .....	14,440	14,232
Dryland & Preston .....	14,597	14,025
Duthie & Dobson .....	15,247	14,677
J. Ellison .....	15,800	16,050
W. H. Ford .....	14,337	13,830
J. Gerrard & Sons, Ltd. Manchester* .....	14,356	13,190
J. Goutley .....	15,035	14,216
H. E. B. Greene & Co. ..	14,735	14,216
W. Hall & Son, Ltd. ....	14,485	13,905
Holmes & Greene .....	14,898	14,323
Hughes & Stirling .....	15,600	14,877
P. W. Mayor & Co., Ltd. ..	14,792	14,447
J. Merritt .....	14,860	14,288
J. Mills & Son .....	14,290	13,654
J. Patterson & Co. ....	15,177	14,577
J. Rothwell & Sons .....	13,995	13,980
P. Rothwell .....	14,085	14,493
T. Spencer .....	14,878	14,500
P. Tyson .....	15,190	15,350
H. Vickers & Son .....	15,000	14,440
J. H. Vickers .....	14,232	13,707
S. Webster .....	15,646	16,000
J. Williams .....	15,299	11,660

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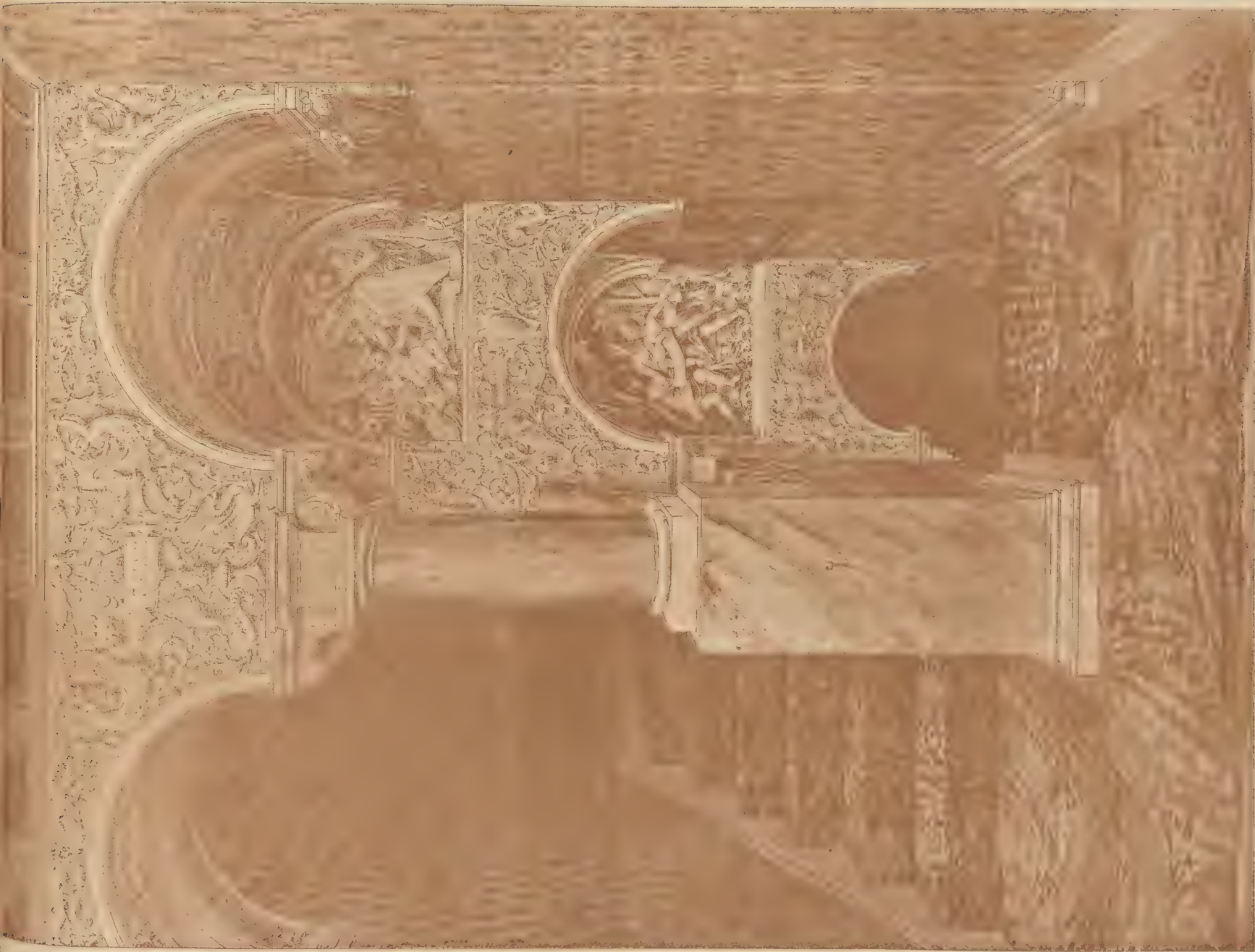
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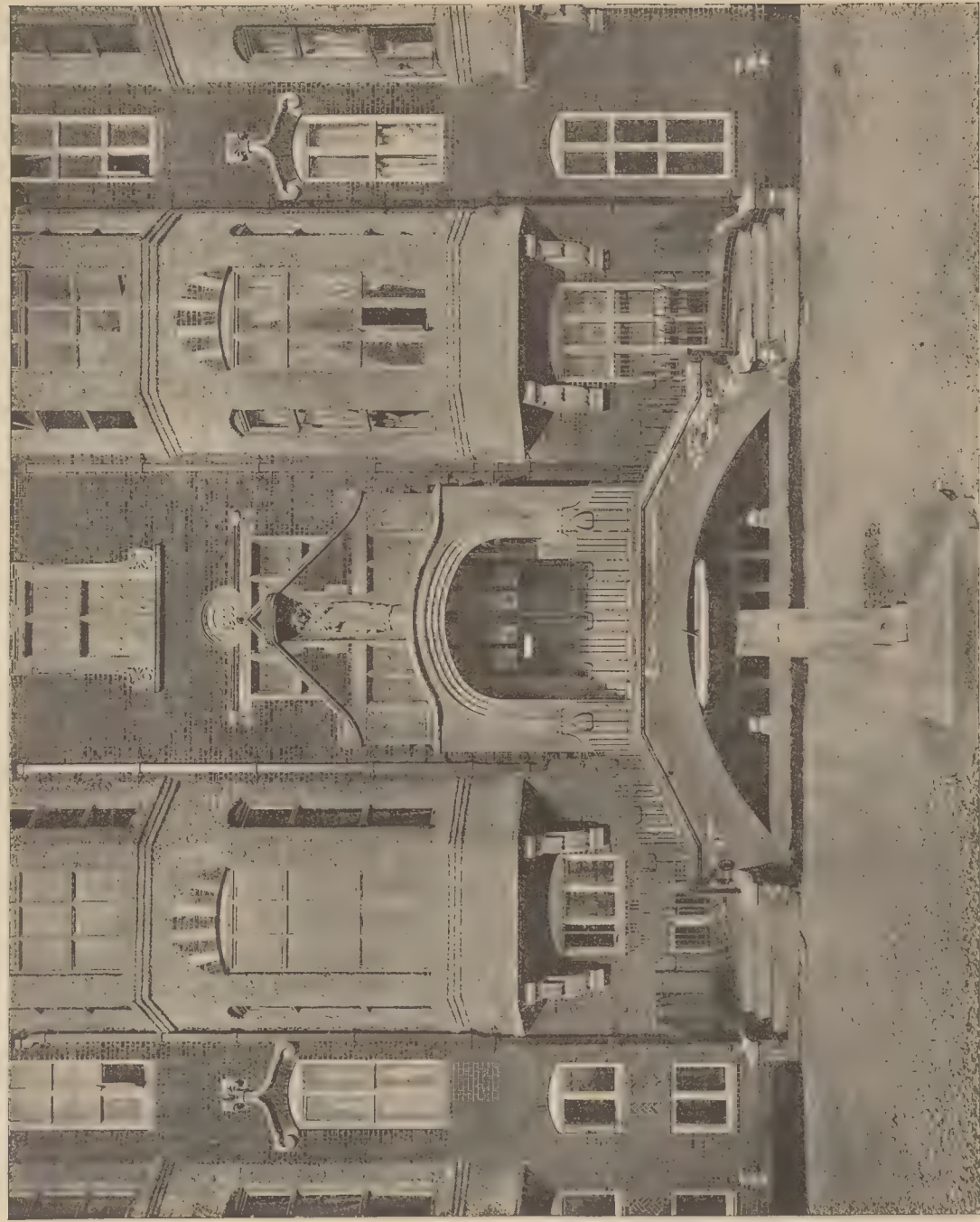
100 DECORATION OF A STAIRCASE IN A TOWN HOUSE - BY CHEVALIER 100







GENERAL VIEW.



CENTRAL ENTRANCE.

ST. GABRIEL'S TRAINING COLLEGE, CAMBERWELL.—MR. PHILIP A. ROSSON, A.R.I.B.A., ARCHITECT



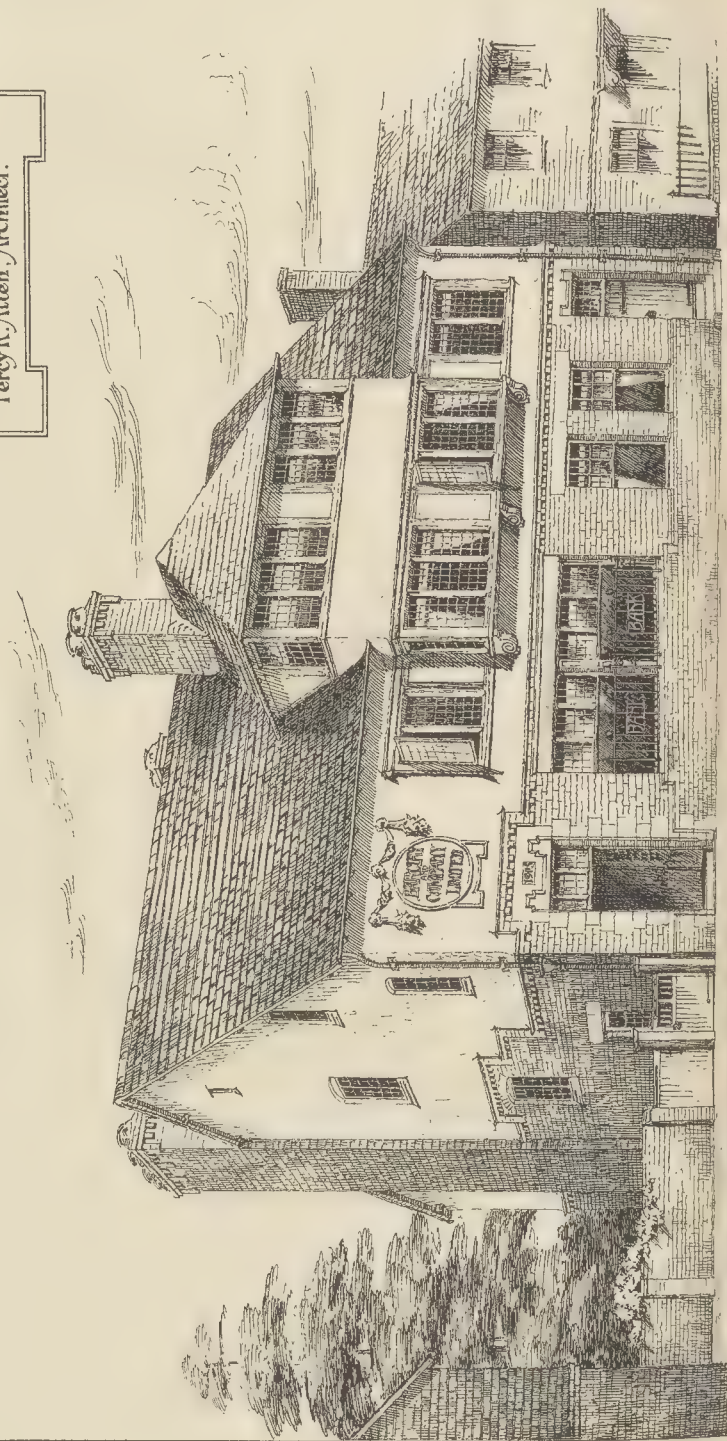


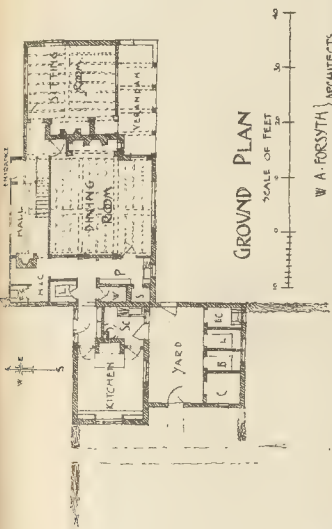




THE BUILDER, NOVEMBER 18, 1905.

NEW PREMISES  
HIGH ST., MAYFIELD.  
Percy K. Allen, Architect.





GROUND PLAN

SCALE OF FEET  
0 10 20 30 40

W. A. FORSYTH  
H. P. G. MAULE  
ARCHITECTS

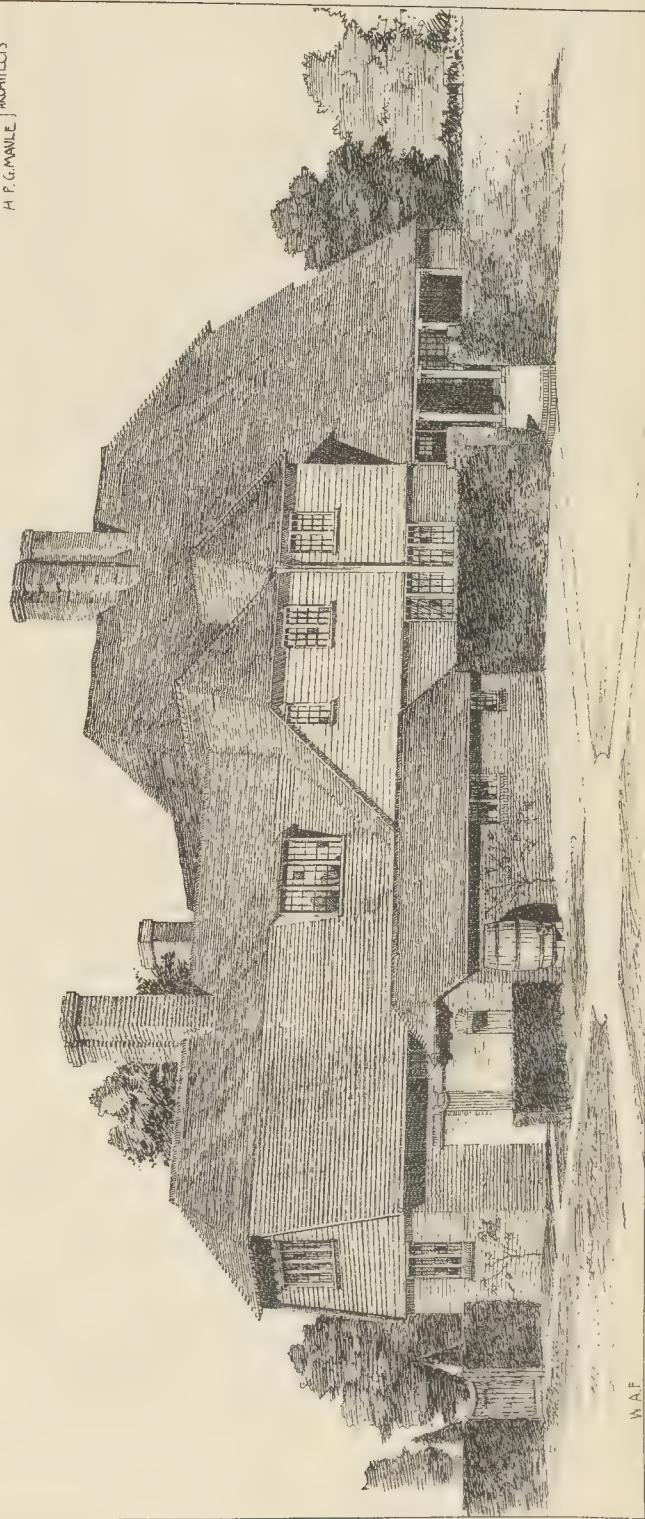


PHOTO LINDA SWAGUE 8.7.12 4.15 EAST HARDING STREET PETER LANE, EC

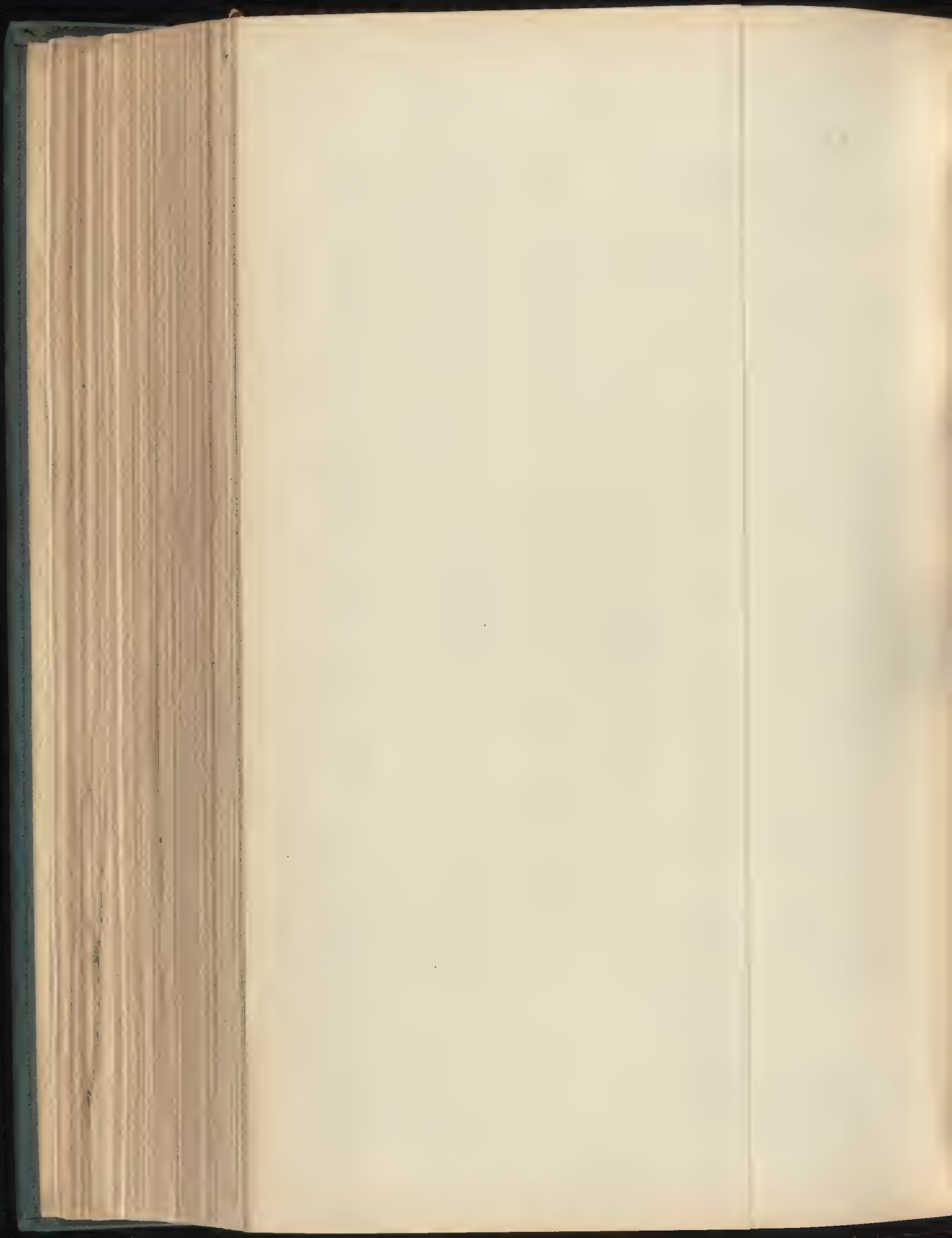
W.A.F.











# The Builder.

VOL. LXXXIX.—No. 3277.

NOVEMBER 25 1905.

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House at Corby.....	Messrs. Gotch & Saunders, Architects.
Old Manor Houses (Illustrations to Paper at the Architectural Association).....	From Photographs.

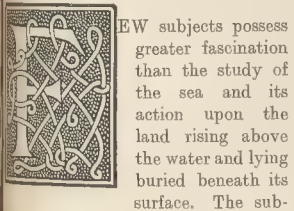
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## Sea Defences:



EW subjects possess greater fascination than the study of the sea and its action upon the land rising above the water and lying buried beneath its surface. The subject is particularly interesting to the inhabitants of countries whose shores are continually exposed to the erosive action which the intrinsically harmless water exercises under the compelling influences of tide and wind. Such action is of all-absorbing interest to small nations whose hinterland consists largely of friable material lying little above or even below high water level. Then the construction and care of coast protection assumes national importance, and the first line of defence is not a powerful navy, but a stable sea wall, or beach.

Many parts of our coast are quite capable of holding their own, while others are very susceptible to hostile influences, and the owners of property on the sea-board witness the gradual diminution of their possessions with nothing but equanimity. In places where the value of land has reached high figures owing to the growth of fishing villages and into flourishing towns, more or less efficient defensive works can be inaugurated. But in agricultural districts along the coast the value of land is too small to justify anything but the most modest

expenditure from the standpoint of the owner who is in the front line of battle.

Notwithstanding the widely diverging conditions that prevail on different stretches of coast, two facts stand out prominently, that the sea attacks the land by waves and by currents. Waves arising in their fury may tear down and break through the obstacles raised by man, but acting alone upon a natural shore they do comparatively little harm, and tend to build up banks of sand and shingle, thus conserving rather than destroying the land. Currents, on the other hand, working stealthily and without bluster, continually remove material in deep water and eat away the foundations of cliffs and beaches. Then comes the turn of the waves to work swift destruction. This accomplished, the currents carry away the debris and prevent the ground swell from making repentant amends by building up foot-banks to protect the coast-line. Hence, as Baron Siccama pointed out in a paper read at the last meeting of the Civil and Mechanical Engineers' Society, the problem of defending the dry land against the inroads of the sea resolves itself into two parts: first, to prevent the surf from eroding the dry land; second, to lead the current away from the coast-line. The means suitable for the attainment of these objects vary considerably in accordance with the power of the waves, the trend and force of the currents, and the tidal range. To discuss in any adequate manner the various appropriate solutions for the difficult problems arising out of different combinations

of these forces and conditions would be impossible within the brief limits of a single paper. Recognising this, Baron Siccama confines his attention chiefly to types of sea defences suitable for places where moderate forces have to be encountered, and which can be constructed at comparatively small cost. The systems of construction described are those largely adopted on the Dutch coasts and estuaries, and upon which the author's experience fully entitles him to speak with authority. For sufficiently obvious reasons masonry sea walls are out of the question for the protection of agricultural land, and since the advent of the *teredo navalis* in Northern waters the utility of timbering has been seriously impaired, even in places where its cost is not prohibitive. Thus we are told that the timber piles formerly holding up the sea dams on the Zuiderzee were everywhere destroyed by the *teredo*: "and the sea broke the then defenceless dykes, flooding the country."

An alternative method of construction is offered by the use of branches and twigs in the way first shown to man by that ingenious animal the beaver. Ages back the banks of islands in the deltas of the Euphrates and the Tigris were reinforced with branches of trees, and Baron Siccama shows that the same modest building material enters largely into the construction of dams and dykes in the low levels of Holland. For light embankments where no heavy surf is to be feared the ground is first covered with a layer of puddled clay, over which straw and tree branches are laid and



pegged down, the whole matting being overlaid with riprap or brick. In works of heavier character use is made of long fascines, locally described as "wispen," built up of branches, and firmly bound with osiers to form a compact bundle from 12 in. to 16 in. circumference, and of any required length. To cover the slope of a newly-made bank the wisps are laid close together in the direction of the slope, sometimes upon a matting of loose branches, held down by stakes. Heavy stone pitching completes the embankment, and, if the fall of the slope requires it, one or two rows of piles are driven to prevent the stones from sliding down.

Where the foot of the dam is never quite dry, the wisps are laid together in the form of a raft comprising two tiers, one transverse and the other longitudinal, secured at crossings by osier bands and hurdles. The raft, locally known as a "ryzen bed," or osier bed, is made on level ground, and, having been floated to the intended site, is adjusted in position, where it is held by stakes or warps. Stone or ballast is then deposited to sink the raft equally and to form a protective covering. This method is suitable only in places where the sea is sufficiently calm to permit the application of the raft without danger of disturbance before it can be fixed. If rougher waves have to be reckoned upon the rafts are much stronger, being often 600 ft. long by 50 ft. wide, and made up of six tiers, all strongly tied and pegged together, and overlaid with stout hurdles. Having been towed to the site, the raft is loaded at the centre until that part begins to sink. Stones are then laid along the edges until the whole bed is grounded. Other beds are sunk on the top, breaking joint with those preceding, and diminishing in width to above low water, when the rest of the work is made up to the required level.

Of course, the durability of the branches and twigs depends very much upon the degree to which they are exposed to weather and the action of sea-water. In process of time the vegetable materials begin to decay, causing considerable settlement, which the author has found to be gradual and easily dealt with. On the landward side of an embankment the rooting and growth of the stakes forms a valuable permanent protection, and on the sea side the branches are said to be very often replaced by silt or sand, and the covering stones to be overgrown with cockles and mussels, which bind them together. The holes left by decayed piles are filled with stone, and the whole construction becomes more permanent, requiring only occasional repairs. On the sea dams of the Zealand islands, Baron Siccama says that much use is made of straw, spread in the direction of the slope, and held down by tough wisps of the same material to form a matting, which above high-water line gives sufficient protection against the wash of waves against the slope.

The foregoing are very simple and inexpensive methods which might be employed with advantage in some parts of England where the force of the waves is moderate, and where partial protection is afforded by outlying banks of shingle or sand. In places exposed to the full force of heavy seas they would be perfectly useless.

As regards defence against erosive currents by keeping them away from natural banks and cliffs, or artificial defences, there is nothing better than a well-designed system of groynes. We are glad to say that the folly of building high and massive groynes has been fully recognised by engineers in this country. Low groynes extending above high-water mark and beyond low-water mark are being used with manifest success in numerous places, and it seems likely that concrete-steel will prove to be a valuable substitute for timber in the construction of such defences.

In Holland osier work is largely applied in building groynes intended to prevent the currents from scouring continuous channels parallel to the coast and to assist the waves in pushing sand towards the beach. But it should be pointed out that the usual form of cross section, practically identical with that favoured on the Belgian coast, is not calculated to collect drifting material in the manner aimed at by English engineers.

The Dutch groynes described and illustrated by Baron Siccama are about 600 ft. long from high-water line, 18 ft. to 20 ft. wide, and spaced 900 ft. apart. At the centre they are about 2 ft. above beach level, and at the sides flush with it. As far as low-water line they are laid in a trench upon a basis of reeds and branches, held down by hurdles. Then comes a covering of gravel or riprap, and on top a carefully-packed course of flat stones. Below the low-water line the stone covering rests upon a light osier bed, while piles are driven along the sides and down the centre. Stones are tipped between the piles, and the growth of seaweed finally completes the structure.

While the paper to which we refer deals with only one phase of a huge subject, it is a distinctly valuable contribution, and the account given by the author of simple methods adopted by a small and by no means wealthy people for the protection of their land should have the effect of stimulating the flagging energies of English landowners. At present the tendency of this class—except in urban districts—is to do nothing but cry out for Government aid, which we do not believe will be forthcoming, notwithstanding the admitted need for the centralised control and regulation of coast protection works, and especially for stringent laws prohibiting the removal of beach material and its unfair accumulation by rich corporations to the detriment of neighbouring communities and individuals.

**CONGREGATIONAL SCHOOL HALL, HAILSHAM.**—A school hall has been opened by the Congregationalist community at Hailsham. The building is of red brick and stone, and provides accommodation for 300 people. The designs were prepared by Mr. F. J. Rayner, of Newhaven, and the work was executed by Mr. T. Rich, of Hailsham, at a cost of about 1,800.

**WORKMEN'S HOTEL, BELFAST.**—The new hotel for working men which has just been established by the Salvation Army in Victoria-chambers, Victoria-street, was opened a short time ago by Sir James Henderson. The building has been reconstructed by Mr. R. Ewing, from the designs of Messrs. Browne Brothers, architects; and the other contractors included—Messrs. J. Lowden & Co., plumbing work; Messrs. Moorwood & Sons, Sheffield, heating and cooking appliances; Mr. W. Mellor, tiling and terrazzo work; Messrs. John Currie & Co., hardware and ironmongery and Mr. R. J. McKinney, cubicles, etc.

## THE ARCHITECTS' LIBRARY.

THE above heading has been adopted as the general classification of a valuable series of new works on the history and aesthetics of architecture, the first volume of which has appeared under the title, "A History of Architectural Development." The first volume of a book by Professor Simpson, to be completed in three volumes. The present volume deals with the development of architecture from the earliest Egyptian period to 1000 A.D. the second is to deal with Romanesque and Medieval architecture throughout Europe; the third with the architecture of the Renaissance. Under the same general heading, "The Architects' Library," the publishers announce the appearance at an early date of work in two volumes, by Professor Beresford Pite, on "Building Construction." To produce a series of books by competent writers which are to form a kind of specialised "architects' library" is a spirited undertaking, and we shall naturally look with interest to its continuation in the further publications which are said to be in contemplation, but are not yet specially announced.

We take it that the object of this series of publications is not so much to give new information or new theories on architecture as to co-ordinate, in a comprehensive and convenient form, the outlines of the existing knowledge on this great subject. That at least appears to be the scope of Professor Simpson's first volume. He does not, we suppose, claim to be bringing anything new before us; but he has produced a book which is exceedingly valuable as a work for students entering on the subject, and which should also be useful to non-professional readers who wish to have an intelligent knowledge of architecture, as he has brought together information some of which is not to be found in any one book upon architecture; and though the book has not the comprehensive analysis of Fergusson's great history, it has on the other hand the advantage that it is more fully illustrated, and that the illustrations deal more fully with the constructive details of architecture. Moreover, it is what we may call an exceedingly sane book; no eccentric or doubtful theories are brought forward, and the critical remarks introduced sometimes at variance with the most generally received ideas—are thoughtful and rational, and such as a reader may very well take into consideration even if he is not disposed entirely to agree with them. Moreover, the importance of construction and material as influencing architectural style is duly enforced throughout.

The account of Egyptian architecture is clear and well illustrated. The author adopts and illustrates M. Choisy's theory of the use of the "rocker" as a means of raising the large stones, which is so well worked out and expounded by the eminent French writer that it seems to be generally agreed to accept it, and we will admit that it explains something.

"A History of Architectural Development" in three volumes. Vol. I. By F. M. Simpson. Professor of Architecture, University College, London. London: Longmans, Green, & Co., 1905.



for which no other explanation is forthcoming; but it is as well to remember that, after all, it is only a deduction, and can only be regarded as probable, not as proven. We agree with the author that the idea of the Beni-Hasan columns having given the suggestion of the Doric column, formerly a favourite point in architectural text-books, may as well be abandoned. The example is too early, too isolated, and too much wiped out afterwards by the almost universal prevalence of the lotus-headed column in one or other of its forms, to allow one to suppose that the Greeks picked out that incident from Egyptian architecture to work upon. The process of development of a square stone column into an octagon and thence into a polygon, and thence to the hollowing of the faces to emphasise the angle, is after all a very natural one, and it is probable enough that in archaic Greece it was started also, only that the Greeks worked it out to an architectural result and the Egyptians did not. The one point which we quarrel with in the Egyptian chapter is a negative and not a positive one, and it is common to nearly all writers on architecture, viz.: the omission to point out the essentially inferior and non-intellectual character of the Egyptian order as compared with the Greek. Of the subtlety of the general conception of the temples, with their forests of columns and their dim lighting from above, too much could not be said; but writers on Egyptian architecture seem so impressed with these characteristics that they forget the shortcomings of Egyptian architecture in detail. Between the bulky round Egyptian column, painted all over and ornamented by a colossal imitation of a flower or a bud, and the severely thought-out detail of the Greek-Doric column, there is an absolute gulf intellectually: in this respect the Egyptians were children as compared with the Greeks; and in any book which deals at all with aesthetics of architecture this point ought to be emphasised.

In treating of Greek architecture the author touches on the subject of scale, and how in the Greek order "the size of a building makes no difference in the proportions and in the number of parts"—instancing the comparison of the Parthenon with the Theseum. It is a very curious point this apparent indifference of the Greek architects to any alteration of the scale of parts in altering the scale of the building. Professor Pearson observes that "in no other style of architecture could this arrangement be applied with any chance of success."

Westminster Abbey a quarter of a mile would be a toy"; but he does not make any suggestion as to the reason for this. The conclusion must not be pushed too far either; look at the miniature Doric columns in the balustrade of the British Museum, how feeble and misplaced they appear. Would the Greeks have ever made use of the Doric column on that small scale, and for a mere balustrade? It does not seem likely, and we have certainly no instance of it. If not, there must be some limit beyond which this reduction of scale with satisfactory effect does not apply.

In relation to the once vexed question of the wooden origin of Doric archi-

ture, the author dismisses it with costs; rather too summarily perhaps. We do not quite understand the point of his remark about the Lycian rock-cut tombs which imitate carpentry—that they are not buildings but only carvings. That is true enough; but they show that at an early period people who had constructed in carpentry thought it worth while to imitate its forms in stone-cutting, and they would have been just as likely to do so in building with separate stones. We consider any idea of the wooden origin of the Doric column absurd; it is essentially a stone form, and the fact that earlier examples are thicker in proportion than the later ones is all in favour of this; and it may be doubtful whether there is any direct connexion between the Lycian tombs and the Doric entablature, though it would be risky to assert that there was not. But there is a good deal in Doric entablature which does point to a timber origin—which is better explained on that supposition than on any other. To admit this assumption is not necessarily, as the author maintains, "to destroy one of the greatest charms of Greek architecture, the æsthetic logic which dominates every part." The æsthetic logic is shown in the way in which these timber *origines* have been translated into stone—made to put on a masonic expression; a process which does away entirely with the idea of mere imitation. The forms point to a far-away wooden origin, but which is only faintly traceable in its evolution into masonic expression. We should prefer to think otherwise; like the author, we would rather suppose that Doric architecture had nothing to do with a wooden origin; but in regard to the entablature we think appearances are against this.

In regard to the refinements of line of the Parthenon the author adopts the simple and commonsense view that the entasis of the columns and the rise of the podium steps was simply (as Vitruvius says of the steps) to prevent them looking hollow; reminding the reader of what seems to be almost overlooked now, that the entasis of the columns is so slight a deviation from the straight line that it was never even seen till looked for. The very refined contours of the Greek mouldings he maintains were drawn by hand, which we should think probable; the fact that the entasis of the columns was evidently set out by scientific methods does not contradict that idea, as that was a curve too delicate and on too large a scale to be drawn by hand. The author refers to the fact that Pennethorne tried to prove that the curves of the mouldings were worked out mathematically; but Pennethorne tried to prove too much, as we showed at the time his book was published. In reference to the fact that the two end columns of a Doric colonnade are closer than the others, the author seems to treat this as a purely æsthetic refinement for the purpose of giving an appearance of strength to the angle of the building; he surely overlooks the difficulty of spacing produced by the necessity (in an æsthetic as well as in a constructive sense) of getting the triglyph at the angle; it was that which led to the closer spacing of the columns. And there is a little

point about the fluting of the columns which has been missed: why twenty flutes? Because with that number you get the recess of the flute under the centre of the abacus, where the projection is least, and the point or arris of the flute under the projecting angle of the abacus, thus giving a more logical relation between the plan of the column and the abacus. To do that the flutes must be of a number that will give an odd number when divided by 4, and 20 is the only number between 12 and 28 that will give that result: 28 would be rather too many for effect; 12 of course too few.

The chapters on Roman architecture are perhaps the most interesting part of the book; the subject is connected with so much that is important in regard to the relation between construction and design; and Roman architecture, though far less perfect, is no doubt more multifarious in its interest than Greek. Indeed, we fully sympathise with the author in the claims which he makes for greater attention to and respect for Roman architecture than it has lately received. As he says, "if the Romans had only possessed the artistic sense of the Greeks, their architecture would have been the grandest the world has ever seen." It is a large "if"; but great scale and constructive resource count for something, as well as refined detail.

We hope the Architects' Library may be continued, in other volumes, as well as it has been commenced.

#### NOTES.

AN important paragraph is to be read in the Board of Trade's Monthly Memorandum on the state of the Labour market for October:—"As compared with a year ago, there was a general improvement in all the principal industries except building," which means, in other words, that there are fewer unemployed in England than a year ago. Yet it would generally be supposed, when one takes up a newspaper, that employment was extraordinarily bad—the fact being that the great want of employment is confined to London and chiefly to the East End. Everyone must sympathise with men out of work, and more especially with their families, but it is obvious that under present circumstances very great care is required in the distribution of relief. More particularly should the question be regarded not from a temporary, but from a permanent point of view; that is, the object to be aimed at is the prevention of the collecting of casual labourers in London. We much fear that the donations which have recently been given will tend to increase the number of unemployed in future years, causing them to expect relief as a matter of course. Unquestionably also, from various causes—some political—more is heard of the unemployed now than formerly was the case, but at any rate we may very well bear in mind that there is evidence that the general conditions of employment are satisfactory.

SINCE our summary of Workmen's Compensation cases, which appeared last week, was written, one more case has



been reported of general interest—*Spacey v. Dowlais Gas and Coke Co.* The applicant was a navvy in the employment of the Gas Company, and was engaged in cutting a trench in a road some quarter of a mile from the gasworks, for the purpose of changing a main laid underneath, when he sustained an injury to the eye. No mechanical power was being used at this place. The gasworks themselves constitute a "factory" within the meaning of the Workmen's Compensation Act by reference to the Factory and Workshop Act, 1901, and the County Court judge had held that the mains constituted part of this "factory," and that this man was, therefore, employed "about" a factory. The Court of Appeal reversed this finding, and laid it down that the mains formed no part of the "factory" since they were not connected with the manufacture of the gas (and the Factory Acts denotes "the making of any article"), but were used for its delivery, and the business of manufacturing the gas was distinct from its delivery. The man was, therefore, not in such physical contiguity to the factory as is contemplated by the words of the Act, "on, in, or about." The decision is unquestionable, but it draws attention to the anomalies of the Act since, had the man been engaged on work connected with a "sewer," he could have claimed as being engaged upon an "engineering work," yet the operation of opening up a road to reach a sewer or to reach gas or water-pipes would seem equal in point of danger. In one of the recent cases the Court seemed to attach some importance to the argument that the intention of the Legislature might sometimes be gathered from the dangers attaching to kindred occupations, but this case illustrates the danger of relying on any such reasoning.

#### The Repair of Highways.

UNQUESTIONABLY our English highways receive more careful attention now than was the case a few years ago, but there is still a good deal of the ratepayers' money wasted by unpractical and unscientific work. For example, now that highway authorities use steam rollers more often, metal is frequently put down unbroken. It is ground in superficially, and gives a fairly level surface till the dry summer weather, when the surface is rapidly destroyed by traffic. Over and over again, too, instances may be seen of metal being spread over the old surface, which has not been broken up; the result is a kind of surface cake instead of one homogeneous road. Again, surveyors are far too lenient in enforcing the law as to cutting and trimming hedges. When a highway is very wide, and has grassy sides, a high hedge does not harm the actual road, but where the road is somewhat narrow, as is the case especially in the rural districts round London, high hedges cause the road to become rotten, it does not dry quickly, and so it produces mud and dust and becomes more easily disturbed by traffic.

#### The Simplon Tunnel.

AN instance of the great accuracy attainable in the alignment of tunnels and other underground workings is presented

by the Simplon tunnel. This undertaking was commenced in August, 1898, by the driving of guide headings from the Swiss and Italian sides of the face, and in February last the actual junction of the galleries was effected, after the serious difficulties mentioned in our "Notes" of October 8, 1904, had been successfully overcome. The estimated length from end to end was 12.5 miles, and, as recent surveys show, the actual length only exceeds this measurement by 2 ft. 7 in. Thus the error was only  $\frac{25}{1000}$  of the total length, or less than  $\frac{2}{3}$  in. per mile. The same surveys indicated that the levels of the two galleries were within  $\frac{3}{4}$  in. of each other, corresponding with a variation of  $\frac{27}{1000}$  of the length, or  $\frac{3}{4}$  in. per mile. With respect to direction, it was found that the line driven from the Swiss frontier deviated  $\frac{4}{3}$  in. towards the west, while that driven from the Italian end deviated  $\frac{3}{4}$  in. towards the east. Thus, the collective discrepancy was 8 in., and the greatest divergence from the true line of each heading only  $\frac{4}{3}$  in., the utter insignificance of the errors being shown by the relation each of them bears to the total length of the tunnel— $\frac{257}{1000}$  and  $\frac{184}{1000}$  respectively. These extremely accurate results reflect much credit upon the engineers and contractors concerned in the conduct of this great work.

#### Venetian Foundations.

OWING to the fact that Venice is built upon a layer of clay, not more than from 18 ft. to 24 ft. thick, resting upon a deep bed of water-logged sand, it may be said that the entire city is carried by a natural raft of huge dimensions floating on the surface of a semi-liquid mass. This unusual condition quite precludes the use of long piles, such as are used in Amsterdam and elsewhere for foundations, because it is essential that the skin of clay should not be pierced. Wherever this happens in Venice a jet of sand and water is forced up by pressure of the overlying stratum, and the bearing power of the pile is destroyed. Consequently, the piles should not penetrate more than about 12 ft. to 18 ft. into the clay, but as this stratum contains occasional pockets of sand and mud it is necessary at such points to drive longer piles so as to reach the clay beneath. The old substructure of the Campanile is a good example of early foundation work, consisting of white poplar piles connected at the top by longitudinal and transverse oak beams, forming a grillage carrying a base of rubble masonry over which are stone footings in five steps. In spite of its great age, the foundation showed comparatively few signs of deterioration when examined after the collapse of the tower, the most serious defect being a subsidence of 6 in. at the north-east angle. The new foundation, now being built around the old work, is of similar character, and is really nothing but an extension of the original foundation. One curious, but by no means surprising, circumstance is that since the demolition and removal of the superstructure, the entire foundation has been raised  $1\frac{3}{8}$  in. above its previous level, owing to the unbalanced hydrostatic pressure of the semi-liquid material below. This effect shows how

literally true is the statement that Venice floats upon the waters of the Adriatic.

#### Right to Light over Open Spaces.

THE case of *Boyce v. Paddington Borough Council*, upon which we commented in our issue of August 1, 1903, has been carried to the House of Lords. The case is an important one. The local authority, by virtue of the Metropolitan Open Spaces Acts, 1877 and 1881 and 1887, and the Disused Burial Grounds Act, 1884, had vested in them a disused burial ground to be maintained as an open space. The plaintiff in the action had erected and was erecting certain blocks of flats abutting upon and overlooking this open space. To prevent the plaintiff from acquiring a prescriptive right to light and air the defendants erected a screen or hoarding in front of the plaintiff's windows, and the plaintiff brought an action to restrain them from doing this. Sect. 5 of the Act of 1881 directs that the land is to be held for the enjoyment of the public "in an open condition, free from buildings," and sect. 3 of the Disused Burial Grounds Act of 1884 provides "that it shall not be lawful to erect any buildings upon any disused burial ground except for the purpose of enlarging a church, chapel, meeting-house, or other place of worship." By the Open Spaces Act, 1887, the word "building" in reference to the above is defined to include "any building, permanent or temporary." The House of Lords have reversed the decision of the Court of Appeal, and have restored the judgment of Mr. Justice Buckley—that is to say, it has been held that the erection of this screen in order to preserve the rights attaching to this open space was not inconsistent with the powers conferred on the local authority by the statutes. The nature of the screen erected was not described in detail, so the question as to whether it was a "building" is not so directly decided, but Mr. Justice Buckley intimated that a screen put up for such a purpose would not be a building within the meaning of the above Acts.

#### Landlord and Tenant.

A CURIOUS contention was raised in the recent case, *Gibbon v. Payne*. So long ago as 1866 certain premises in St. Pancras were leased for ninety-nine years under a lease which contained the usual repairing clause. The premises were described as a "messuage, coach-house, and stables," but it appeared the buildings were not complete, and the tenant was to complete the said buildings to the satisfaction of the lessor within six months. Other houses forming part of the building estate had been also let to the same lessee, and the evidence showed that the stables and coach-house had never been erected, the original scheme having been modified in 1866 by throwing the site appropriated to the stables into the gardens for the adjoining houses. The leases had been assigned and the action now brought was by the present lessors to recover the possession of the premises from the present lessees on the ground that they had been guilty of a breach of the covenant in omitting to repair the

non-existent, coach-house and stables. These facts gave rise to several complicated legal considerations, but in the result the case was decided on the one ground that the lessor had consented to the alteration in the building scheme; he was directly interested in seeing that it was carried out "to his satisfaction," and as his own residence was not remote he had every opportunity of so doing; and it is also to be observed that rent had been received for some thirty-eight years. It was mere non-enforcement of an ordinary covenant to repair would, as the Court pointed out, not be sufficient to release the lessor. The lesson to be learnt from this case is one we have constantly brought to the notice of our readers, that in accepting a lease or an assignment of a lease they should carefully see that the covenants have been fulfilled, or they may find themselves saddled with unexpected and apparently impossible liabilities.

At the small gallery at No. 2, Haymarket, called "The Goupil Gallery Annexe," being a kind of "chapel of ease" to the Goupil Gallery proper, is a collection of nearly 200 works in jewellery, enamel, and metal, by Mr. Nelson Dawson, containing a great deal of beautiful and artistic workmanship. What is remarkable in the smaller articles for personal use or adornment is the way in which rich and beautiful colour is combined with metal-work, by the introduction of transparent enamels or, in some cases, precious stones. We see this combination in perfection in the "Bowl in Silver and translucent Enamel" (125) and the "Bowl in Wrought Silver with Enamel" (131); in the pendant in gold (130) with a miniature "basket of roses" on it with rubies in enamel setting; and in the wrought silver and enamel clasps (78). In a silver match-box (104) a most delicate effect is produced by the fine slightly curved lines of the box, and the little turquoise at each angle; we prefer this to the more heavily ornamented match box with enamel (102). The lines adopted for metal work clasps tend to run a little too much into curved and wavy lines; a little rigidity now and then might be an improvement, though in the handles to the "Gilded Servers in Wrought Silver" (101) the way in which they are worked out consists of thin metal is very effective; the silver sugar-tongs next to them (14) are also very delicate bits of design and workmanship. There is occasionally an attempt to treat an object in an unusual way at the expense of practical fitness, as in the set of octagonal serviette rings (18); the serviette in folding generally makes an approximately circular shape, and the circular form of ring is therefore the fittest for its office. Many of the chains and necklaces are very charming; we may notice especially one with coral beads (66), with long inter links divided by little quatrefoils, and punctuated at regular intervals by coral bead. The candlesticks mostly rather ostentatiously simple; they have a dignity of style; the pair with a decorated surface ornament in bronze enamel (175) are unusual and charming, and with a greater look of interest about them. Among the larger

articles the cover for a stove or radiator (167), in beaten steel, is a delightful contrast to the kind of thing which the shops and tradesmen's catalogues generally show us; the "Picture-stand in Forged Iron" (164)—it suggests rather a music-stand—is a fine bold piece of metal work, but the upright support is rather too heavy in character for the light desk which it carries. Architects ought to see this exhibition, which has much that should be attractive to them.

The Society of Fine Arts. THE exhibition of the same class of work by a French artist, M. Lucien Gaillard, at the Society of Fine Arts, is a notable but not refreshing contrast to Mr. Nelson Dawson's work. The style of the work is larger and bolder, but the disagreeable cleverness of the "article de Paris" runs through it all; the personal ornaments seem those that a "demi-mondaine" rather than a lady would wear; they leave a kind of bad taste behind them. Except as to mere cleverness of execution, our best artists in ornamental work have nothing now to learn from the French; and indeed the contemplation of work like that of M. Gaillard is anything but improving to the taste. The large repoussé metal dish showing crows with outstretched wings (97), executed in alloys of copper and silver and of gold and copper, is a fine and effective piece of work; but the bronze vase in front of it, composed of three Brodignagian horned beetles put together, is a thing in a monstrous taste, such as no person of refined artistic perception would bear to have on his table. This imitation of insects is a kind of plague of contemporary French jewellery, as we see it in the bracelet (18) adorned with a large beetle in gold and enamel; a barbarian kind of art, in spite of its finish of execution. The peacock feather bracelet (19), enamel on gold, is a more refined bit of work; but of the whole collection we may say that we are glad that it represents French and not English taste.

In another room at the Fine Art Society is hung a collection of reproductions in colour of a curious series of emblematical designs by Burne-Jones, to be published under the title "The Flower Book," though they have no obvious connexion with flowers. They are a series of dream-pictures of figures and backgrounds, mostly in very rich colour, each of them comprised within a circle of about six inches diameter. They are said to have been each originally suggested by the name of some flower and the associations connected with it; but the artist, who began them as a relaxation from more serious work, had himself forgotten the origin of many of them. They are very suggestive little fancies, though the drawing of the figures, with a few exceptions, is of a most naïve and archaic order. We think their value rather exaggerated; though at present, while the memory of the artist is still fresh, copies of them will no doubt be coveted by many. The reproductions, by the Paris firm of Piazza & Cie., are beyond praise; it is difficult indeed to tell them from the originals. Only three hundred

copies are to be printed; and the text is not typed, but reproduced in fac-simile from a beautiful script writing by Mr. Graily Hewitt.

The Modern Gallery. AT the Modern Gallery in Bond-street there is a collection of works by four artists—sculpture by Mrs. Bernard M. Jenkin (Miss Margaret Giles), and paintings by Miss Mabel J. Young, Mr. Reginald Waud, and Mr. W. J. Neatby. Mrs. Jenkin's exhibits include a very nice sketch model for spandrel figures for architectural decoration (89), a bas-relief stone panel, "A Daughter of the Marshes" (97), showing a nude seated figure amidst a quasi-decorative arrangement of water-plants, a very good bit of work; a charming little statuette group "The Grandchild," and a number of small medallions and other work, all of considerable merit. Mr. Waud shows some good portraits in oil; Miss Young's paintings are rather more ambitious in subject than successful; at least they failed to interest us. Mr. Neatby's decorative landscapes are rather like pictures for the nursery, but his series of small heads painted in a decorative manner as medallions, and with symbolic decoration on the mounts, are very charming in their way, and form the most distinctive collection of work in the exhibition.

The New Premises for the Institute. A LARGE number of Fellows and Associates of the Institute of Architects, in the Provinces as well as in London, have signed a memorial to the Council of the Institute of Architects in the following terms:—

"We, the undersigned members of the Institute, having learned from the President's Address, delivered on the 6th inst., that the R.I.B.A. is about to erect a new building for its own use, feel that an opportunity of designing this should be open to all its members.

In the event of this opportunity being afforded, we suggest that a competition should be held and its conditions based on the 'Regulations for Architectural Competitions,' and that the members should select a jury of three assessors by vote."

We do not think that the Institute would be very well advised to open an unrestricted competition for the new premises to all their members. They would saddle themselves probably with a great number of drawings and a great deal of time and trouble in examining and adjudicating on them, and it is doubtful whether they would evolve a better building than could be had from a limited competition. We should suggest a selection, by ballot in the Council, of twelve competitors, say six from London and six from the Provinces. That would be a suitable way of dealing with the occasion, without entailing an infinity of wasted time and trouble on the competitors as well as on the adjudicators.

DUST DESTROYER AND SEWAGE FARM. NICHOLLS, BIRMINGHAM.—The opening of the Nicholls destructor and the inauguration of the electric transmission system in connexion with the sewage farm at Tyburn took place on the 7th inst. Mr. Watson was the architect who prepared the plans, and the principal contractors were Messrs. Lee & Son for the whole of the buildings, 15,615*l.*; the British Thomson-Houston Company for the whole of the electrical work, 8,314*l.*; and Messrs. Heenan & Froude for the furnaces, 4,589*l.* The total cost of the scheme is 35,529*l.* 2*s.* of which the Corporation pays 17,691*l.* 10*s.* and the Drainage Board 18,137*l.* 12*s.*



### THE MOTOR EXHIBITION AT OLYMPIA.

JUDGED alike by the number and quality of the exhibits and the crowded attendance of the public, the fourth exhibition promoted by the motor manufacturers and traders must be pronounced an unqualified success. The exhibition opened on Friday last is the second which has been held at Olympia, and it is quite evident that this spacious building is too small to accommodate all types of motor-cars, waggons, and boats on the market, even if foreign exhibits were omitted. Almost the entire area of the main hall is occupied by the Motor-Car section. The Commercial Motor section is to be found partly at one end of the main hall and partly in the annexe, and the Marine Motor section is in the middle of the main hall and partly in the annexe, where also are sections devoted to Components and Carriage Work, and Machinery used in Automobile Construction. In the gallery are the Tyre and Accessories sections. All these departments without exception are filled to overflowing, and so narrow are the gangways in comparison with the crowds of visitors, that locomotion is a serious problem in many parts of the exhibition.

The pursuit of automobilism as a sport or as a means of recreation has no connexion with the objects of the *Builder*. The motor-car itself as a means of rapid locomotion for private or professional use doubtless appeals to many of our readers, but not to such an extent as to justify detailed notice of the many admirable carriages now on view in the Motor-Car section at Olympia. To deal in the briefest possible terms with the most striking exhibits would occupy far more space than we can afford, and to make mention of a few leading examples would be unfair to others of practically equal merit as regards mechanical details and artistic design. Hence we must leave the department in question with the remark that it constitutes an unanswerable proof of the wonderful progress made by the British motor-car industry within the past year. It must not be supposed, however, that this section is entirely devoted to pleasure cars. On several stands the visitor will find examples of private omnibuses, cabs, and of vehicles specially designed with a view to the requirements of commerce. These developments must be taken as a sign that the possibilities of the motor-car from the utilitarian standpoint are by no means escaping the attention of manufacturers.

When the conscientious visitor has at last completed his lengthy tour of inspection through the long alleys bordered with the most ingenious and dainty productions of the mechanical engineer, the coach-builder, and the upholsterer, and has emerged into the section where commercial motors are displayed, he will be in a far better position to understand the part which self-propelled vehicles promise to play in trade and commerce. As private carriages form but a small proportion of the horse-drawn vehicles of the present, so we predict will private motor-cars represent but a small percentage of the mechanically-propelled traffic of the future.

In the Commercial Motor section there is abundant evidence that the requirements of public authorities, carrying companies, and business firms are occupying a large share of attention from various well-known makers and others who will soon become well known. On every hand are to be found motor omnibuses for the public service, steam and petrol waggons, lorries, and vans, light delivery vans, and small parcels vans. There also are hospital ambulance carriages, and other vehicles for public authorities, and one of the most significant adaptations of the internal combustion engine is to be found in a series of motor-driven lawn mowers and a motor roller.

In view of the aid offered by vehicles of this class towards the solution of passenger and goods traffic problems in urban, suburban, and rural districts alike, we may appropriately review the chief types of commercial motor to be found at this year's exhibition.

Commencing with types of the motor omnibus, we have first to record the lively satisfaction experienced that so many British firms should now be in a position to supply the wants of omnibus companies. Whatever the advocates of electric tramways

may say, the motor omnibus will surely come to the front, and it is gratifying to find that foreign firms will not be able to make a happy hunting ground of this country so far as concerns future orders.

In the omnibuses on view at Olympia the engine usually ranges from about 24 h.p. to 30 h.p., but in one or two cases the limit rises to 40 h.p. Commendable effort appears to have been made with the object of simplifying the control so as to relieve the driver from details of motor management likely to divert his attention too much from the guidance of the vehicle. Consequently several ingenious devices for automatic lubrication have been introduced, and one firm has an arrangement automatically regulating the ignition to synchronise with the number of revolutions made by the engine. In the matter of gears also we observe ample evidences of judicious selection. Many of the omnibuses have speed-change gears with the wheels always in mesh, this system having the advantage of quiet operation. Some makers transmit power to the hind wheels by means of pinions on the differential shaft, these pinions engaging teeth on the inside or the outside of toothed rings or drums attached to the wheels. Another feature possessing claims to commendation is the fairly general employment of the multiple disc clutch invented by Professor Hele-Shaw, an effective and reliable appliance working without perceptible jar or shock.

To show the active interest taken in the production of omnibuses, we may mention that fully two dozen firms have exhibits, either of complete vehicles or of the under-frames and mechanism, and, as several of these firms show two or three different patterns, the total number of such vehicles is probably more than fifty. Messrs. Alford & Alder exhibit a very neat omnibus of 10-12 h.p. fitted with front canopy and wind screen, and having shelves intended for the samples of commercial travellers, a somewhat similar car being shown by the Argyle Motor Company on Stand No. 15. The Dietrich firm have on view a 24 h.p. omnibus built for the General Omnibus Company of Paris. Near by are a workmanlike 30 h.p. New Arrol-Johnston omnibus to carry thirty-eight passengers, and two omnibuses on the stand of Messrs. Liversedge & Son—one of 35 h.p. with a double-decked body and canopy top, the other of 24 h.p. with single-decked body and front entrance. Messrs. Straker & Squire show a 24 h.p., thirty-four passenger omnibus built to the order of the London Road Car Company for the Hammer-smith-Charing Cross route, and on the adjoining stand of the Wolseley Tool and Motor Car Company is a 20 h.p. double-decked vehicle with accommodation for thirty-six passengers, the motor having four forward speeds and one reverse speed. The Milnes-Daimler Company exhibit a standard London double-decked omnibus, constructed to the order of Messrs. Tilling to attain a maximum speed of fourteen miles an hour, the total weight being  $4\frac{1}{2}$  tons, and a similar 'bus built for the London and North-Western Railway.

We cannot refer in detail to all the public service vehicles of this class, but mention the following among those of firms whose exhibits specially deserve inspection:—The Sims Manufacturing Company, 28-35 h.p. omnibus for thirty-six passengers; Messrs. Clarkson, Ltd., steam chassis for double-decked omnibus, fitted with new automatic steam generator, liquid fuel burner, and a patented system of lubrication (we ought to say that thirty-four omnibuses of this type have recently been ordered by the London Road Car Company); Messrs. Dennis Bros., a 24 h.p. worm-gear omnibus for thirty-four passengers; Messrs. James & Brown, a 25-30 h.p. omnibus; the Maudslay Motor Company, a very fine double-decked omnibus with 30-40 h.p. engine, having chain drive, four forward speeds, and one reverse speed, built for use in Edinburgh; Messrs. Scott, Stirling & Co., a double-decked 24 h.p. thirty-six passenger, and a single-decked 14 h.p. eighteen passenger omnibus; The British Automobile Development Company, a thirty-six passenger omnibus, with direct drive on the highest of three forward speeds; Messrs. Straker & MacConnell, a 40 h.p. forty-two passenger omnibus, with air-brake control and automatic carburettor, also a 24 h.p.

and a 20 h.p. omnibus of generally similar construction. We could continue the catalogue, but limits of space forbid. The foregoing notes, however, show how important a branch of the motor industry is already represented by omnibus building.

Now let us turn for a moment to heavy traction—a section in which the petrol motor chiefly preponderates. As a rule, the type of chassis is analogous to that used in motor-bus, and most of the heavy waggons include four-cylinder engines, automatic lubricators, three or four speeds, driven by chain or by pinions gearing into internally-toothed wheels. Double ignition is employed in several vehicles, and some have water-cooled brakes.

Among typical examples of vehicles for heavy traction to be found at Olympia several have already been described in our columns when noticing other exhibitions. For this reason it is not necessary to go fully into details on the present occasion. In consequence, we shall content ourselves with such brief references as will serve to point out the more meritorious of the exhibits. Taking the stands in numerical order, we have a well-made 3-ton delivery wagon of 20 h.p. by the Wolseley Tool and Motor Company; two very fine 5-8 ton steam waggons by Messrs. Coulthard & Co.; a serviceable 3-ton petrol lorry for ten miles an hour by Messrs. John J. Thorneycroft & Co.; a 24 h.p. 3-ton lorry and a 2-2½ ton delivery wagon, both with worm gearing, both by Messrs. Dennis Bros.; three different examples of the well-known Straker type; and a 27 h.p. 5-ton lorry by the Maudslay Motor Company. Messrs. Wallis & Stevens exhibit a workmanlike steam tractor with compound engines running in an oil bath, differential gear, and winding drum, the trailer for use with this locomotive being fitted with patent backing gear, screw-friction brake, and draw-bar. The Thames Engineering Works show a 4-ton steam lorry, which we have described in a previous article; the Hay Motor Company have on view a 6-ton steam lorry, built to comply with the regulations of the Local Government Board, and carrying sufficient fuel for a journey of forty to fifty miles; Messrs. Foden, Ltd., show a well-designed 5-ton wagon also built to comply with the requirements of the Local Government Board. In addition to the foregoing, there are many vans capable of dealing with loads from 1½ to 2 tons, and numerous examples of small delivery vans for parcels and general merchandise. Without committing ourselves to an exact estimate, we should say that there are in the exhibition at least thirty types of such vehicles suitable for business establishments of various kinds, but, not applying to building and other contractors, individual types cannot be particularly mentioned.

In concluding this general review of a most comprehensive and instructive exhibition attention is directed to two types of vehicle affording one more proof of the numerous directions in which the motor industry is being extended. The first is a 5-ton combined steam-driven tipping wagon and street-watering van, designed for municipal purposes by Messrs. Jesse Ellis & Co., and the second a Straker-Squire motor-ambulance for the Army Hospital Board. It should be mentioned that Messrs. James & Brown also show an ambulance motor-car built for the Metropolitan Asylums Board.

The Marine section includes a comprehensive display of motor-boats and launches, some of considerable size and power, the Machinery section contains a large assortment of valves, seals and engineering sundries, while the sections devoted to tyres and accessories are well filled with interesting exhibits of extremely varied character.

This wonderful collection at Olympia is a most convincing proof of the vitality retained by British manufacturers, and a remarkable demonstration of the great national industry they have suddenly built up in our midst.

ALL HALLOWS CHURCH, HENDON. H. A. New record was dedicated on November 5. The ancient church of All Hallows, in the Hundred of Hoo, Kent. The nave and some of the panelling for the sanctuary were designed by Mr. Walter Terry, of Brockley, who has followed the style and character of the XVth century work of the screen and of the carved oak work of 1890 the windows and chancel were restored, and the wooden screen was also restored.



## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The usual fortnightly meeting of the Royal Institute of British Architects was held at No. 9, Conduit-street on Monday, Mr. John Belcher, A.R.A., President, in the chair. The minutes were taken as read.

*American Methods of Erecting Buildings.*

Mr. R. A. Donell, Managing Director of the Waring White Building Company, Ltd., read a paper on "American Methods of Erecting Buildings," of which the following is an abstract:—

In his opening remarks the author referred to the increase of rapidity of construction and economy as being the dominant factors in the consideration of the subject. American contractors are generally good business men, and apply business principles to their affairs. They try to make every man in their employ responsible in his own position or sphere, advancing him when he shows equalities to trust his own judgment and to go ahead alone successfully. The best builders in America, as a general rule, have served a large portion of their apprenticeship in architects' offices, and this has resulted in a better understanding of the architects' ideals and demands. Much had been written about the British workman, but the author did not agree with the writers. They all attacked the bricklayer. The English bricklayer, in his opinion, did better work than his fellow in any other country. As regards the amount of work done, he had had men lay an equal, and in many cases a larger, number of bricks per day, under similar conditions, than he had in America. Continental brickwork does not compare with work here. He considered, too, both the English stonemason and the masonry splendid workmen. We get careless of our labour here because of its cheapness; more it more expensive we should watch over it more and give it better supervision. The best American contractors never allow more than twenty-five men to work without a foreman, the result being that he sees that they work, and, what is more important, that the work is planned out for them in advance, and that their materials will be ready as wanted. One of the chief reasons for the rapidity of construction in large buildings in America is the way in which materials are dealt with. Time being an essential factor, it would be impossible for a contractor there to execute joinery, stonework, masonry work, and ornamental plastering so efficiently or so well with his own hands as in his own shops as each man in the own particular trade, who has made it his speciality and has had life-long experience in it. Such work as steel, terra-cotta, partitions, and mechanical plant is manufactured by much larger firms than here, and can, therefore, be supplied much more quickly. The builder stands, however, between the architect and the specialists, seeing that the material is correct in quality and workmanship, and is being worked carefully to details, and also that it is being advanced as to be ready at the proper time to fit in with the other work. Coming to the other aspect of the subject, the author observed that the difference in the methods of construction in American practice is the result of evolution in response to certain conditions, climatic and economic, and public demand. The predominating client is the practical and commercial, his demands are those that result in the greatest financial benefit to himself, such as speed, economy in construction, greatest available space to let, and so on. The remuneration of American architects is the same as here; but for this much more work is required, more detail drawings having to be furnished, and no assistance from clerks of works or quantity surveyors being afforded. In America the quantity surveyor is unknown. The time given to architects in which to estimate is rarely over a fortnight, and each builder keeps his own estimate of estimators. If consulting, mechanical, and structural steel engineers are required, they are generally employed by the architect; and to avoid the expense of many architects have these engineers on their own staff. This would only be remunerative when a large amount of work was done annually—in the case, for instance, of men who deal with the largest work,

amounting to from one to four millions sterling per annum. In some cases an architect's establishment costs would be about 50,000L a year.

In America each city has its own building department, which is the only authority to be consulted. Before starting work plans must be filed and approved, after which, except for variations, etc., one can proceed without further interference if following plans which have been filed. The larger cities have a competent staff to deal with building works; and also an engineering staff to calculate the strength of the various parts from the drawings, so as to see that they conform to the by-laws, and are structurally safe, and thus prevent "jerry" building, etc. Again, each city has its land surveyors, who at once, upon notification, fix according to law and to deed and title, the exact boundaries of your client's property. Thus, the architect, immediately upon starting his work, obtains exact dimensions for his plans, so that the builder has these fixed dimensions to work to, and from which to order materials in advance.

With regard to materials, a small brick is used, measuring on the average about 8½ in. by 4½ in. by 2½ in., except glazed bricks, for which the English size is generally used. The bricks are laid in all manner of bonds, such as English, Flemish, no-bond, etc. For this last reason English brickwork is superior structurally to American. Timber is much more extensively used, and is much cheaper than here. This is the reason of so many wooden houses being erected, and also so much "mill construction," or what is called "slow-burning construction." The principle of this latter is to use large timbers throughout, i.e., heavy joists, measuring at least 3 in. by 12 in., and stanchions, or pillars, at least 12 in. by 12 in.; while all flooring is 3 in. thick or more, so that in case of fire they will char a long while before breaking. This system of construction is recognised by insurance companies as second only to the ordinary fire-resisting construction, and when a sprinkler system is installed is considered, in the majority of cases, equally as good. Terra-cotta, the author considered, has reached a higher usefulness in America than here, the reasons being, first, the greater variety of clays, which gives the opportunity of furnishing almost any colour or shade; and secondly, it is particularly fitted for an external covering to a steel skeleton frame. America is also in advance in its manufacture, the terra-cotta being straighter, truer, and produced in much larger blocks than here, thus more nearly approaching stone in design. There is very little concrete stair work in the States, cast-iron being used in fire-resisting buildings on account of the lightness of construction. In the author's opinion it would be better for American practice, especially as regards fire-resistance, to follow the English by using concrete staircases in all non-fire-resisting buildings, and also as regards the system of concrete lintels in use here, but not in America.

For buildings over eight stories in height the prevailing system of floor construction is either hollow terra-cotta blocks built in arch form, with either flat or segmental soffits or some form of reinforced concrete. Partitions in these buildings are of hollow terra-cotta blocks, expanded metal, or "Mack." Breeze building-blocks are not yet used. In New York all buildings over twelve stories in height must not only have the floors and partitions of fire-resisting material, but if woodwork has been used it must be treated, whatever its kind, by a fire-resisting process. All exterior window frames and sashes must be of metal with fire-resisting glazing. Party-walls are not customary in the larger buildings, and the cantilever foundation has been devised to meet the need of supporting adjoining walls on their respective cartilages without the expense of underpinning and guarding against disturbance that comes from using spreading foundations which enter upon neighbouring land. Cantilever foundations are mostly found in the sky-scrapers of New York.

The author called particular attention to the large amount of cast-iron work used in the States in the framework of buildings, up to twelve stories in height. Cast-iron, he believed, could be used to great advantage here for stanchions, as it is a cheap

material immediately available, and it can always be manufactured close to where the work is being done. It can also be delivered and erected quickly.

Passing on to consider the "sky-scraper," a type of building that has more or less revolutionised building practice, the author referred to the tales occasionally heard of forty-story buildings. Such, he believed, could be safely built; but he thought that the practical commercial building would not be higher than twenty stories, and that would soon be the limit. When built on proper lines, the life of these steel-frame buildings is as long as that of other buildings. The steel is entirely buried in concrete, all exterior stanchions being inclosed in brickwork, and the interstices grouted full of cement mortar. The interior stanchions are treated in the same way, bricks or fireclay being used for covering. In addition, the stanchions themselves are now being filled internally, while being erected, with concrete. As to a comparison in cost between buildings supported on steel stanchions and by ordinary brick walls or piers, the cost of carrying a load on a steel stanchion is about one third that for carrying the same load on a brick pier, providing the load is about 60 tons. There is also a saving of floor space by steel construction. The area of a steel stanchion to carry 60 tons can easily be made 1.46 sq. ft. finished and inclosed where the sectional area of a brick pier to carry the same load would be 10 sq. ft. Another advantage is its adaptability to the construction of architectural features, as projections outside the main building lines can easily be carried on brackets or cantilevers with little cost and without interfering with the main steel frame. The advantages, too, in the way of planning are great, for walls can be taken out and large areas gained wherever desired. Again, the building's advancement does not entirely depend upon weather or even daylight, as work can be carried forward in the various shops and well in advance. Not only that, but the steel frame can be pushed ahead and the inclosing shell can follow at any floor, working, if necessary, on several stories at the same time, and starting interior work long before the exterior carcass is completed. As to the aesthetic legitimacy of steelwork, there are logical reasons for its adoption; and if there is reason, then surely steel cannot be inartistic, any more than timber.

In conclusion, the author said that there were a great many things America can learn from England, an older country with much experience. On the other hand, there are things Englishmen can learn from Americans, who have gone ahead with energy, making mistakes, realising them, and beginning afresh again, as all youth does and will when it has the proper grit. Architect and builder should work together. The builder must have plans, details, and instructions complete and definite at the earliest moment in order to accomplish the desired results. Give him full control and make him alone responsible. If the architect deals with one person for a portion of the work and another for something else, he not only relieves the builder of a portion of that responsibility, but he actually hampers the builder's progress, for then the other person looks to the architect, and not to the builder.

Mr. B. I. Greenwood (President of the Institute of Builders), in moving a vote of thanks to the reader of the paper, said that they were filled with admiration of American methods, but he thought they were not filled with envy. They could admire that which ingenuity could do without, being particularly anxious to do exactly the same thing themselves. He was sure that the circumstances which obtained in America would not fill the architectural profession with envy, because they had been told that, while the remuneration of architects was the same, yet there was a great deal more work required, and it seemed to him that the enormous staff which it appeared it was necessary for an American architect to retain was somewhat appalling. As to the surveyor, well, he was extinct, so that it was not likely that the quantity surveyor would be enamoured of the American system. Then, as to the builders; they had to pay 1s. 10½d. per hour for mechanics, and take out their own



quantities; he could assure them there would be no envy, and builders would not be desirous of emigrating just yet, because they believed that more favourable circumstances obtained in the old country. He was surprised to hear of the custom in America of separate contractors being employed on the same building for different trades. He was surprised because they in England were more modern than that. He knew that in the old days, and sometimes in Scotland even now, the custom prevailed, but he had always thought that the rapidity of construction which obtained in America required that the whole should be in the hands of one contractor. Now, however, that they heard that the different trades were in the hands of different specialists, it became all the more phenomenal that such buildings could be erected in the space of time they had heard. He did not think that the elevated buildings which they had seen would ever come over to this country. It was like living in a pit to walk through streets of such buildings. Perhaps, after all, it was a fortunate thing that the first experiment in those high buildings in London had proved such a monstrosity—he referred to the buildings at St. James's-park. He had always thought that those buildings were things to be regretted, but perhaps, after all, it was a blessing in disguise, because it had given them such a horror of that kind of thing which might, at all events, stave off a repetition for many generations to come. He ought, perhaps, to make some reference to what was said concerning the British bricklayer who had been so vilified in the Press. The gentlemen who wrote the letters in the Press—and he was not one of them—compared what the bricklayer did now with what he used to do before. They did not compare what the British bricklayer did with what the foreigner did, but they compared it with what he did in years gone by. He was quite sure that the correspondence was justified at the time it was written, because, a few years ago, the output of work of the average bricklayer was very much less than it was a few years before. But these things altered, and when trade became a little more slack, then the bricklayer did a little more work. When he knew that there were three or four men waiting outside to do the work he took care to do it himself. It might be that even now the British bricklayer did his work better than in America or on the Continent, but he was not in a position to express an opinion. It was delightful to hear of the way in which the builders in America allocated the different floors of a building to pay the various charges, and another extraordinary thing to hear was that the top floor was the highest in rent. They in England did not know that the highest floor had the best rental value, and it was a very convenient argument they had heard that the top floors were so quiet, and could be so easily reached by means of lifts. If they could only persuade Englishmen to believe that, they would accomplish a most desirable thing from the property owners' point of view.

Mr. John Slater seconded the motion, and said that the lecturer had shown them a large number of buildings which, whatever they might think of them architecturally or aesthetically, were undoubtedly interesting. There was no doubt but that the recent work of American companies in London had been very interesting to architects and builders, because they had seen with their own eyes the great rapidity with which these buildings were run up. He was not, however, quite sure that this rapidity of building was a good thing. He presumed that nearly every architect who had had to design buildings must have felt as his work went on that he wished to make some little alterations here and there to improve the building, but it seemed to him that the system of construction which the American syndicates adopted practically precluded any alteration, because they said, "We have to get on and get finished, so that we cannot allow you to make any variations at all." He was not sure that that was best for the finished building. With regard to what Mr. Denell had said as to the British bricklayer, he happened some few years ago to have had experience of Continental bricklayers. He had to look after the building of a lager beer brewery in this country, and all the

work was done by a German contractor, who imported a number of German bricklayers. He was bound to say that it was an absolute revelation to him to see the way those bricklayers worked, for they did in a day what he was sure the ordinary British bricklayer would take three days to do. He was not concerned to support or attack the various trades unions which existed, but they were told that those unions forbade a bricklayer to lay more than a certain number of bricks per day, and, if that was the case, it seemed to him that the workmen themselves gave up all their own individuality. There was no preference given to a good workman over a bad one, because all were brought down to the same hard and fast lines. It did seem to him that that was not the best way to get the best work out of an individual man. Mr. Denell had told them that in America each State had its building department, and that the larger cities had a competent staff to deal with building works, and that they calculated the strength of the parts from the drawings. He maintained that that was not the business of the municipality at all. The London County Council was doing the same thing, and he contended that they were taking upon themselves a responsibility that was not theirs at all. They were using up the time of their staff in a way which they ought not to, because if the architect or the engineer designed a building he was responsible for its safety and its methods of construction, and he did not think it wise of municipalities to take upon themselves to go over the drawings of the architect to see if it was safe. They must remember that if the municipality took up this work they relieved the architect of responsibility altogether, and although probably no architect would wish to be relieved of such responsibility, yet a large number of buildings were built in London and other cities without an architect at all, and if the municipal body took upon themselves to be responsible for saying whether these were safe or not, the builder would trouble nothing at all about it. There was the risk of the municipal body, in its subordinate, being wrong, just as much as if it was left to the ordinary designer. He ventured to hope that they would not have in London any constructions like some of those which had been shown that night. One in particular he felt everyone must have noticed; it was an enormous building of seventeen or eighteen stories high, and, so far as one could see from the elevation, it looked to be about 12 ft. wide. Personally, he could not inhabit such a building without fearing that it would be blown down. But, apart altogether from any criticisms of that sort, they were very much indebted to Mr. Denell for having given them those particulars of American construction, because, whatever they might think of them, yet the more they knew about the methods of construction which such buildings entailed the more they would be able to decide whether it was worth their while or in the interests of their clients to employ such systems as those, or to depend upon the older, more conservative, and, he ventured to think, more reliable methods of ordinary English contractors.

Mr. Howard Collis said that as to the "flat iron building" in New York, the draught it occasioned was very great. Some of the buildings he saw in New York were very high, and two of them, in the Fifth-avenue, looked very imposing, because they formed a noble entrance to the avenue. Those buildings were, however, isolated, but if similar buildings were to be carried all along the street there would be no sun in the street at all. If these buildings were everywhere, he doubted if anyone could walk about New York, and it was obvious that if such buildings were put up as to make the streets uninhabitable the result could not be considered satisfactory. There seemed to be an idea that quick building was an advantage. Of course, speed was very desirable, but in America they saw, not so much speed, as an intense hurry. They never seemed to do anything quietly, but to try and do it in the quickest possible time. What he feared was that this system of hurry could not be conducive to good building. They knew when they talked about the splendid building of the old days that when a man was building a mansion he did the brickwork one year and the plastering

the next year, and the joiner's work the following year, and so on, and the result was magnificent. That system could not obtain now, but still he thought that this love of hurry for hurry's sake was a grave disadvantage to modern building. No building constructed beyond a certain speed could possibly be as good as one which was more leisurely but still speedily and properly done.

Mr. W. Woodward said that previous speakers had somewhat misapprehended the purpose of the paper. He had detected no desire on the part of Mr. Denell to suggest that they should adopt in London the methods which prevailed in America, and the object of his paper was to tell exactly what took place in America, so that perhaps, even in London, they might gather some lessons which might be useful, bearing in mind that they must not rest quietly with the old-fashioned methods of construction, but that they must go with the times and conform to those requirements which were certainly as much needed in London as in America. He thoroughly agreed with Mr. Slater what he said as to the undesirability of municipal authorities taking on themselves responsibilities which did not belong to them, for in taking this responsibility they considerably hampered the architect in his dealing with the buildings. They knew that there were architects in London quite as capable of designing their buildings with perfect safety as any employee of either the borough council or the London County Council, and having admitted this possibility, for such an official to hamper the architect in the execution of his work only resulted in unnecessary expense to the client and delay in the building. Mr. Denell had told them, in speaking of labour, that the trade should not be confined to bricklayers, and he agreed with him. The plasterers were quite as bad as the bricklayers, if not a great deal worse. He had no hesitation in saying that the whole reason for the present state of idleness on the part of the workmen was due to trades unionism. Mr. Denell had said that wages in America ranged from 1s. 10d. to 2s. 11d. per hour, so it looked as if the principle of levelling everyone down, as Mr. Slater had stated, did not prevail in America. If that were so, he hoped that they would gather a lesson from it, and that the British workmen would gather a lesson, and agree that honest, healthy, upright men should not be confined to the same wage as idle drunkards. One important matter which prevailed in America, and which should prevail a great deal more in London, was that of "looking ahead." The secret of delay in building was that the builder, or builder's foreman, did not look sufficiently ahead. He (the speaker) did not see why building should be as it slowly carried out, rapidly carried out as it was in the building, provided that there was space in the building for the various operatives to carry on their work. With regard to the sub-contractor, he noticed that in one part of his paper Mr. Denell said that the Americans indulged in sub-contracting, and in another part he said that the building was wholly in charge of the builder. All he could say was that the fewer sub-contractors there were on a building the better. The absence of the quantity surveyor might or might not be conducive to rapidity, and if the quantities were properly taken out he did not see why one or two men should not take out the same quantities as rapidly as say, twenty different architects. He took it, however, that in America they did some more rapid system of arriving at estimates than in this country, and he did not know whether the builder suffered or whether the client suffered. Another important matter which concerned architects now in these very large buildings which demanded steel construction was that the whole thing and had capable of doing the job for the engineering work at the building. In America he gathered that the architect kept a staff of engineers, and he supposed that a question which would rise in the architectural profession soon was whether the designing of this important engineering work was part and parcel of the architect's duties, for which he should be paid, or whether it was part and parcel of the engineer's duties, which the clients should pay for apart from the



changes of the architect. They had heard also that in America there was one Department responsible for passing building work, and they would that that system could prevail in London. They wished in London that they could take their drawings to one department and that they could be approved by that department and the thing done with, instead of now having to go to half a dozen different departments, each with its own fad. They might also take a lesson from America with regard to terra-cotta. They knew that steel framework was coming largely into use in London, and the information which had been given by Mr. Denell that evening would be of great value to them.

Mr. A. T. Taylor (Secretary of the Institution in Canada) congratulated Mr. Denell on his simple, straightforward, practical paper, and also that he had disclaimed all responsibility for the title, as he (the speaker) took exception to the building methods of the United States being applied to Canada. After all, the great difference between them was merely the evolution of the sky-scraper. In every other respect, while there were little differences in detail, yet, in the general run, they were practically the same. He thought that Mr. Greenwood somewhat misunderstood the lecturer. Mr. Denell did not say that the work was sub-let. It was generally taken by one contractor, but the work was so large that he sub-let it himself to other contractors. The architect, however, dealt with one contractor. It was manifestly impossible on a building costing ten million dollars or so that one man could do the whole of the work himself, and that was where the rapidity of the operation came in. The moment the contract was signed the architect had all his details ready, and that meant a great deal. That was not the custom over here, but, in America, they might have every part of the work complete and finished by the time the contract was signed. The result was that operations were started at once, and while the steel frame was going up, the stonework was being put on, and before the steel frame was finished the stonework was being carried up. The thing applied to the joiners and other trades—everything was ready the moment it was wanted. In that way, by mapping out everything carefully from the beginning, they got speed. From his experience on the other side he felt that it was absolutely essential that municipal authorities should have some right of veto on plans put before them. It must be remembered that they were not all architects who prepared plans on the other side, and a great many of those who presumed to be architects were amateurs, and many of the plans sent in were from being right, and it was absolutely necessary that there should be some authority to go over them and see that they were right. They had seen in several cases in which buildings erected in New York had fallen down before they were finished, and that was because the municipal authorities were remiss, as well as the original designers. As to by-laws, he had examined the by-laws of all the principal cities of the United States, and he was interested to see how carefully they were drawn up, and he considered it very essential that there should be some authority to look over the drawings. He was, of course, content that the drawings of the members of the Royal Institute of British Architects would not require any such revision, but, on the other side, they were not all members of the Institute. As regarded the sky-scraper, although the design of them was put the question before them that night, yet the questions of design and construction were so associated that it was difficult to discuss one without the other. He felt that all of the ideas they were the worst, and he hoped they would never blossom forth on this side. They had simply ruined some of the best streets in New York, and if they went on with them they would not be able to walk in the streets. They would want streets at least 300 ft. wide for such structures, and that would mean laying out the streets *de novo*. Down Broadway they were nearly blown down; the blasts and gales which drove down there were something terrible. With regard to the flat-iron building, it was a fact that sometimes people were blown off their feet, and it was quite an occurrence for the plate-glass windows opposite to be blown out. One other

thing he would mention was that he was not so sanguine as Mr. Denell as to the life of these high buildings. Mr. Denell seemed to think that the casing of the steel construction in cement was all right, but, whatever might be the custom now—and he knew that they were more careful than they were some years ago—he knew that for many years care was not taken. The painting was very faulty, and rust commenced on the steel bars, and then they were enclosed in wet brick-work and covered up. He was sure that corrosion was going on inside these brick piers, and some day they would have these sky-scrapers collapse. If so, the results would be perfectly awful, for, besides the thousands of persons in the buildings themselves, they would bring down all the houses around. He was perfectly convinced that that would happen. The life of the buildings had been too short for them to see it yet, but in forty, fifty, or sixty years, something of the kind would happen. Of course, with very great care that might be avoided, and, as he said, much greater care was taken at the present time.

Mr. Hudson said he understood that a life of twenty-five years was reckoned for these tall buildings, to allow for a remunerative return of the capital expended, and after that they might be mere scrap-heaps.

The Chairman, in putting the vote of thanks to the meeting, said there was no doubt it was quite true that the Britisher could learn a great deal from the American. They had learned to allow the American first to make experiments, and if successful they followed. The world progressed no doubt a good deal owing to the energy and go of the Americans, but they moved much more slowly in this country, and in the other countries of Europe generally. They looked upon everything which was novel with some suspicion, and, in fact, if they went to their clients and suggested the adoption of some new method, the client required to know where it had been done before, and whether he could see it, or if it had been done in the days of Queen Anne. In America it was very different. There, everything novel was approved of. If a man made an experiment in America and it succeeded, he was soon raised to a position of distinction, and made his "pile." If by any chance it failed, then the country was so large that he moved a few thousand miles away and started again. Mr. Denell had told them some interesting things, and in one or two instances had made them gaze with astonishment. An architect's establishment costing 50,000*l.* a year was rather staggering. Whether the architect was expected to get out the quantities, and keep a tame engineer on the premises, he did not know, but he thought there must be some means of obtaining a *quid pro quo*. They had also learned that the builders passed some time in an architect's office, and that the builder took out his own quantities. (They were remarkably trusting in America!) They were told that they made out plans and specifications for the frame building construction, which was all to save the architect trouble, and to deliver him from unnecessary worries. This was exceedingly satisfactory and nice, but, of course, this must be paid for, and he did not doubt that the extra cost of the building would more than recoup both. What was the gain, therefore? They got increased speed in execution, but, as scientific men told them, they could not have something for nothing. If they wanted increased speed they must pay the corresponding additional cost of the power. He thought, however, that they had learned two lessons. One was that they must not lag behind, but take every advantage of improved methods consistent with their work. Of course, in this steel framework they had a very serious problem, and he could not help feeling that, if anything of that sort developed to any great extent, they would all have to become engineers as well as architects, because the architect, in the cases he had seen that night, seemed to take a very secondary place. It was necessary for them to look the thing in the face and ascertain whether they were in a position to become engineers.

The motion having been heartily carried, Mr. Denell, in expressing his thanks, said that the letter which he received from the secretary in reference to his paper stated that he should give a paper on American

methods of building, and that was what he had tried to give them that evening. They must remember that the laws and conditions were quite different in the two countries, and he thought that the quickest way round was "straight through," leaving it to architects to apply what he had told them as they thought fit. Mr. Woodward had referred to the range of wages, but that depended upon the trade—the bricklayer would get one wage, and the steel erector, whose occupation was a very dangerous one, would get higher wages. The wages were all fixed by the unions, and, with regard to the unions, he hoped they would never have the experience over here of them that they had in America. With regard to the work being done by sub-contractors, what he meant to convey was this: the builder was the general contractor, and he subdivided the work again. The architect only dealt with one man, but if there was work to be manufactured in a shop, the builder gave that to someone else, for it was not the custom for builders in America to have their shops as builders over here had.

The Chairman stated that the next meeting would be held on December 4, when an election of members would take place, and the result of the November examination would be announced. Mr. H. T. Bonner had given notice of his intention to move the following resolution:—"That neither the President nor the Council, nor either of them, shall approach the promoters of any competition with the object of their nominating competitors. Nor shall the President nor the Council appoint any professional assessor in any competition unless requested to do so by the promoters of the competition."

#### THE ARCHITECTURAL ASSOCIATION.

An ordinary fortnightly meeting of the Architectural Association was held on Friday last week at 18, Tufton-street, Westminster, S.W., Mr. E. Guy Dawber, President, presiding.

The minutes were read and confirmed, some nominations were read, and the following gentlemen were elected as members, i.e., Messrs. Winter Rose, Philip E. Webb, J. W. Jarvis, A. G. Bridger, K. L. Kidd, J. Seddon, B. Clough Williams-Ellis, H. G. Taylor, J. E. Henderson, R. O. Adamson, R. W. A. J. Cosway, G. W. Joslin, W. H. Hatchard Smith, and G. Flint-Clarkson.

#### The Building Fund.

The Chairman then announced the following further donations to the Building Fund, i.e.:

	£	s.	d.
H. P. G. Maule (2nd donation) .. .. .	5	5	0
C. R. R. Clark .. .. .	2	2	0
F. S. Chesterton .. .. .	1	1	0
W. Dewes (2nd donation) .. .. .	1	1	0
H. White .. .. .	1	0	0
F. T. Bagallay .. .. .	10	6	
C. H. Brodie .. .. .	10	6	
A. E. Bullock .. .. .	10	6	
A. O. Collard .. .. .	10	6	
W. J. Davies .. .. .	10	6	
H. T. Hare .. .. .	10	6	

The Chairman also proposed a vote of thanks to Professor Henry Adams for a donation of some samples of wood and stone. They would be most useful to members of the Association, and he was sure the members would all join with him in thanking Professor Adams for his gift.

The motion was heartily agreed to.

#### President's "At Home."

The Chairman said he desired to announce that on December 8 he would be "At Home" in the Association premises, and he hoped that all those present that evening and all members of the Association who could possibly manage to do so would be present. It was proposed to have an exhibition of the work done by students during the summer, and he hoped that all those who had done any sketching would send in one or two of their sketches, or a sketch-book. Great care would be taken with the sketches. He was anxious that those who did not compete for the Association prizes, or who were not great sketchers, should send in their work and let it be seen what they could do. He hoped to get some sketches by older men as well. With incidental music and so on they hoped to have a pleasant evening.



*Old Manor-houses.*

Mr. J. A. Gotch then read a paper on "Old Manor-houses," which was illustrated by a large number of lantern views from photographs taken, with two exceptions, by Mr. Gotch himself. The Chairman, in calling upon the lecturer, said it was quite unnecessary for him to say what an authority Mr. Gotch was on everything connected with the domestic architecture of England. The following is the paper:—

"The title of this paper must not be taken too literally. A manor-house is, strictly speaking, the dwelling-house of the lord of the manor; and a manor was a tract of land granted by the King to some person of note in return for certain services, and over which the grantee had various rights beyond that of possession. The legal aspect of the subject is often both interesting and amusing, but it is not that with which we are now concerned; nor will it be necessary that the manor, from the standpoint of law, should in any way control what is to be said. But a manor-house, being the principal house on the manor and the home of the possessor, was naturally a building of some distinction, although inferior in size and importance to the castles of the great barons. Being a building of some distinction it possessed architectural interest, although not to be ranked among the great examples of architecture. The houses, therefore, which are now to be considered are not necessarily manor-houses in the technical sense, but rather those of medium size and importance, of which the ordinary manor-house was the type.

There were many houses of this kind in existence even in the days which we are accustomed to picture to ourselves as dominated by castles. But a great number of them have disappeared, having been replaced in many instances by more modern dwellings. The mediæval house was perhaps rebuilt in the reign of Henry VIII., then again in the times of Elizabeth. If the fortunes of the family permitted, it may once more have been transformed in the XVIIIth century, and yet again in the XVIIIth; nor is it beyond the bounds of possibility that the XIXth century may have put its uncertain stamp upon the latest successor of the mediæval original. It is an interesting speculation how long a house which is continuously inhabited will last without reconstruction. Given plenty of money with which to rebuild, and probably a century is as long as the family will care to put up with the old fashions. It is then thought necessary to modernise the place, unless considerations of sentiment or economy induce the builders to retain some of the ancient work.

In consequence of this rebuilding, early houses are not very numerous, and most of those which have survived have undergone frequent alterations; it is therefore difficult to find examples of untouched early domestic work. Nevertheless, by comparing one fragmentary specimen with another, it is possible to ascertain what were the main lines upon which they were built. Many of them were not strongly fortified, even in the turbulent times of the Edwards. They were arranged with a view to defence, it is true, with thick walls and small windows, but it was defence from a casual attack and not from a set siege. They were generally surrounded by a moat, and the stronger ones were furnished with a drawbridge and portcullis; but many of them had merely an ordinary bridge and a strong door. The larger sort were built round a courtyard, which was entered either through a gateway in the house itself or through a gatehouse set in a wall of enclosure. These early dispositions, which took their rise from the necessities for defence, were retained long after the need for such precautions had disappeared; and, without any conscious endeavour on the part of the builders, they added piquancy and interest to the composition.

Another interesting speculation which suggests itself is how far were these old manor-houses the outcome of careful and painstaking design? How much was there of intentional composition in the grouping of their parts? The answers to these questions would probably be found to be "Not very far" and "Not very much." There was, we must remember, a particular style in

vogue at each period and a particular type of plan. Half the difficulty of the present-day designer, therefore, was removed at once, or rather, it never arose. The wants to be supplied were simple, and so also were the means of supplying them. There were a few well-recognised apartments which had to be provided in every house; it more accommodation were required it was added in the simplest way and without much endeavour to harmonise it with the rest of the building. Hence, the planning of many old houses is very haphazard, with the result that their appearance is picturesque; but it may be doubted whether the designer aimed intentionally at a picturesque effect. In fact, half the delight which these old houses inspire arises from their unstudied beauty; they look as inevitable as a natural growth. The masons had their traditional methods of solving the simple problems with which they had to deal; they had their ways of making their windows, their doorways, their chimneys. A window more or less here or there offered no difficulty; an additional irregularity did no harm. Especially is this the case in the smaller and less pretentious houses. In those of more importance a greater foresight was often exercised, and where a "surveyor," or as we should now style him, an "architect" was employed, a good deal of skill was displayed. No one can examine John Thorpe's drawings, for instance, without coming to the conclusion that he was a very ingenious planner, and always bore in mind the outward effect which the disposition of his various rooms would produce.

But now, let us look at a number of views of old manor-houses of various dates and from all parts of the country. We shall see how much they have in common, and yet how widely different they look, owing largely to the materials of which they were built, which were naturally influenced in great degree by local conditions. The material which of all others has played the most important part in architecture hitherto is undoubtedly stone. Wherever we look and upon whatever period we fix our eyes we find that probably 90 per cent. of architectural work has been erected in stone, and that of the remainder at least one-half has its ornament executed in that material, even though the bulk of the walls may be built of some other, such as brick. Somewhat the same proportions hold good in respect of these old manor-houses. Most of them are built of stone. Where stone was not readily procured, the walling was perhaps of brick or of timber and plaster, but even then stone was used for the ornamental portions. Not so much in half-timber work, because the wood was easily worked. But, in regard to brick, and its ally terra-cotta, although they furnish some fine examples in certain districts, yet in point of number they are comparatively insignificant. They occur chiefly in the southern and eastern counties, and even there the mouldings of the windows and doors will sometimes be found to be worked in plaster or cement in imitation of stone.

The illustrations, with two exceptions, are all from photographs which I have taken myself. This necessarily limits their range to a certain extent, but it perhaps helps to increase their reality and ensure their genuineness. They are purposely selected from places which, for the most part, are little known, and which therefore will probably be new to many of those present.

*Longthorpe Tower.*

The first example is Longthorpe Tower, situated in a small village of that name about two miles west of Peterborough, the village of which Thorpe Hall is now the principal house, a fine and interesting specimen of the work of Inigo Jones's son-in-law, Webb. The Tower is of very different character from the Hall. It was a country-house of the abbots of Peterborough, built for peaceful purposes, but made of sufficient strength to render it secure against casual attack. There is not much left of the original building besides the tower and the end of an apartment which may have been the hall. This is of Early English date, and may be put at about 1250. What the original accommodation may have been is a matter for conjecture; but it probably consisted of a hall, the tower, in which the abbot's private rooms

were placed, and some kitchens which have disappeared, possibly because they were built of wood. The house has undergone many alterations. At the end of the limb, which was presumably the hall, there is a XVth century window on the ground floor and a XVIIIth-century window above it. There is also a wing of the latter date, and a further addition of modern times. In fact the house shows signs like nearly all ancient dwellings, of continuous occupation and continuous changes to meet changing conditions. The most interesting part is the tower itself, which is a Midland version of the Northern peel-towers. It consists of only three floors, whereas in the towers of the north of England and south of Scotland there are usually five floors; but, then, it must be remembered that northern peel-towers were generally self-contained, and had no adjoining apartments. The ground floor here is provided with extremely small windows, only 4 in. wide; the other two floors, being less accessible from outside, have windows of more cheerful size; but even in the case of the middle story, which was the chief apartment, it was considered necessary to enlarge the original windows in the XVIIIth century. The lights of the two lower stories are glazed, and it is not impossible that these of the principal room were glazed from the outset, but glass was far too great a luxury to be bestowed upon inferior rooms and in those days all but the most important windows were provided with nothing more than shutters. The windows of the top floor at Longthorpe have clearly never been glazed from the outset to this day, and it is needless to say that the room is not used for domestic purposes. The ground-floor room was approached from the adjoining building, and so also was the room above it; but access to the topmost room was gained by a narrow staircase in the thickness of the wall, and from this room a second staircase wound round a spiral up to the battlements of the roof. The ground floor was merely a cellar or store-place; the first floor, which alone has a fireplace, was the solar, or lord's private room; while the room over it was probably devoted to his retainers as a sort of watch-tower. In this room there is a latrine in the thickness of the wall.

There were probably some outer defences to the house, but, if so, they have entirely disappeared, including the moat, which must almost certainly have existed.

*Woodcroft Castle.*

The next house in point of date is Woodcroft Castle, not far from Stamford. This presents features which are absent from Longthorpe, but lacks others which exist there. For instance, there is no ancient staircase, nor any sure indications of where it was. The whole place has been more drastically remodelled inside, and restoration (necessary no doubt) has played havoc with the ancient arrangements. On the other hand, the moat remains, and the entrance gateway, as well as the chapel above it. Although called a "castle" the house was nothing of the kind; it was not even strongly fortified, since there are no indications of either a drawbridge or portcullis. It depended upon its gates for preventing unwelcome access, and upon its moat, its thick walls, and narrow windows for security in other respects. It seems to have been of much greater extent originally, and to have occupied most of the area enclosed by the moat. Of the remains left, not many rooms can be identified with certainty. There is no doubt, of course, about the archway, which was the entrance; the small room on its right was probably the porter's, the large one on the left was perhaps the guard-room. There is nothing to show where the hall and kitchens were. It is equally certain that the room over the archway was the chapel, since the piscina still remains; and there was a gallery over part of the chapel, as indications exist of the gallery front and of the stairs of access.

The round tower, which has survived, was balanced by another at the other end of the front, which has completely disappeared, but it is impossible to say whether there was a tower at each of the other corners. The whole treatment of the place has a somewhat unfamiliar air, and it is quite possible that a foreign architect (shall we call him) may



have been sent from the Abbey of Peterborough, which is not very far distant. This plan, also, has work of different periods. The original house was built in the closing years of the XIIIth century; the east wing was either built or remodelled in the XVth; the chapel was made into a living-room in the XVIIth; and in the XIXth many evidences of its previous history were blotted out. Not that it had much history attached to it. Only once did Woodruff emerge from the obscurity which envelopes so many ancient places, and that was in the civil wars, when one Dr. Michael Hudson endeavoured to hold it against a force of Parliamentary troops. In spite of a stout resistance, the defenders were driven from one stronghold to another until at last Dr. Hudson found himself fighting on the summit of the tower. He was overpowered and thrown over the parapet, but he clung tenaciously to the gargyle which may yet be seen projecting over the waters of the moat. His assailants hacked at his fingers, and he fell into the moat below, whence he struggled to the land. But for some reason he was highly obnoxious to his enemies, who included many men from the neighbourhood, and it was one of the latter who struck the fatal blow when the indomitable doctor reached the bank. The incident has been utilised by Keats in "Woodstock," in which the character of the intriguing Dr. Rochefort was suggested by Dr. Michael Hudson.

Kirby Muxloe.

Nearly two centuries had elapsed before the next house of our series was built. It was at Kirby Muxloe, in Leicestershire, and is again wrongly called a castle (see illustration). Castle it was not, but a fortified dwelling-house, rather more artistically fortified than the former examples. Unlike them, it was not in continuous occupation for very long; there is no history attached to it, nor are there any contemporary records to throw light upon its origin or decay, but, judging by the excellent preservation of the little moulded work which has survived, it could not have been subjected to the wear and tear of daily life for any great length of time. Unlike them, it is built of brick, but its mouldings are of stone. There is not an abundant supply of stone in that district, and what there is is hard to work; accordingly, the walls are large in scale. The actual remains of the house are not extensive, but the outlines of the walls can still be traced, and they indicate that it must have been of considerable size. It was surrounded by a moat which washed the walls on every side, and its main disposition was almost truly symmetrical. This fact is interesting in view of the dominating part which symmetry played in domestic architecture in the Italian influence becoming paramount in English design. The gateway is the most important feature of the house, and this consists of the whole being mounted on the next floor by a large arched room. There was a drawbridge and a portcullis. The recess into which the former was drawn up and the holes for the chains which raised it are plainly visible. So also are the grooves for the portcullis and the hinges in the wall of the guard-room which retained it when elevated. These means of defence were supplemented by a variety of an active kind, for in the flanking walls are circular orifices, through which the muzzles of cannons were thrust, a method of defence of which there are not many examples to be seen of this date, which is about 1480. The red brickwork is ornamented in places with a diaper of blue; a fashion which became very prevalent during the sixteenth century. Among the patterns which the mason's scrutiny reveals are the letters "W. H." and a heraldic "manch," the initials and cognisance of William Lord Hastings, who, if tradition can be believed, built the house for the celebrated Jane Shore. It may be so, and in that case the strength of the defensive works seems to indicate that the lordship, having got the lady there, intended to keep her.

Stoke Albany.

At about the same date, but rather earlier, was the interesting manor-house of Stoke Albany, in Northamptonshire, which, again, is only a small half of the original house.

Its principal features are the windows, buttresses and entrance door on the main front. The doorway is a well-moulded, pointed opening, surmounted by two shields of arms, the forerunners of the heraldic displays with which the Elizabethan designers loved to adorn their porches.

To the Gothic period belongs also the quaint fireplace of a small farm-house in Somerset called Churchill Park, where the great oak beam is cut to form a flat-pointed arch, and is panelled with a quatrefoil and cusps (see illustration).

Influence of the Italian Manner.

So far, the houses which we have examined have all been Gothic in their treatment. We now come to the period when the influence of the Italian manner began to be felt. The change was gradual, more gradual than that from any one of the preceding styles to the next. The actual causes of the change of style in mediæval times have never yet been thoroughly explained. How was it that, within ten or fifteen years, the forms given to the ornamental parts of buildings should have altered so completely as to constitute a new and distinct style, and that the change should have effected work over the whole country at the same time? Where was the dictator of fashion located? And how came he, in those days of difficult communication, to influence simultaneously districts so far apart as Yorkshire and Devonshire, Norfolk and Cheshire? Whatever he was—Guild or Fraternity or Society of Freemasons—and wherever he existed, his ways were less sudden in the XVIIth century than they were in the XIIIth, for, when the foreign forms had found a lodgment in England, they were by no means universally adopted, and the old traditional methods of work were retained side by side with the new for some thirty or forty years. The Italianising of English work was a slow process. It began in Henry VII.'s tomb, at the instigation of the King, his son, and it was more or less in court circles that the new mode was practised. One or two houses of the nobility built between the years 1520 and 1530, such as Laver Marney, in Essex, and Sutton Place, in Surrey, were strongly touched with the new influence. But even here the ancient ideas lingered, and Gothic work is to be found side by side with a rendering, more or less faithful, of Italian detail. Sutton Place is a case in point, where the main lines are still Gothic, while the applied ornament is of the Italian type. At the Wyne, in Hampshire, the linen panelling which covers the walls has curious new touches about it, and a Gothic-headed doorway is surmounted by a panel of thoroughly Italian feeling. The same infusion of foreign ideas is to be found in much, though not all, of the work of the first half of the XVIIth century. At Deane Park, in Northamptonshire, for instance, it is visible only in the scrollwork attached to the coat-of-arms of Henry VII. At Clifton Maubank, in Dorset, the beautiful front had much of the new detail, while the bulk of the work was largely English. So fine a piece of work was this front that it was removed and re-erected at Montacute, and the remnant of the house at Clifton has but little of the new fashion about it. It is impossible to look at this house without noticing the bay window high up in the gable—a somewhat unusual position, but one which was copied at Montacute, and this feature serves to remind us what an important part the bay window played in the design of Elizabethan houses (see illustration).

The worthy masons of England were much exercised by the new fashion. Brought up in Gothic traditions, they found themselves compelled to adopt a style of ornament quite strange to them, and of which they did not grasp the underlying principles. Some of them were clever, some were merely honest plodders, and the result of their endeavours sometimes arouses admiration, sometimes amusement, sometimes pity, and sometimes, in unsympathetic breasts, contempt not wholly free from rage. At Dingley, in Northamptonshire, is one of the most curious examples of the good Englishman striving with these puzzling foreign fashions (see illustration). His arches are pointed, but they spring from Classic columns, his gables assume strange outlines, and his Classic mouldings are diversified with curious Gothic

beads, introduced in a manner which would have shocked Palladio.

The Growth of the Manor-house.

But we must return from this digression on style to the consideration of the growth of our manor-houses. By the time at which we have now arrived, halfway through the XVIth century, the fortification of houses had gone out of fashion; there was no longer need for it. Nevertheless, as it was difficult to get rid of old habits, so it was difficult to dispense with old features and old methods of planning. The courtyard idea lingered on long after the need for such a disposition had ceased. But, no doubt, the desire survived for keeping control over those who went in and out, and therefore the porter's lodge was still retained; and this was flanked in some cases by towers which preserved the appearance of those which in former days defended the gateway of a mediæval castle, although they no longer fulfilled the same functions. But, as time went on, so the defensive precautions grew less, and houses were made more and more cheerful. Windows were made larger, and placed without hesitation on outside walls. Prospect was taken into account, although it did not yet determine the whole position and arrangement of the house; the garden was cared for, and laid out with an eye to display; and the whole place was arranged with a view to a quiet, peaceful country existence. The development of this side of life may be well traced in such a house as Canons Ashby, in Northamptonshire.

The prevailing idea of the well-to-do squire was, like Dogberry, to have everything handsome about him. The body of the house was spacious, and, in obedience to the custom now well established, it was usually planned in a symmetrical manner. The walls inside were panelled, the ceilings covered with designs of greater or less intricacy, the chimney-pieces were made large and handsome, the staircases wide and massive. Heraldry was called upon to help in the decoration, and there are very few houses at all well preserved which do not reveal much of their history through the help of this beautiful and fascinating science, or art, should it be called?

The same general treatment was adopted in all parts of the country, and the result varied according to the nature of the local materials and the skill of the craftsmen employed. In districts, such as Lancashire, Yorkshire, and Derbyshire, where the stone is hard, and in Cornwall where granite was used, the detail is plain. In the Midlands it is often rich and elaborate. The plaster-work is sometimes admirable in design and execution. In remote places it is often puerile. Many of the smaller houses depend for their effect more upon their simple and picturesque outline than upon richness of ornament. Throughout all these years the plan of the house had been of the same type, namely, a large hall as the chief apartment, supplemented by rooms for the family at one end and rooms for the servants at the other. An adaptation of this idea on a small scale may be seen at Cold Ashton, in Gloucestershire, which also retains its forecourt and entrance gateway. The formal arrangement of the approach, even though on a quite small scale, as in this house and at Eyam, in Derbyshire, lends distinction and dignity not to be obtained by a haphazard arrangement.

Houghton Conquest, etc.

With the advent of the XVIIth century the Italian influence gained more ground, and began to affect not merely the detail, but the actual disposition of houses; and yet, side by side with this change, there lingered on the methods of fifty years before. At Houghton Conquest, in Bedfordshire (see illustration), is a house built for the accomplished Countess of Pembroke, "Sidney's sister, Pembroke's mother." You remember Ben Jonson's epitaph:—

Underneath this sable hearse  
Lies the subject of all verse,  
Sidney's sister, Pembroke's mother;  
Death! ere thou hast slain another,  
Learned and fair, and good as she,  
Time shall throw a dart at thee.

This house, built before 1621, the year of the countess's death, combines mullioned windows, with a very pronounced Italian treatment of the loggia; while at Ragdale, in Leicestershire, built by Sir Henry



Shirley in 1629-1631, is a hall which retains the far simpler treatment reminiscent of Elizabeth's days. In the same county is Stapleford Hall, where, at about the same time (1633), William, Lord Sherard, had rebuilt a wing in which he combined some ancient Gothic niches and statues with the gables and dormers which were characteristic of his own period.

#### The Advance of Formalism.

The change towards stricter Italian detail produced many interesting pieces of design, in which it is evident that the mason, although compelled to adopt the prevailing fashion, yet rebelled against giving up his ancient freedom in favour of strict rules, with a result both quaint and interesting. Such is the doorway of Cheney Court, not far from Bath. The advance of formalism and the change in the disposition of the accommodation of the house may also be seen at Chelvey Court, in Somerset, where there is no longer a central hall, but merely an ante-room leading to the living-rooms and the staircase. Here, although the plan has changed from the Elizabethan and Jacobean type, the porch and many of the windows are still of that style.

Formalism continued to increase as the years went by, especially in the larger houses, but in those of the manor-house type it was restrained chiefly on account of expense; and the simple forms of the XVIIIth-century house are nearly as pleasant to look upon, and harmonise as well with the English landscape as the mulioned houses of a hundred years earlier. They frequently exhibit a little play of fancy in parts of the design, although in the nature of things the increased deference paid to set rules precluded those unrestricted flights which are so charming a characteristic of earlier and freer days.

#### Gardens.

But if the houses offered less scope for the imagination, the garden gave it a wide range, and we owe to the XVIIIth century some of the most charming designs for the surroundings of the house which could be desired. This is not the occasion for pursuing that branch of design at any length, but, broadly speaking, all the most delightful old gardens, with their straight walks, their clipped hedges, their statues, lead vases, and pleasant summer-houses, were laid out in the early years of the century before last. Not that the XVIIIth century neglected this part of the process of making a home—not at all. The Parliamentary surveys of the houses belonging to Charles I. give dry, formal descriptions which the imagination can easily expand into the most glowing pictures. Sir William Temple was a great gardener. Numberless examples might be mentioned of splendid lay-outs—Hampton Court, Boughton House, Badminton, West; but these are much vaster in scale than our manor-houses, and many of them have been destroyed. We may fairly say that the high-water mark of beautiful gardening was attained in the first quarter of the XVIIIth century. We have already seen one example at Canons Ashby, and must content ourselves on this occasion with a brief glimpse into the lovely garden at Melbourne, in Derbyshire.

Such is the all too brief and superficial account of the old manor-houses of our great cities it may, with its illustrations, have brought a welcome breath of country air; to those whose feet are still on the threshold of our noble art it may have offered a transient view of the by-paths which lie waiting to be explored in the vast domain upon which they are entering—by-paths, the pursuit of which will at once enrich their imagination and afford a welcome relaxation from their sterner duties."

Mr. H. D. Searles-Wood, in proposing a hearty vote of thanks to his old friend, Mr. Gotch, said that papers of the kind were most useful, for they not only refreshed the memory of many a pleasing jaunt, but they also pointed a moral which all could take to heart. Would Mr. Gotch tell them what is the heraldic device he referred to as a "manch," and what was Cardinal Wolsey's cognisance? It had always been a matter of great regret to him that there was no handbook which gave in a succinct

form all these cognisances—a little book such as one could carry about. The only cognisance he knew was that of the Hungerfords, which consists of a wheat-sheaf between two sickles. It was astonishing how many of the old houses of England have the cognisances of this family or one or other of the great families, showing how wide these family interests spread. As to Barrington Court, which was still in the market, it was a pity that such a lovely place was not to be preserved.

Mr. S. Flint-Clarkson briefly seconded the vote of thanks.

Mr. Matt. Garbutt said that in one of the gatehouse views which Mr. Gotch had shown them there were some small loopholes, and these they were told, were intended for the use of cannon. Would Mr. Gotch give them his reasons for so confidently asserting that those holes were for cannon, and not for smaller weapons? They were exceedingly small for cannon.

Mr. John Murray said that, whilst looking at the views they had seen, he had been particularly struck by the simplicity of most of the designs and the amount of restraint which they exhibited. These were points which might well be copied by modern architects, and he suggested to students that they might take a lesson from them. The subject of manor-houses deserved careful study, and the paper would assist them in their work.

Mr. W. A. Forsyth said that the subject did not admit of much discussion. Mr. Gotch had made it his own, and he treated it in such a way that no one could contest what he said. As to the settings of the houses, very often one was shown these buildings and was not allowed to see the scenes in which they were set, and it had been a great advantage to see Mr. Gotch's views. More than that, they had been able to study a number of places which they had not seen before, but which now they were anxious to visit. They were always pleased to see Mr. Gotch amongst them. Mr. Gotch never refused to read a paper before them when asked to do so.

Mr. H. P. G. Maule said that Mr. Gotch had not said much as to the development of plan, and it would be rather interesting to know the lecturer's views as to whether the plan of these manor-houses was evolved from the smaller houses upwards or from the larger houses downwards—whether they commenced with the hall and two rooms on either side and gradually extended that, or whether the large castle or bigger house was cut down. He thought that, in many cases, the idea was suggested that the house had grown from the nucleus of a hall and a kitchen and perhaps a solar on one side and perhaps two or three bedrooms, and that that had gradually increased until we got the courtyard plan. It was rather interesting to know something as to the plan, for one constantly found in quite small houses—in the small yeoman houses in the midst of Kent, for instance—the big hall and two rooms, and very little evidence of more, and he thought that type of house had existed from very early times indeed.

The Chairman, in putting the vote of thanks, said that they had had an exceptionally interesting paper, and they were indebted to Mr. Gotch for it, and also for the views of so many out-of-the-way houses. He could not agree that there was not much scope for discussion, for, in his opinion, the paper was full of points for discussion, and it was not possible for him to touch on more than one or two of them. One point raised had always exercised his mind, and that was how far the beauty of these old manor-houses was attributable to actual design or to haphazard methods of building? Mr. Gotch put it down to the haphazard way they had of building—they added on to their buildings just as they required to make additions, and what was added happened to make a picturesque whole. But there was another point to bear in mind, and one which had governed, to a great extent, the planning of perhaps the courtyard arrangements of these old manor-houses. He spoke with a good deal of experience and knowledge of these buildings in Warwickshire and Gloucestershire, and he thought the plan had been governed by the way the builders had been forced to roof the house. They commenced with one small

hall probably, and when they wanted to add to the building they did not decrease the size of the hall, but they added on a wing at either end. It was just like a game of dominoes. If rooms were required, they did not necessarily extend the ends of the building, but a turn was given, and so gradually a courtyard was formed, and so in time the picturesque effect was secured. In all the plans and views they had seen every house had a single span; the builders could not have single span roofs in those days, and that fact determined the plan of some of the later manor-houses. And we knew how external affected them and how it affected detail. The old builders—they were not architects of course—were very loath to let go the old traditions and habits, which they had been practising for years, and take up new ones. Changes were always found in the entrance doorways, in chimney-pieces, etc., and it was generally in the doorways that they tried their 'prentice hands. They kept to the old traditional lines as long as they could. In Mr. Gotch's book on the Renaissance there was a well-known example—a doorway at Aylesford Hall, where was to be seen the Gothic head and the classical label, and the whole district teemed with details like that. In one house was an old Georgian or Queen Anne doorway, and the windows at the sides were treasured as mullions, with square heads.

The vote of thanks was put and carried heartily.

Mr. Gotch, in reply, said it was a great pleasure to come among them and to keep in touch with a body with which in years gone by he was much associated and in which he then took a much more personal interest than was possible now that his residence was at a considerable distance from London. A paper like his did not afford much opportunity for discussion, for it was historical rather than controversial. A "manch" was an heraldic term for a long sleeve, of the XIVth century, which fell from the arm. Mr. Searles-Wood was right in saying that in many old manor-houses one met over and over again the cognisances of some of the principal families of the time. He understood that Barrington Court was in the market, but he believed that an appeal had been made by the Society for the Preservation of Places of Natural Beauty for funds to enable them to purchase the building. As to the cannon openings at Kirby Marlow, the officers were about the size necessary to accommodate cannon of that day, and they were two or three feet from the floor inside—quite a convenient height for cannon and not convenient for shot guns. The openings were not intended for arrows, the openings for these being in the form of long slits. Probably the cannon of those times would not shoot more than 200 yds. As to the development of the plan of the house, he agreed with Mr. Maule in thinking that these houses began from a small type and worked upwards. The original house consisted of a hall and a room for the family and a room for the lord and the kitchen department at the other end, which was often built of wood, and in many cases had entirely disappeared. As the desire for comfort increased, more and more bedrooms and other rooms were built, and the plan then expanded at each end—one end for the family and the other for the servants, and as time went on, that developed into the courtyard plan. For defensive buildings like Barnwell Castle, there were surrounding thick walls, fortified by towers in certain places, particularly at the entrances, and very interesting buildings they were in many cases. What we see now of buildings of that kind was only the defensive parts. He agreed with what the Chairman had said as to design, but he could not think that the builders paid anything less the attention we do to appearance. They built a structure to mouth, so to speak; they built a structure not because it was a good way of building because it was a good way of building according to their lights, and, as it often happened, the carrying out of work of constructional lines often resulted in some thing good and pleasing to look at, and was so in regard to many of these old manor-houses.

The meeting then terminated.

The next meeting will be held on December 1, when Mr. E. F. Reynolds will read a paper on "Turkish Architecture," illustrated with lantern views.



## THE ROYAL SANITARY INSTITUTE.

On Tuesday last week a discussion took place before the Royal Sanitary Institute at the Parkes Museum, Margaret-street, W., on the subject of "Rural Housing," Col. J. Lane Nottor presiding. In our last issue we gave a report of the remarks made by Dr. F. J. Sykes.

## The Cottage Exhibition, Letchworth.

Mr. T. W. Aldwinckle, who followed, described at considerable length the cottage exhibits at Letchworth, in the course of which he said that it would be necessary at the outset to set up some standard by which to judge the character of the various exhibits, and to consider what were the essentials in a cottage which, costing to build 150*l.*, or thereabouts (prime cost), should be suitable for an agricultural labourer paying a rent of 3*s.* per week. In the first instance, for the purpose of economy in construction, the cottage should be a simple, rectangular, self-contained building, with a simple span roof, free from cross gables, dormers, and other breakings up of the roof-line (however artistic they might appear), as well as all bay windows and other projections. This was laying down a drastic law, as the exigencies of cost must be paramount. The eaves of the roof should have a projection of 12 in. or more to protect the walls from rain. Some of the competitors showed the upper story wholly in a mansard roof, which was a somewhat cheaper arrangement than brick walls, but there would be some lack of warmth in the bedrooms. It must also be borne in mind that this class of cottage had but little to spend on fuel; therefore the windows must not be large, and the external walls must be of a material of a thickness capable of excluding cold and damp. Some of the cottages in the exhibition had external walls of 4-in. timber framing covered externally with plaster or weather boarding, others with thin plaster or concrete slabs (say, 3 in. or 4 in. thick), and others had windows out of all proportion to the size of the rooms. To keep these cottages comfortably warm would require an amount of fuel quite beyond the means of the labourer. Yet this matter must not be ignored. Warmth was of vital importance in a cottage home. As regards accommodation to be provided, there were required a living-room, scullery, and two bedrooms. A third room, or parlour, was quite unnecessary. It added to the cost of the building, and was only used on rare occasions. If a parlour was provided, the living-room was reduced in size, and, after this, the latter was the room in which the family passed most of their time. The living-room should be the largest room in the cottage, with not less than 160 ft. floor area, and should have a small range (with oven and no boiler), a well-made one, but one economical in fuel. In the winter the cooking would be done in this room. There should be a dresser or cupboard dresser. Through ventilation was desirable for this room, if possible. The floor should be of tile, not wood; the latter could not be so clean and sweet. If the floor of the living-room was of wood, the floor-boards should be nailed down direct to the concrete, and should have a layer of hard core underneath. In one cottage there was a cement margin round the room a few inches wide, an arrangement which prevented the damp from reaching the floor-boards. The entrance to the room should be through this room; direct, but through a lobby, and a north-east aspect for this entrance should be provided. There should be a good-sized stone threshold outside the entrance, and a small roof over. It was important that this living-room should be a comfortable one to sit in, and that it should be free from draughts from doors, etc. In some of the cottages exhibited the living-room had as many as four doors, without a single comfortable corner. The scullery should have a floor area of not less than 80 ft. It should have a small range for cooking in summer, and a dresser should be provided for removing the rain rising from the copper. If there was a bath it should be in the scullery, and it should have its hot-water supply from the copper. The cottage taking the first prize had no bath, and it was more than likely that the cottage would prefer a more primitive arrangement. In some of the cottages

there were provided a combined model cottage range, copper, bath, and hot-water supply, which would cost at least 15*l.*, or one-tenth the whole cost of the cottage. It was advisable that there should be the means of getting from the scullery to the bedrooms on the upper floor without passing through the living-room. This did not mean that the stairs should lead direct from the scullery or from the living-room, as this allowed the steam and vitiated air from the ground floor to ascend into the bedrooms. There was much to be said in favour of an outside wash-house, so that the washing could be done without the steam entering the cottage. The cottages built by Lord Carrington on his estate had this arrangement. All this, however, tended to increase the cost. Every cottage required a back door, and this should be in the scullery. The door should lead to a roofed lobby open at one end or side, so that from this lobby access could be had to the coal store and water-closet. This gave sufficient air separation to the latter, while it could be approached under cover, which was desirable in bad weather. It was important that the water-closet should not lead direct from the interior of the cottage. It might be considered desirable that where there was an earth-closet the access should be wholly external and not from a lobby, or even that it should be an outbuilding. Wherever the access to the closet, coals, or wash-house was wholly external, there should be a paved way leading to same, of tiles or other suitable material. A coal store and a properly lighted and ventilated larder were required (both of only very moderate size). The larder should lead from the scullery. Where the coal store also leads direct from the scullery, there should be some external means of getting the coal into the store without going through the scullery. The stairs should not be steep, with not more than one set of winders, and should have a hand-rail, also a window (to open). It was preferable to have all the bedrooms on the upper floor. In the first place, it was more economical in construction, as all these rooms could be partly in the roof. It was also more convenient for family purposes, as if one bedroom was placed on the ground floor the children sleeping there would not be under parental control. It was only fair to state, however, that there were several very good cottages in the exhibition which had a ground floor bedroom. When these bedrooms were much in the roof the windows should be in the side gables, so as to avoid dormers. It was advisable that the parents' bedroom should communicate directly with one of the other bedrooms, to allow of the supervision of the very young children. The position of the bedstead had apparently not been considered by many of the competitors. The ground floor should not be less than 7 ft. 9 in. to 8 ft. high from floor to ceiling. There did not appear to be any advantage in increasing the height by exposing the joists over. A flat ceiling was certainly more sanitary. For the bedrooms, when partly in the roof, the mean height should not be less than 7 ft. 9 in., with vertical wall not less than 5 ft. in height. Reference had already been made to the size of the windows. It was advisable that they should be near to the ceiling in all rooms, and if a part of the upper portion could be made hopper fashion, so as to be kept open at night, so much the better. A large amount of cupboard space was not desirable. A food larder and cupboard dresser should be sufficient. Other cupboards only mean dark places difficult to keep clean. It was preferable to put in bedrooms and elsewhere a good deal shelf, with a deal rail under having a few good cloak hooks. Unventilated and dark spaces under the stairs were most undesirable as cupboards. The internal finishings must necessarily be very simple and inexpensive. All walls should be plastered internally, except the coal store and possibly the larder, and all salient and internal angles in same should be slightly rounded. Wall papering was undesirable in any case, distemper being preferable. Skirting boards were undesirable, as the space behind them harboured vermin. A cement skirting was preferable. There should be no wood floors to the ground floor story, unless there was a bedroom. Well-made ledged doors hung with strong purpose-made strap hinges (not ordinary cross

garnets) were sufficient, except perhaps for the front entrance-doors. A plain rounded architrave would be sufficient. The internal reveals of the windows should be in plaster and rounded with a deal head and window-board. The utilisation of the rain water was very important. This was usually collected in water-butts, which eventually became very foul. In one of the exhibited cottages the rain water had been collected into an external iron tank placed about the level of the first floor, and was then "laid on" to the sink, copper, and bath. In external appearance there should be the true "cottage" character. This need not be costly; simplicity itself would do a great deal. One competitor stated in his description, "We have found that a few years' growth of shrubs and creepers quite eclipses men's efforts at decorating exteriors." The last, and by no means the least, essential was that the cottage should be substantial and permanent in character, to such an extent, indeed, that private individuals erecting them could borrow money upon them on mortgage.

As to the question of one-story and two-story cottages, there was, of course, a good deal to be said on both sides. In a one-story cottage the cost of the stairs was saved, and the foundations could be slighter. On the other hand, in two-storied cottages the rooms on the ground floor were undoubtedly warmer by reason of having rooms over them, and the bedrooms are not open to the objection of being close down to the ground. One great objection to a one-story cottage was that it occupied considerably more land, and required, therefore, more frontage. It would seem preferable, therefore, to build these cottages of two stories, and also to build them in pairs. This arrangement, which was perfectly consistent with a good plan, saved one main wall in two cottages, and also gave each cottage three external walls instead of four, thus saving fuel in warming the rooms. The width of the garden was not limited to the frontage of the cottage, and could be as much more as might be desirable. When the amount available was very limited, the cottage in pairs was almost a necessity. Of the cottages exhibited in Classes 1 and 2, only a few came within even a "measurable distance" of being erected for a prime cost of 150*l.* Of a large number it must be said that they could not be built for 250*l.* Some of the competitors, indeed, seemed to have been perfectly reckless as regards cost, aiming only at producing artistic buildings or cottages of such a size and of such internal and external finishings as would render them only suitable for week-end middle-class bungalows, or, at the least, for artisans' dwellings with a rental of 6*s.* to 7*s.* 6*d.* per week. A great deal of the exhibition was thus very misleading in this respect, and was calculated to produce a false impression on the public mind, which might do harm rather than good to the cause in the interest of which the exhibition was projected. As a matter of fact, several of the cottages were already let at rents considerably exceeding 3*s.* per week.

The building which had obtained the first prize in Class 1 was a simple rectangular self-contained building of the pure cottage type, of a distinctly substantial and permanent character, and undoubtedly deserved the award which it had obtained. The architect is Mr. Percy Hounfon, of Chesterfield. "The cottage comprises living-room, scullery (no parlour), and three bedrooms. The front entrance is through a lobby which leads to the living-room. From the living-room we reach a central (well-lighted) lobby which gives access to the scullery and to the stairs. The living-room is 18 ft. by 12 ft. (extreme dimensions), the actual floor area being 194 ft., and has a good window at each end, thus providing cross ventilation. This room is so planned that it will be bright and comfortable, and free from draughts from doors (there are only two doors in the room). There is a good range (rather too large), and an excellent cupboard dresser. The fireplace has a semi-circular arch in salt-glazed bricks, and looks very arch. The floor is of tile quarries. The scullery (12 ft. 3 in. by 7 ft. 6 in.) has a copper sink, and 'working bench' under the window. There is no provision for getting rid of the steam from the copper. One thing is wanting in the scullery, and



that is a small range for use during the summer; there is ample room for this. There is no bath. There is room in the scullery for this. The back door leads from the scullery to a roofed lobby with open end, giving access to the water-closet and the coal store. The door of the water-closet might with advantage have been placed nearer to the open end of the lobby. A well-lighted ladder leads from the scullery. The whole of the ground floor, except the living-room, is paved with granolithic cement. The stairs are good and well lighted. The window originally did not open, but, apparently in consequence of criticism, this has been rectified, although the opening is a very small one. The arrangements on the ground floor are such that access to and from the scullery and the bedrooms can be obtained without passing through the living-room. The first floor is very well planned, there being no wasted space. The bedrooms are, respectively, 18 ft. by 10 ft. 8 in. (extreme dimensions), 12 ft. by 9 ft., and 8 ft. 9 in. by 8 ft. 9 in. Two of these have a fireplace. All are good and well lighted. The total cubic space of these bedrooms is 2,700 ft. The ground floor is 7 ft. 9 in. high, and the upper floor 8 ft. to the ceiling, and 6 ft. 3 in. to the wall plate. The internal finishings are simple and suitable. All the walls are plastered internally, except the coal-cellar, and the salient angles are rounded. The internal doors are 3-in. ledged, well made, and hung with very good wrought-iron strap hinges, with latches and pins. The windows, which are not too large, have casement sashes with good fastenings. All the rooms have deal skirtings and picture rails. There are deal rails and cloak pegs in the scullery and inner lobby. There are ventilators in all the chimney breasts. The rooms are finished in 'Duresco' distemper. The interior is cheerful and pleasing throughout, and there does not appear to be a dark corner anywhere. The external walls are of 9-in. brickwork covered with rough-cast, limewhitened. The foundations are of brickwork twice the thickness of the walls. There is a layer of concrete 6 in. thick under the whole internal area of the building. The roof is a simple span roof without dormers and with good projecting eaves, and is covered with local plain tiles. The aspect of the front door is north-west. A pent roof over this door would be an improvement. Externally the building looks like a cottage. There is one defect in the plan, which is apparently unavoidable in a building designed on these lines, and it is that fireplaces cannot be grouped together inside the building, but are, on the contrary, in the external walls, thus involving wasteful loss of heat. The area of the cottage is 473 ft., and the cubical contents 10,272 ft. The cost per cubic foot is 3½d. It is interesting to note that this cottage, which is undoubtedly a good and cheap one, could be erected in any district without infringing the by-laws, except as regards the height of the rooms, and a few minor details. As regards cost, the judges state that they are satisfied that this cottage has been erected for the stipulated sum, and this, therefore, cannot be questioned. But it may be safely inferred that in some other district, and under other circumstances, the cost would be somewhat higher. Nevertheless, it may be put down as the best and one of the cheapest cottages in the exhibition. There appears to be no reason why this cottage should not be erected in pairs, with a reduction of about 12% for each pair."

Mr. Aldwinckle then described other prize designs, as well as others of a good and suitable type, after which he referred to Lord Carrington's cottages, which had been erected at an average of 156½ lbs. each.

"They are two-storied cottages built in pairs, and comprise living-room, kitchen, wash-house, and three bedrooms. The living-room, 12 ft. by 8 ft., is entered from a lobby, which also leads to the stairs. There are a mantel register and a cupboard. The kitchen, 12 ft. by 11 ft., has a self-setting range and a cupboard, but no sink. The pantry leads from the kitchen. There is no bath. The wash-houses are ingeniously arranged one behind the other at the rear, as also the fuel store and earth-closet, the last-named being to the rear of all, and some distance from the back door. There are a copper and a sink in the wash-house. Access from the kitchen to the bedrooms can only be had by going

through the living-room. There is one large bedroom and two small ones, the latter without fireplaces. The windows to the small bedrooms are rather small. The ground-floor rooms are 8 ft. high, and the bedrooms 9 ft. to the ceiling, and 6 ft. 3 in. to eavinging of roof. The external walls are of 9-in. brickwork, and the roofs are slated. The roof is a single span one without dormers. The floors of kitchen, wash-house, and pantry are paved with 6-in. square red tiles on 3-in. concrete; the fuel store and earth-closet with white bricks on edge in sand. The living-room has a deal floor on 4-in. by 2½-in. joists or 4-in. by 4-in. oak sleepers. There does not appear to be a layer of concrete under this, and in this respect the requirements of even the Model Rural By-laws would not be satisfied. The interior finishings are all good and suitable. The staircase has a handrail, and is properly lighted. The fireplaces and chimneys are grouped together in the centre of the pair of cottages. There is a pent roof over the entrance door. These cottages may be described as exceedingly good and cheap. The area of the pair is 1,060 ft. The erection of these cottages, forty-three in all, has been spread over twenty-four years, the last pair having been built in 1897. It is interesting to note that the latter cottages were cheaper than the earlier ones, the last pair costing only 288£. This includes contractor's profit, which the Letchworth cottages do not. As the cubical contents are 18,560 ft., this works out at 3½d. per ft. cube."

As to the exhibits in Classes 1 and 2 at Letchworth, no striking novelty in construction had been produced. With the exception of a few cottages, which had their external walls of concrete of thicknesses varying from 7 in. to 10 in., there were practically no suggestions of any real value as regards new materials or construction for external walls, and thus we had only a choice between brickwork and concrete. External walls of open timber framing, or of thin plaster or concrete slabs, were quite out of the question in this climate. It was plausibly said that many of the old cottages were of wood and were very comfortable. No doubt they were. The windows were very small, seldom open, and there was no attempt at ventilation. Nowadays circumstances were very different. The windows were larger, ventilation had to be considered, and a cottage with thin external walls of whatever material could not be kept comfortable (i.e., warm) in winter without a great expenditure of fuel. As to durability, it must be obvious that walls of timber framing or very thin slabs of plaster on concrete could not be considered permanent in the true sense of the word; nor the class of construction upon which money could be borrowed. Again, the cost of repair must be considered. Cottages built of slight and perishable materials would cost a serious amount per annum for their upkeep. As to fire, some of the timber cottages in the exhibition were mere tinder boxes. We thus get back to either the brick or concrete wall. In those districts where good ballast could be obtained on the site, it was possible that a 9-in. concrete wall would be slightly cheaper than a 9-in. brick wall, but it was very doubtful whether the small economy would outweigh the undeniable advantages of brickwork. We apparently came, then, to the conclusion that, all things considered, a brick wall was most suitable for these cottages. The thickness must not be less than 9 in., and an 11-in. hollow brick wall was preferable (No. 69, which had taken the prize for the cheapest cottage, had this). In any case, the brickwork should be covered with rough-cast, as an additional protection against the weather. This external covering was even more necessary for a concrete wall. The all-important question, however, and the one which it was the object of this exhibition to solve, was that of cost. Can a cottage of the type of No. 14 (prize-winner) be built for a prime cost of 150£? Here, again, the question of locality came in. At Letchworth building materials appear to be very cheap, especially bricks, and this, no doubt, accounted for the fact that the judges reported that they were satisfied that this cottage had actually been erected for the stipulated amount, which, in this case, worked out at 3½d. per foot cube, the cubical contents being 10,272. This was a low price even under favourable circumstances, but it was higher than the cost per foot cube of the most

recently built of Lord Carrington's cottages, so that there was some reason for believing that it was possible to erect a cottage, or all events, a pair of cottages, for something near the stipulated amount.

The cottages at Letchworth had been built under the rural by-laws of Hitchin. They were practically the model rural by-laws of the Local Government Board. Under these there are no stipulations as to the material or thickness of external walls (except as regards basements); consequently ordinary timber and framing, thin concrete or plaster slabs, plastering on expanded metal, and, in fact, any material, however thin or poor of unsuitable, could be used in building these cottages. There are, however, in these by-laws important regulations as to concrete cover damp areas, damp courses to walls, copings to parapets, open spaces at rear of the buildings, the provision of suitable windows, ventilation under boarded floors, ventilation of rooms, drainage, water in earth closets, ash-pit cesspools, and the submission of plans to the local authority. The result of this freedom in relation to wall construction had been that a large number of cottages had been erected under the by-laws with external walls which were neither durable, permanent, damp-proof, or in any satisfactory degree capable of excluding the cold; to say nothing of the highly inflammable nature of some of the erections. Strangest of all was the fact that the cottage which had obtained the first prize was a brick-built structure of a distinctly good and permanent character, which could except as regards, perhaps, the height of the rooms and a few minor details, have been built under most of the so-called prohibitive by-laws of other urban district councils. This was a most interesting and instructive object-lesson, showing that these much-abused by-laws were not necessarily an obstacle to cheap (and good) cottage building. What was really required was a more reasonable and intelligent administration of these by-laws, conceived in a sincere desire to assist rather than obstruct those who were honestly striving to do good work.

Mr. Alderman Thompson (Richmond) said the question which had been asked, "Was it possible to build a cottage for 150£?" had been answered in the affirmative by the exhibition at Letchworth and the cottages of Lord Carrington. He wished to emphasise the fact that the cottages at Letchworth were not confined to agricultural labourers' cottages, and, indeed, if they took the total number of labourers who were badly housed, the agricultural labourers would be in a small minority. The thing aimed at by the exhibition was to build cheaply, and it was not reckoned to be an exhibition of model cottages. There was no doubt but that the great majority of cottages had been built under the favourable conditions which existed at Letchworth for less than 150£. Some of the buildings were merely put up to advertise certain materials, and probably cost more than 150£. He agreed that, so far as Letchworth was concerned, that brick came out on top. It was a fortunate thing that bricks only cost 24s. a thousand delivered on the spot, while at Richmond they cost a great deal more. As to the cottage which won the first prize, it looked as if it had been taken out of a terrace, and that accounted for the chimney being at the ends, which he thought was an unsuitable position. He felt that Mr. Aldwinckle had been somewhat severe in his remarks as to cost, for he knew that the Tenants' Co-operative Housing Council's cottage, No. 47, was built for less than 150£, while Mr. Cadbury's (112-2-3) actually cost 138£. Where the external walls went into hot-water was with the concrete brick cottage, which was not, however, by-laws, but a cheap cottage. With regard to by-laws, he would point out that they were now allowed to build an attic in the roof on a 9-in. wall, although he did not suppose many local authorities had troubled to alter their by-laws to meet that. Further, the roof was no party wall through. These were modifications entirely optional. To reduce the cost, he would point out that the by-laws required modification of the by-laws where reinforced concrete was used, for 14-in. walls were required with concrete. He would like



know if there was any advantage in having a room higher than a man could reach, for his own view was that it would be a greater advantage to give the extra brickwork in a larger area. Another important thing was that they had asked the originator of the exhibition to get the contract bills of quantity for the cottages so that they could know what was the minimum amount of materials required to get the greatest amount of cubic space, and so give them a guide to the use of the cheapest material.

Miss Cochrane, speaking for the wives of agricultural labourers, many of whose homes she had visited, said the first thing nearly all the women asked for was three bedrooms. Then they wanted a fire in one bedroom only, a large kitchen, living-room with good grate for cooking, and a good bed room. They did not ask for a scullery, but asked that the second room down stairs should be the parlour. They also wanted a window in each room, and only one large window in each room. They all asked for good windows, and wanted a porch. Their longing seemed to be to have the parlour on one side, the kitchen on the other, and the stairs straight up. If they had a quarter of an acre of garden there would be no need for expensive systems of drainage which always got out of order. Most of the women she had seen did not want baths.

Dr. Woodforde said that to the outside public the exhibition at Leitchworth was somewhat misleading. The cottages were supposed to be built for 150l., but many were excluded which would add considerably to the expense. A friend wrote to some of the builders asking what they would duplicate the cottages in his district for, and the price. In one case 89l. 17s. 5d. was required for extras. It must be borne in mind that Leitchworth bricks cost only 24s. a thousand, but in its immediate neighbourhood bricks cost 30s. a thousand. Then the price was very favourable for cottage building. They had a good chalk soil, which did not require much foundation. With all respect to the builders also, he would like to know the condition of these cottages after they had been up a few years. With regard to rural by-laws, his feeling was that they were necessary, not for the coercion of the poor landlord, but to prevent the bad landlord putting up bad houses. Dr. Woodforde pointed out plans of cottages erected in pairs at East Berks, each containing six rooms, and erected according to the model by-laws, and costing 300l. the pair.

Miss Gurney explained the objects of the "Plumbe" Copartnership Building Council, which was to encourage thrift and self-help. Associations were formed of persons prepared to develop a piece of land in the interests of themselves as the persons who would live there. They naturally preferred as big gardens as possible. Their idea was to get different classes into one community, and thus prevent the formation of slums in the suburbs.

Mr. C. Hare said that, speaking as an architect, he believed many of the houses at Leitchworth could be built for 150l. They learned a number of things from the exhibition. They learned that a square plan was the cheapest, and that chimneys in the centre of the house were an advantage, for by this they got heat all over the house. A gentleman had referred to external architectural excrescences being required, and it was certainly not necessary to put on ornament on a building to make it beautiful. If they got proper proportions they would look well, and in the country they could easily obliterate ugly architecture by the use of simple lines. They had also learned something with regard to ventilation. In planning a house always showed the position of the bed room was the cheapest form for non-combustible building material, but the by-laws in most places made it impossible to use it. He thought Mr. Thompson's suggestion of a skeleton bill of quantities, he agreed that it was impossible to judge two plans unless they had the quantities of brickwork in each

bath off and making a separate room. Staircases ought to go straight from the lobby, and access to them ought not to be obtained through the living-rooms. He noticed that many of the plans showed a mass of angles, which always added to the cost. Every bedroom should be sufficiently large so that the bed was not put against the wall. Besides the economy of having fires in the centre of the building, it warmed the house all over. Concrete walls were very good, but he hoped they would not have a lot of cement work outside. He felt that it was impossible to build a good substantial cottage for 150l. if they were to include builders' profits, architects' charges, and water and drainage, which, he believed, were things not included in the Leitchworth cottages. It depended a great deal on the local material at hand. In Oxfordshire he had seen chalk cottages 200 years old, but when once a chalk house began to go it tumbled down like a pack of cards. A quarter to half an acre of garden was necessary. He had seen the houses being put up by the London County Council at Tottenham, and he questioned whether the Council was doing the right thing. The people would have to come to London to their work, and they would all want to come at the same time, and it struck him that the thing would be a failure. The speculative builders could not fall back on the rates, and the result would be that the County Council would be able to keep the houses up and get the best tenants, while the other houses would be let to people coming from the slums.

The Chairman said it seemed to be the generally accepted opinion that these houses could be built for a reasonable sum, depending largely upon the locality in which they were built. If they did not get perfection in these houses they were going a long way towards it without incurring great expense.

Dr. Sykes, replying to a vote of thanks, hoped that they would make a higher standard of sanitation in cottages than was adopted by the Local Government Board. A cottage which lasted 200 years and then fell down he looked upon as an ideal cottage.

Mr. Aldwinckle said there was no objection to the arrangement of the parlour and living-room each side of the lobby, but he would not like to say offhand that it was a better arrangement than the successful plan. He felt that, while it might not be possible to build many of the cottages for 150l. on other sites, yet a number of them could be built for a price nearly approaching it.

#### NELSON COLUMN, TRAFALGAR-SQUARE.

DURING the recent commemorative decoration of the column the opportunity was taken to again examine the condition of the fabric. It is found that the column is in need of being repointed, and that the arm of the figure is cracked, though not very seriously, above the elbow. The necessary repairs will be executed by the Office of Works, and the capital of the column, which was filled with pigeons' nests, will be cleaned. The column was built, in 1839-52, by W. Railton, who, in his design (chosen in competition in January, 1839), followed the proportions of a Corinthian column of the Temple of Mars Ultor, at Rome. It is constructed of granite from Foggin Tor, Devonshire; the graduated stylobate of the pedestal rests upon the frustum of a brickwork pyramid, 48 ft. square at base, and 13 ft. high, which is supported by a 6-ft. layer of concrete in a stratum of clay about 12 ft. below the surface; the contractors, Grissel and Peto, devised a special form of scaffolding for the building operations. The capital was cast from old guns in the Woolwich Arsenal foundry from full-sized models prepared by C. H. Smith. No plugs were fixed into the work, the foliage being secured to the bell of the cap by means of three large metal belts laid in grooves. The statue, carved by E. H. Baily, R.A., and with scrupulous care in every detail, is in two blocks of Craigleith carboniferous sandstone, given by the Duke of Buccleuch. With its plinth it measures 17 ft. in height, and was raised on November 3-4, 1845. The column is 145 ft. 6 in. high to the top of the capital; its diameter increases from 10 ft. 13 in. at the base to 11 ft. 7½ in. at the summit. The four bronze reliefs are by W. F. Woodington

—Battle of the Nile; C. E. Carew—Death of Nelson; J. Ternouth—Bombardment of Copenhagen; and Watson and Woodington—Battle of St. Vincent. The column cost 23,000l., the statue, capital, and reliefs cost 5,000l., and Railton was paid 2,000l. The four lions, by Sir Edwin Landseer, R.A., were uncovered on January 31, 1867. His studies for the lions, first sketched in the Zoological Gardens, were bequeathed by the late Mr. T. G. Hill to the National Gallery. In Ternouth's bas-relief, on the east side, the figure of the sailor supporting a wounded boy is modelled after the figure and features of Thomas Hopper, architect. Some minor repairs of the stonework were made in 1896, upon a report by Mr. Harrison, the "steepie-jack," of Sheffield. Mr. W. Larkins made the present initial examination of the structure.

#### ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The opening general meeting of the Leeds and Yorkshire Architectural Society was held on the 16th inst. at the Queen's Hotel, Leeds, when the Presidential address was delivered by Mr. G. Bertram Bulmer, who pleaded, in the course of his remarks, for control of the advertising "fiend." He said:—"Perhaps the greatest destroyer of our architectural efforts is the advertising fiend, whose emissaries are over-running every corner of the city and suburbs. No place is safe from their encroachments. The main streets of the city, the highways which lead to and from it, the country lane—once sacred to rural beauty—are alike desecrated by the advertisement hoarding and the glaring lettering of the self-seeking advertiser. This growing nuisance must be controlled, and town and country authorities have more power to deal with transgressors. Owners of property also could assist by prohibiting their tenants from defacing the buildings with sign-boards and prominent lettering, confining all privileges in this direction within strict limits. Half a century has passed away since the French imposed restrictions. We have a national society dealing with the question, which was formed in 1882, and in the spring of this year the 'Advertisement Regulation Bill' passed its second reading in the House of Lords; but the evil is so widespread that it will be necessary to form an overwhelming public opinion which will perceive the folly of spending money and effort in beautifying our cities and buildings, and mutilating the result with flaming advertisements. Yet another feature will have to be eliminated if we intend to promote the aesthetic treatment of our great thoroughfares—the standards and overhead wires in connection with our tram system. It is to be desired that engineering skill will devise a method to bring this about. Another means of obtaining a clean and cheerful aspect for our streets is the use of cleanable material, such as hard bricks and terra-cotta, and we have two samples in this city, which periodically renew their pristine beauty, and will continue to do so for ages to come by the application of water supplied by a hose-pipe. Unfortunately, terra-cotta lends itself so readily to the repetition of ornament that there is danger of making our designs too elaborate, and the multiplication of ornamental features makes the cleansing process more difficult. Therefore, we should aim at plain wall-surfaces, with high-class decoration sparingly used." After the address was concluded, Mr. Bulmer presented the prizes, which had been awarded as follows:—Measured drawings—Silver medal and President's prize of 5l. 5s., Mr. W. Whitehead. Sketching—1st, Mr. W. J. Freeman and Mr. W. Whitehead; 2nd, Mr. J. Graves. Design—1st, Mr. W. P. Rylatt; 2nd, Mr. W. Whitehead. Essay—Mr. W. P. Rylatt. Construction—Mr. W. P. Rylatt. Halden prize of 4l. 4s., Mr. W. Foggett.

#### ARCHAEOLOGICAL SOCIETIES.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—The first meeting of the session 1905-6 was held on Wednesday, the 15th inst., at 32, Sackville-street, Piccadilly, at 8 p.m., the Treasurer, Mr. R. H. Forster, in the chair. A paper was read by Mr. Emanuel Green upon "The Roman Channel Fleet, with Notes on Clausentum and the Isle of Ictis." After tracing the journey to Britain by sea and



land of the Emperor Claudius, and his return home, where he received a grand ovation as having girdled the earth with a Roman ocean, it was shown that from this time the military movements on land were supported by a watchful protector, the Classis Britannica, guarding the Fretum Britannicum, the narrow sea. This important fleet, which existed for 400 years, has hitherto been entirely overlooked. Many finds and evidences in proof were noticed; thus, with others at Boulogne, there is an inscription in honour of a trierarch, or captain, who was a known contemporary of Claudius, and tiles and bricks have been found there as well as in Britain bearing the letters C. L. B. R. The revolt and success of Carausius were fully commented on, and especially a naval fight off the Isle of Wight, when the victors, the imperial galleys, continued their course to Clausentum, our Southampton. The important position of Clausentum has not received the notice which it should claim as being the western port of the narrow sea, as Richborough was the eastern, and so the guardian against the pirates of the north. Clausentum was a large well-placed depot from which the voyage to Gaul would be safe and well protected by the fleet. It was, in fact, the chief western port, and may be traced as the place for the shipment of lead from the Mendip mines. Another point not unconnected with this, the supposed large export of tin from Britain, was most minutely noticed, and especially in connexion with the supposed tin islands, the Cassiterides and the Isle of Ictis. The old writers as authorities were fully examined and criticised in chronological order, especially the accounts of Caesar and Diodorus. The conclusion was that the early statements were written from hearsay, not from personal knowledge, and that there was no such early tin traffic with Britain. The mention of Britain in the story arose from the current belief that its western end was opposite Spain, and so in the ocean just outside or beyond the Cassiterides and the Isle of that group called Ictis. One writer was bold enough to assert that Britain was in full view from the Spanish coast. As to Cornwall, tin is not mentioned in the Domesday for that county. No tin was found there until after that date. The story of a certain block of tin, now in the Truro Museum, said to have been found in Falmouth Harbour, and claimed as belonging to the early export, was sharply criticised, and declared to be one more myth in this mythical story. Mr. Compton, Mr. Gould, the Chairman, and others joined in the discussion which followed.

**GLASGOW ARCHAEOLOGICAL SOCIETY.**—The annual meeting of Glasgow Archaeological Society was held on the 16th inst. in the rooms of the Society, 207, Bath-street. Mr. T. G. Dalrymple presiding. Mr. W. G. Elack submitted the annual report, which stated that seventeen members had been added during the past session. The Council had made representations to the Lanarkshire County Council regarding the partial removal of a prehistoric fortification near Abington, and the Council had at once interfered. With reference to representations, in which the Council had assisted, protesting against the scheme for the rebuilding of the Royal Infirmary, the Council regretted to state that the directors were apparently determined to proceed with the erection of the building. The infirmary formed part of the old Archbishop's Palace of Glasgow, and was given as a free gift by the Crown to the directors. It was matter for deep regret that the directors should proceed to take such action as would, there was grave reason to apprehend, for all time destroy the appearance of the cathedral, more especially as they were advised that the reconstruction of the building might be so carried out as to avoid any such contingency. The report was adopted. A paper was afterwards read by Sir James Balfour Paul, Lyon King-at-Arms, on the "Matrimonial Adventures of James V."

**SCOTTISH ECCLESIOLOGICAL SOCIETY.**—At the meeting of the Glasgow district of this Society recently, a paper was read by Mr. John Honeyman, R.S.A., on "The Shrine of St. Columba at Iona," in which the writer described in detail the remaining indications that, at one period—probably in the beginning of the XIIIth century—the choir of the Abbey Church had beneath its

east end a crypt with side aisles. Mr. Honeyman was able to bring some of these indications vividly before his audience with the aid of photographic slides. He also exhibited plans and sections of the building as he supposed it had been originally arranged, and referred to examples elsewhere erected about the same time, referring more particularly to the crypt at Amalfi, where the relics of St. Andrew, the patron saint of Scotland, were enshrined in 1208. He thought that enough remained at Iona to show that the general arrangement of the plan at Amalfi, Iona, and the original crypt at Glasgow were similar, and gave reasons for believing that they were intended to serve the same purpose—namely, to cover the grave or preserve the relics of the patron saint in such a position that when the choir was built the high altar might be placed exactly over the consecrated spot below. No doubt Columba had been buried about 600 years before a resting-place had been prepared for his relics, but St. Andrew had been buried more than a thousand years before the cathedral at Amalfi was begun. In those days the bones of saints and martyrs went a very long way—the possession of a skull, a leg or arm bone, if well authenticated, was quite enough to make a shrine famous throughout the world. He did not say that there was evidence to prove that the crypt at Iona had been erected as the shrine of Columba; he only pointed out reasons for believing that it was. Mr. Honeyman went on to mention some of the peculiarities of the only remaining portion of the old structure. A weather-table on the north wall indicated that the side aisle had at one time extended westwards to the transept. He had cut a trench from north to south a few feet west from the present west wall of the aisle, and found, about 2 ft. below the surface on the line of the outer wall of the aisle, the remains of the old aisle wall, and also that the foundation of the north wall of the choir was only about 2 ft. below the surface, proving that the crypt had not extended westwards further than the present aisle. The floor over the crypt appears to have been of wood carried across the aisle on corbels, and on the side next the choir on a level scarcely 6 in. broad, 18 in. below the surface of the floor. The floor of the present choir is 6 ft. 3 in. lower. Mr. Honeyman pointed out that the natural configuration of the ground, sloping as it does to the south-east, made it easy to construct a crypt without much excavation if the choir floor was raised (as it evidently was) only 2 ft. above the floor at the west end of the nave. That the floor level there has never been materially altered is evident from the fact that it is there we find the remains of the oldest chapel and the oldest nave—the chapel in which tradition says Columba was buried, and the nave which was 5 ft. narrower than the existing one.

#### ENGINEERING SOCIETIES.

**THE JUNIOR INSTITUTION OF ENGINEERS.**—A visit of this Institution took place on Saturday afternoon, November 18, to Messrs. Barclay, Perkins, & Co.'s Anchor Brewery, Southwark, the number of members attending being about 100. They were shown round by Messrs. T. H. Pickett, W. H. Phillips, and E. Barnett, who pointed out the many features of engineering interest which were to be seen, including the malt store-bins, elevators, various malt-cleaning screens, crushing rolls, coppers, mashing-tuns, under-backs, copper-backs, sparging apparatus, hop-backs, coolers, wort refrigerators, fermenting squares, slate-cleaning backs, yeast backs, fermenting rounds, yeast presses, steam and gas engines for motive power, a new battery of boilers, electric-light installations, cooperage cask-cleaning machinery, and hop stores, maintained at a temperature below freezing point by means of a refrigerating apparatus specially laid down for the purpose. Altogether about three hours were spent in the inspection. The ensuing visit will be to the works of Messrs. Johnson & Phillips, at Charlton, on Saturday morning, December 16.

**ARTS AND CRAFTS EXHIBITION SOCIETY.**—The triennial exhibition of this Society will in all probability be opened about January 15, 1906, in the Grafton Gallery, instead of in the New Gallery as heretofore. The receiving days will be December 28 and 29.

#### COURT OF COMMON COUNCIL.

The fortnightly meeting of this Court was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

**Proposed Tramways in the City.**—A letter was read from the London County Council relative to a proposal to construct tramways along the north thoroughfare, from the existing lines in Aldgate, via Mansell-street and the new thoroughfare near Little Tower Hill. The communication was referred to the Special Committee.

**Tramways Across Blackfriars Bridge.**—Mr. Kimber moved that it be an instruction to the Bridge-House Estates Committee that no expense be incurred in connexion with the widening of Blackfriars Bridge until the Bill now being promoted by the Corporation for that purpose has received the Royal Assent, and the London County Council have effectually bound themselves to perform all the conditions that may be attached by the Corporation to the tramway crossing the Bridge. After a long debate the motion was withdrawn.

**Thames Barrage.**—It was decided on the recommendation of the Special (Royal Commission Port of London) Committee that a representative be made to the Government in favour of the appointment of a commission or departmental committee to inquire into the proposal to construct a barrage across the Thames at Gravesend, but without the Court expressing any opinion as to the desirability or feasibility of the scheme.

#### Fifty Years Ago.

FROM THE BUILDER OF NOVEMBER 24, 1853.

#### THE ARCHITECTURAL EXHIBITION.

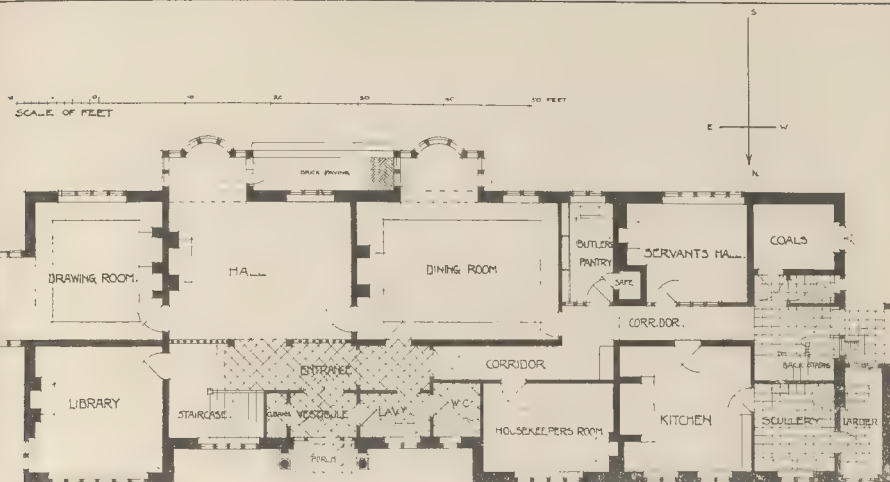
On the 3rd and 4th of next month drawings are to be received at the Suffolk-street Galleries, and we take leave to say that every architect in the United Kingdom who sets a proper value upon his art and upon his own personal interest will be prepared to contribute, or to satisfy himself that he has good reason not to do so. No one can afford to be at all careless in this matter. With the utmost respect for the older members of the profession we urge upon them that they are not exempt from the duty of maintaining a position, or the alternative which there is in all professions of being supplanted. To the young we say that the opportunities that an exhibition affords are the most valuable which are open to them. We see no reason why the Architectural Exhibition should not be made to supply all that can be got out of architects' competitions—with their degrading influence upon the profession, their sacrifice of much that is important to the result in art, and their confessed failure as to the attracting men of established reputations which it is of course one of their objects to do. The main excuse for the numerous responses to any sort of offer has been that "competing is a means of education in the preparation of designs. The question is whether similar advantages, along with other sources, may be made to accrue from positive instances in which professional employment and status have come from the exhibitions that have already taken place—moderately successful as these have been. We may remark that the Architectural Association has already done good service by its class of design, and might, we think, easily give all the advantages as to study, by the occasional choice of subjects of greater importance and magnitude, in connexion with particular sites of ground. Committees will perhaps one day begin to doubt whether their interests are served by the present system of architects' competitions.

#### Illustrations.

#### MONUMENT TO PAILLERON PARIS.



HIS graceful monument to the author of "Le Monument," on s'Emmie," and other works, though less well known than the one to be erected in the Parc Monceau at Paris. It is the work of M. L. Bernstamm, a pupil of M. Mercier and was exhibited in the sculpture hall at the Salon this year. The architectural details are by M. Rives.



House at Newmarket. Plan.

# HOUSE AT NEWMARKET.

This house is situated on high ground on the Queensberry Estate, and commands an extensive view of the surrounding country. It is built of local red brick; the sills and heads to the windows and the gables and pediments are of moulded bricks. The three days are of white Mansfield stone, and the entrance porch, carrying a semi-circular window over, is of wood with lead dressings. There is a small stable and coachman's cottage in the grounds; and a feature is being made of an old gravel pit which lies to the south of the house by converting it into a sunk garden.

Messrs. Parnell & Son, of Rugby, are the contractors; Messrs. Dent & Hellyer are doing the plumbing work; and Mr. J. H. Verrell is the clerk of works. The drawing illustrated is by the architect, Mr. A. N. Pomroy.

# HOUSE AT CORBY, NORTHAMPTON-SHIRE.

This house is built of the local brown sandstone, with Weldon stone dressings and stone slates from Colley Weston.

The entrance-court is laid out much as shown on the drawing. The interior treatment is plain and simple; the hall and vestibule, however, are panelled, and special treatment has been accorded to the staircase, the ceiling and fireplace of the drawing-room, and to the fireplace of the billiard-room. The lighting will be electric, supplied by a private installation.

The drawing was hung in this year's Academy. The architects are Messrs. Gotch & Saunders, of Kettering.

# ILLUSTRATIONS OF OLD MANOR HOUSES.

THESE are from photographs lent by Mr. J. A. Gotch, and are given as illustrations to his paper read at the Architectural Association, a report of which will be found on another page.

**LIBRARY, SEVENOAKS.**—The opening of the new Free Library at Sevenoaks took place recently. The building is externally of red brick, with Bath stone dressings, and green slated roof. Surmounting the main door is a lead-covered dome, with weather vane, the Seven being just beneath the dome. The ground floor contains the lobby of the lending department, and magazine and filing and repair-rooms. The new room is also situated in the front, with vestibule hall, and a Stuart's granite staircase leading up to the first floor, which contains the reference library and ladies' rooms. The whole of the ground floor is of maple wood flooring. The back portion of the building, which is of one floor only, is covered with lead flats, and is lit by skylights. The heating chamber and boiler are in the basement. Mr. E. E. Cronk was the architect.

# THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, Sir E. A. Cornwall, Chairman, presiding.

**Resignation of Sir W. Richmond.**—The Clerk read a letter from Sir William Richmond resigning his position as one of the county aldermen.

The seat was accordingly declared vacant.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council 2,218*l.* for street lighting purposes; Camberwell Borough Council 1,495*l.* and 2,410*l.* for housing purposes; Fulham Borough Council 25,000*l.* for electric light installation; and Hackney Borough Council 1,104*l.* for street improvement. Sanction was also given to Stoke Newington Borough Council to borrow 6,175*l.* for electric light installation and meters.

**School, Rotherhithe.**—The Education Committee brought up a report recommending that expenditure on capital account not exceeding 6,082*l.*, in respect of the erection of a permanent school on the Magdalen-street site, Rotherhithe, be sanctioned. After discussion, the recommendation was agreed to.

**Reconstruction of Bridge.**—The Bridges Committee recommended that the estimate of 17,000*l.* for the reconstruction of Victory Bridge, carrying Ben Jonson-road over the Regent's Canal, be agreed to.

This recommendation was also carried.

**Projecting One-story Shops, Edgware-road.**

—The Building Act Committee proposed to give consent to the erection of certain one-story shops in Edgware-road, Paddington,\* the recommendation being moved by Mr. Taylor, as Capt. Hemphill, the chairman of the Committee, refused to do so.

Capt. Hemphill said it was undesirable to allow these projections in such an important thoroughfare. It would be no advantage to the public.

Mr. Lewin Sharp moved that the recommendation be referred back, remarking that the Committee were not doing their duty to the public in allowing such projections.

Mr. Lewis said the applications showed an ingenious attempt on behalf of the landlords of London to increase their ground rents.

Mr. Waterlow objected to the proposals, as these one-story shops were dangerous from the point of view of fire. It was undesirable to have some shops projecting and others not.

Mr. H. R. Taylor said he hoped that the applications would not be rejected as, if agreed to, 15 ft. would be given up to the public without costing anything. The proposals, if carried out, would make the thoroughfare considerably wider, and the

owners only wanted 5 ft. in exchange for the 15 ft. There were already one-story shops in Edgware-road.

Mr. Burns, M.P., said that the Council ought not to grapple with the improvement of such an important road in this niggardly way. The Council, especially in view of the recent Report of the Traffic Commission, should look ahead and remember that in twenty years the traffic of the road would be twice what it is now, and then the street would have to be widened at great cost. The minimum width of important streets in London should be 125 ft., and he regretted that Kingsway and Aldwych were not made that width. The Council ought to widen the street now while the improvement could be carried out at a comparatively small cost.

Sir Melville Beachcroft said that Mr. Burns was beating the air. The offer that was made would enable the street to be widened by 15 ft., giving a total width of 84 ft.

On a show of hands, the amendment was declared carried, and on a division it was carried by fifty-seven against forty-two. The applications were then referred back.

**Sites for Fire Stations.**—It was agreed to seek authority in the next session of Parliament to enable the Council to acquire compulsorily, and to use as sites for fire stations (i.) a piece of vacant ground on the western side of Wyndcliff-road, at its junction with Charlton-road, and (ii.) the site of "Foxley House," No. 30, Foxley-road, Camberwell New-road.

**Site for Car-shed.**—It was also agreed to seek authority in the next session of Parliament to acquire compulsorily the site in Pemberton-road and Pemberton-terrace, Holloway, for the erection of carshed and sub-station in connexion with the electric working of the Council's (northern) tramways.

**Norbury Estate, Croydon.**—On the recommendation of the Housing of the Working Classes Committee, it was agreed that the estimate of 500*l.*, submitted by the Finance Committee, be approved in respect of preliminary expenses to be incurred in the preparation of plans, etc., in connexion with the development of section B of the Norbury Estate, Croydon.

**Improvements.**—The estimate of 1,300*l.*, submitted by the Finance Committee in respect of the widening of Peckham Rye was approved.

The estimate of 2,267*l.*, submitted by the Finance Committee, was also agreed to in respect of the Lower Richmond-road improvement.

**Proposed Finsbury Park Empire Theatre.**—The Theatres and Music Halls Committee reported that they had considered plans, submitted by Messrs. F. Matcham & Co., on behalf of Moss's Empires, Ltd., showing the arrangements proposed to be adopted in the erection of a music-hall, to be known as the

\* The applications are printed on another page, under "Applications Under the 1894 Building Act."







# The Student's Column.

## STEAM BOILERS AND PIPES.—XXI.

### THE FLOW OF STEAM.

**N**O system of pipes for the conveyance of steam can be designed in a really satisfactory and economical manner unless the laws governing the flow of steam are properly complied with.

We have known plenty of cases where the sizes of the pipes have been determined by a mental process that can only be designated as guesswork, and that does not deserve even the dubious praise of being characterised as a "rule-of-thumb" method.

In the present article we propose to state some simple rules for calculating the discharge of steam through orifices and pipes, and, as a necessary preliminary, we give in Table XXV. some of the most frequently required properties of saturated steam.

In applying the figures given in this table to readings taken from a steam gauge, 14,706 lb. must be added to such readings, because the gauge registers about 14,706 lb. (approximately 15 lb.) less than the absolute pressure above a vacuum.

The theoretical velocity of efflux from a steam boiler or other reservoir containing steam at a pressure higher than that of the atmosphere is governed by the law of gravity which governs the velocity of air entering the furnace of a boiler. The velocity of flow of steam in pipes is governed by the same law, which we have seen also governs the velocity of flow of the hot gases in boiler flues and chimneys.

TABLE XXV.—PROPERTIES OF SATURATED STEAM.

Absolute Pressure per sq. lb.	Temperature.	Latent Heat per lb.	Total Heat per lb. from Water at 0 deg. F.	Weight per cu. ft.	Volume per lb.
lb.	Deg. F.	B.T.H.U.	B.T.H.U.	lb.	cu. ft.
1	102.1	1042.9	1144.5	0.0030	330.36
2	126.3	1025.8	1151.7	0.0058	172.08
3	141.6	1019.0	1156.6	0.0085	117.83
4	153.1	1008.8	1160.1	0.0112	89.62
5	162.3	1000.3	1162.9	0.0138	72.66
6	170.2	994.7	1165.3	0.0163	61.61
7	176.9	990.0	1167.3	0.0189	52.94
8	182.9	986.7	1169.2	0.0214	46.89
9	188.3	981.9	1170.6	0.0239	41.79
10	193.3	978.4	1172.3	0.0264	37.84
11	197.8	975.2	1173.7	0.0289	34.63
12	202.0	972.2	1175.0	0.0314	31.88
13	205.9	969.4	1176.2	0.0338	29.57
14	209.6	966.8	1177.3	0.0362	27.61
15	213.0	965.2	1178.1	0.0386	26.36
16	216.3	964.3	1178.4	0.0387	25.85
17	219.6	963.9	1178.9	0.0411	24.82
18	222.4	963.7	1179.2	0.0435	23.96
19	225.3	963.7	1179.2	0.0459	23.78
20	228.0	963.8	1179.2	0.0483	23.70
21	230.6	963.8	1179.2	0.0507	23.72
22	233.1	963.8	1179.2	0.0531	23.84
23	235.5	963.8	1179.2	0.0555	24.03
24	237.8	963.8	1179.2	0.0580	24.26
25	240.1	963.8	1179.2	0.0604	24.64
26	242.3	963.7	1179.2	0.0628	25.09
27	244.4	963.7	1179.2	0.0652	25.63
28	246.4	963.6	1179.2	0.0676	26.27
29	248.4	963.4	1179.2	0.0700	27.01
30	250.4	963.3	1179.2	0.0724	27.84
35	259.3	963.1	1179.2	0.0855	31.95
40	267.8	962.9	1179.2	0.0979	37.27
45	274.4	962.9	1179.2	0.1089	41.18
50	281.0	963.0	1179.2	0.1202	45.31
55	287.1	963.0	1179.2	0.1314	49.48
60	292.7	963.0	1179.2	0.1425	53.95
65	298.0	963.0	1179.2	0.1538	58.49
70	302.9	963.0	1179.2	0.1645	63.07
75	307.5	963.0	1179.2	0.1750	67.68
80	312.0	963.0	1179.2	0.1859	72.35
85	316.1	963.0	1179.2	0.1969	77.15
90	320.2	963.0	1179.2	0.2080	82.19
95	324.1	963.0	1179.2	0.2198	87.45
100	327.9	963.0	1179.2	0.2307	92.83
110	334.6	963.0	1179.2	0.2521	107.07
120	341.1	963.0	1179.2	0.2738	123.85
130	347.2	963.0	1179.2	0.2952	142.23
140	352.9	963.0	1179.2	0.3162	162.16
150	358.3	963.0	1179.2	0.3377	183.56
175	370.8	963.0	1179.2	0.3899	256.26
200	381.7	963.0	1179.2	0.4431	226.00

The law in question is expressed by the fundamental equation, formula (12), given in Article XIII., p. 345:—

$$v = \sqrt{2gh}$$

As explained in that article this formula indicates merely the theoretical velocity, and does not take into account friction and other causes of loss. It should be noticed further that the flow of steam through orifices and pipes is affected by conditions that do not

obtain in the case of liquids and perfect gases, and that rules applying with approximate accuracy to the flow of water and air give results that are somewhat too low when applied to the flow of steam.

*The Flow of Steam Through Orifices.*—Apart from frictional or other losses, steam flowing into the air from an outlet on a boiler, or other reservoir in which pressure is maintained, has the same velocity as that of a body falling by gravity from the height of an imaginary unbalanced column of steam having a uniform density equal to that at the outlet on the boiler or reservoir.

To determine the height of the unbalanced column, which is the head ( $h$ ) in the formula (13), we must take into account the difference of pressure on each side of the outlet, and the density of the steam inside the reservoir. As the pressure is always stated in pounds per square inch, and the density in pounds per cubic foot, the pressure must be converted to pounds per square foot.

Then for  $h$  we have

$$h = \frac{(p_1 - p_2) 144}{D}$$

where  $p_1$  = pressure in pounds per square inch inside the reservoir, and  $p_2$  = pressure outside the reservoir, and  $D$  = weight per cubic foot of steam at the initial pressure.

Example (25).—Find the velocity of steam discharging to the atmosphere, say 15 lb. per square inch, through the safety valve of a boiler in which the absolute pressure of 35 lb. per square inch is maintained.

Substituting  $\left[ \frac{(p_1 - p_2) 144}{D} \right]$  for  $h$ , formula.

(13) reads

$$v = 2g \sqrt{\left[ \frac{(p_1 - p_2) 144}{D} \right]}$$

By Table XXV.  $D = 0.0858$ ; while  $p_1 = 35$  lb., and  $p_2 = 15$  lb. Inserting these values, we get

$$v = \sqrt{64 \cdot 4 \left[ \frac{20 \times 144}{0.0858} \right]} = \sqrt{64 \cdot 4 \times 33,566} = 1,470 \text{ ft. per sec.}$$

This result is the theoretical velocity of the expanded steam.

It must be remembered, however, that the coefficient of contraction (see Article XIV., p. 370) reduces the flow to an amount between 56 per cent. and 93 per cent. of the calculated value, according to the form of the outlet.

Experiments by Napier and others prove that when steam at any pressure flows from a reservoir through an outlet into a space where any other pressure prevails, less than 58 per cent. of the pressure in the reservoir containing the steam, the flow has the practically constant velocity of about 885 ft. per second at the initial density.

According to the experiments of Mr. Brownlee,\* the velocity of discharge of steam, in terms of the initial density, from a boiler or other reservoir is given by the formula

$$v_1 = 3.6 \sqrt{h} \dots \dots (17)$$

where  $v_1$  = velocity, as at initial density, in feet per second, and  $h$  = height in feet of a column of steam of uniform density at the given initial absolute pressure, the weight of the column being equal to the pressure on a unit area of the base.

It should be noted that this formula does not apply to pressures below 26 lb. per square inch when steam is discharged into the ordinary atmospheric pressure of 14.706 lb. (say, 15 lb.) per square inch.

In flowing through an outlet of suitable form the steam expands to the pressure outside the reservoir, and, as for outside pressures less than 58 per cent. of the inside pressure the ratio of expansion is 1.624, the velocity of the expanded steam is readily obtained.

Table XXVI. has been calculated by formula (47), and the following example will make clear the manner in which the rule is employed.

Example (26).—Find the velocity at which steam issues from an outlet on a steam boiler into the atmosphere; pressure of steam = 26 lb. per square inch above vacuum, pressure of atmosphere = 14.706 lb. per square inch.

The required height ( $h$ ) of the column of

\* Transactions of the Institution of Engineers and Shipbuilders in Scotland, Vol. XVIII.

## TRADE CATALOGUES.

THE Sun Gas Company, Ltd., have sent us a pamphlet describing their apparatus for the dry generation of acetylene. This Company have acquired the patents of Mr. G. J. Atkins, who devised the method of using a solid substance containing combined water, instead of liquid water, for the generation of acetylene from calcium carbide. Contact between the carbide and the solid substance containing combined water (e.g., washing soda) causes chemical reaction to take place, and acetylene is generated. The apparatus consists of an iron cylindrical drum having two compartments, one of which contains the calcium carbide, and the other the dry decomposing material. The drum is revolved by hand, and a measured amount of carbide is thereby automatically fed into the decomposing material. The acetylene resulting from the contact passes into a gasholder.

The Goehean Manufacturing Company, of Canton, Ohio, U.S.A., and London, send us a copy of "Zevy's Architects' Contract Book," consisting of ten detachable sheets, measuring about 23 in. by 18 in., bound in a limp cover. If similar sheets are used in the United States the architects of that country must be exceptionally business-like people. In the right-hand top corner there is a form for the contract between the architect and client, and in the opposite corner another form in which the architect is supposed to book the order with a distinguishing number. The lower part of the sheet is tabulated for entering the names of firms tendering, the prices of the building and engineering work under some eighteen headings, records as to the signing of the contract, and particulars as to the method of payment. The back of the contract-sheet is not prepared for docketing, as one would expect in the case of so precise a document, but bears paint specifications "for the complete preservation of steel railroad and highway bridges and of metal structural work of all kinds from rust and corrosion," the points to be those of the Goehean Manufacturing Company, and applied under the direction of that firm, whose announcements appear in the form of advertisement pages. Three general types of protective material are made by the company—"Oxidised Carbon Cement" for the preservation of steelwork, "Galvanum" for the permanent protection of galvanised iron, and "Old Honesty Paint," a preparation of pure linseed oil and lead, for general use. No details are given as to these products, but from the photographic views of important buildings and engineering works where they have been used it is clear that the preparations in question have received the approval of leading architects, engineers, and business firms in Great Britain, as well as in the United States.

BUSINESS PREMISES, EDINBURGH.—Two blocks of buildings, consisting of 26 to 30, Princes-street, and the west side of St. Andrew-street, from Princes-street to the lane, are in course of reconstruction. The work is being carried out under the supervision of Mr. J. J. Burnet, of Glasgow.



steam is equal to the pressure per square foot divided by the weight per cubic foot of the steam at the given pressure. From Table XXV, we find the weight of steam at 26 lb. per square inch to be 0.065 lb. per cubic foot.

Hence for the height of the column we have

$$h = \frac{26 \times 144}{0.065}$$

and the velocity of efflux  $v_1$  initial density.

$$v_1 = 3.6 \sqrt{\frac{26 \times 144}{0.065}}$$

$$= 3.6 \sqrt{57,600} = 864 \text{ ft. per second.}$$

As the ratio of expansion is 1.624, the velocity  $v_e$  of the expanded steam is  $v_e \times 1.624 = (864 \times 1.624) = 1,403 \text{ ft. per second.}$

TABLE XXVI.—VELOCITY OF DISCHARGE OF STEAM AT DIFFERENT PRESSURES INTO THE ATMOSPHERIC PRESSURE OF 14.706 LB. PER SQUARE INCH.

Pressure above Vacuum lb. persq. in.	Velocity of Discharge.	
	$v_1$ At Initial Density.	$v_e$ Steam Expanded ( $v_1 \times 1.624$ ).
	ft. per second.	ft. per second.
22	864	1,403
30	868	1,409
40	875	1,421
45	878	1,426
50	881	1,431
60	886	1,439
70	890	1,445
75	892	1,449
90	896	1,455
100	899	1,460

Although the velocity of steam discharged under the conditions considered above is practically constant, the weight obviously varies with the area (A) of the outlet and the density (D) of the steam in pounds per cubic foot.

For ordinary use it is convenient to have a formula directly giving the weight of steam discharged in a given unit of time, thus saving the separate calculation of the weight from the velocity.

To find the weight (W) discharged per second from the velocity the procedure is represented thus:—

$$W = v_1 \times A \times D$$

where  $v_1$  = the velocity as at constant density, A = the area of the outlet, and D = weight per cubic foot of the steam at the given pressure.

Example (27).—For steam at 70 lb. per square inch, the velocity by Table XXVI, is 890 ft. per second, the value of (D) from Table XXV, is 0.1648 lb., and if we take the internal area of the outlet at 1 sq. in., =  $\frac{1}{144}$  sq. ft., the weight discharged per second is

$$W = \left( 890 \times \frac{1}{144} \right) \times 0.1648$$

$$= 6.18 \times 0.1648$$

$$= 1.018 \text{ lb. per second.}$$

Similarly the discharge per minute is

$$W = \left( 890 \times \frac{1}{144} \times 60 \right) \times 0.1648$$

$$= 370.8 \times 0.1648$$

$$= 61.107 \text{ lb. per second.}$$

From example (27) it is clear that, with the velocity of outflow at slightly less than 890 ft. per second, the discharges can be approximately expressed by the following simple rules:—

Weight of steam per second

$$W = 6.16 A \times D \dots (48)$$

Weight of steam per minute

$$W = 370 A \times D \dots (49)$$

By taking the constant velocity at 874 ft. per second, we get further simplifications of the formulae giving results that err slightly on the safe side. Thus:—

Weight of steam per second

$$W = 6 A \times D \dots (50)$$

Weight of steam per minute

$$W = 360 A \times D \dots (51)$$

The experimental results of Napier and Brownlee show that the weight of steam

flowing from an outlet into a space where the pressure is not more than 58 per cent. of the initial steam pressure is represented by the equation

$$W = P A \dots (52)$$

where W = weight discharged in pounds per seventy seconds, and P = initial absolute pressure of the steam, and A = area of the outlet in square inches.

This is another easy rule to remember, although somewhat inconvenient, owing to the irregular unit of time necessary.

Rankine states the same rule, including a fraction as a factor to reduce the period of time to one minute, as follows:—

$$W = 6 P A \dots (53)$$

Although formulae (48) to (53) are based upon the results of experiments in which an outlet was necessarily employed, the calculated weights should be qualified by one or other of the values of the co-efficient of contraction stated on p. 370, so as to allow for the effect of the lower efficiency of the outlets employed in practical as compared with experimental work.

In a general way the values of the co-efficient of contraction may be taken at 0.65 for a thin orifice in a plate, and 0.85 for a short cylindrical mouthpiece.

For use with formulae (50) and (51) it will be sufficient to put the values at 0.65 and 0.85, as the factors 6 and 360 in these rules have already been reduced slightly below the corresponding factors in formulae (48) and (49).

With the object of enabling the reader to compare at a glance the results given by formulae (48) to (53) we append the calculated weights of steam discharged into the atmosphere from an outlet of 1 sq. in. area. The initial pressure of the steam is taken at 70 lb. per square inch absolute:—

Formula No.	Weight of Steam Discharged.	
(48)	1.015 lb. per sec.	60.97 lb. per minute
(49)	0.983 lb. per sec.	59.00 lb. per minute
(50)	—	59.33 lb. per minute
(51)	—	70.00 lb. per minute
(52)	—	60.00 lb. per minute
(53)	—	60.00 lb. per minute

#### WESTMINSTER CITY COUNCIL.

The usual fortnightly meeting of this Council was held on Thursday last week at the City Hall, Charing Cross-road, S.W.

**Repair of Trenches by the Council.**—The Law and Parliamentary Committee presented a report dealing with the decision given recently at the Clerkenwell Police-court in the litigation commenced by the Council against the New River Company (now taken over by the Water Board) in respect of the amount paid by the Council for the supervision of the reinstatement of trenches in the streets. The matter had already been before the High Court, when the Lord Chief Justice gave a decision that the Council were entitled to their claim, and had been referred back, on a further appeal by the company, to the Police magistrate. The magistrate having decided that the Council had not incurred any substantial extra expense, the Committee reported that the matter would go back to the Court of Appeal.

**Spiked Trestle Rods as Barriers in Roadways.**—At the last meeting of the Council a resolution was agreed to that the Council should make a charge for the reinstatement of 18 in. sq. of paving in all cases where spiked trestle rods were used by statutory undertakers as barriers for street works. The Works Committee reported that they had been advised that the Council could charge only for the actual damage done, and the previous resolution was amended accordingly.

**Repairs to Wood Paving.**—The Works Committee reported the receipt of a communication from the Improved Wood Pavement Company with respect to the requirements of the Council that the company should relay certain areas of wood paving under their contract, in which the company made certain suggestions and stated that it was impossible for them to carry out the works at this time of the year. It was agreed to inform the company that if they were not prepared to relay the areas in question the work would be carried out by the Council, who would charge the cost to the company.

**Works by Statutory Undertakers: Conditions of Consent.**—On the recommendation of the Works Committee, it was agreed that the following should be the conditions of consent for these works:—

1. That three clear days' notice be given to the City Engineer and Surveyor, specifying as far as practicable the

places where, and the date and time when, it is proposed to commence the work.

2. That in case of proposed postponement of the date and time of commencement of the work, written notice be given forthwith to the City Engineer and Surveyor, and as long a notice as possible to be given to him of the

3. That pipes be not laid in the roadway at a less depth from the surface than 2 ft., and in the footway at a less depth than 9 in., except by arrangement with the City Engineer and Surveyor.

4. That the covers of boxes be laid in with material similar to the surrounding pavement, or other hard, durable, and non-slippery material to the satisfaction of the City Engineer and Surveyor.

5. That the work be completed within the time specified in the [Date of Council's resolution approving or consenting.]

#### OBITUARY.

**MR. HARRISON.** The death is announced of Mr. Helier Harrison, of Newark, in his forty-sixth year, after a long illness. Mr. Harrison was an articulated pupil of Mr. G. Sheppard, and subsequently became his partner, under the name of Messrs. Sheppard, Harrison, of Bargate, Newark. Of architectural works carried out by the firm we may mention the enlargement and improvement of Messrs. Warricks & Laidlaw's premises and brewery, Newark; a residence at South Parade, Skegness, for Miss Kirkby; the extension, with infants' classroom, etc., of the Farndon Schools, Nottinghamshire; the Causeway and ancillary works, Colchester-road, Newark; the mission hall and enlargements of the schools, Barnby-road, Newark; shops and warehouses for Mr. J. J. Bates, at Southwell, together with many houses, business premises, and similar buildings in Newark and the neighbourhood.

**MR. CHASEY.**—Mr. William Henry Chasey, of 39, Essex-street, Strand, and Maryon-road, Old Charlton, architect and surveyor, died on November 10.

**MR. JOHN BOWDEN.**—The death has just taken place of Mr. John Bowden, formerly of Stretford, and more recently of Moorside, Glossop. Mr. Bowden was, in his early associations with Lancashire, Assistant Surveyor to the Corporation of Preston, a position which he held for four years. From 1868 to 1873 he was District Surveyor for the Borough of Salford, and he then became Surveyor to the De Trafford Estates. For many years Mr. Bowden was in practice in Manchester as an architect, surveyor, and valuer. He was an Associate Member of the Institution of Civil Engineers, and Fellow of the Surveyors' Institution. In the incipience and successful carrying out of the Royal Jubilee Exhibition at Old Trafford in 1887 the late Mr. Bowden took a foremost part. He was a member of the Executive Committee and of the Council of Governors, and Chairman of the Works Committee. The funeral took place on the 20th inst. at Stretford.

#### GENERAL BUILDING NEWS.

**ALL SAINTS' CHURCH, HERTFORD.**—The opening of the completed church of All Saints, Hertford, took place a short time ago. The style is Perpendicular, and the church consists of a nave of five bays 73 ft. long by 31 ft. wide, with a western tower about 28 ft. square, and north and south aisles 20 ft. and 18 ft. wide respectively, with aisles opening into the tower, in which the font is placed. The chancel is a continuation of the nave, and is 42 ft. long by 26 ft. 6 in. wide. There is a south chancel aisle, with separate entrance and porch, and on the north side of the entrance and porch, there is a small vestry, and also a vestry and choir vestries on the north of the chancel. The nave and chancel are about 40 ft. from floor to wall plate, and have open timber roofs of somewhat low pitch, covered with red tiles. The aisles have roofs covered with red tiles, running the whole length of the church. The north aisle is lighted by four-light windows, and the south aisle by three-light windows. The flooring of the sanctuary and choir is laid with encaustic tiles, with polished stone borders, while that of the aisles is of pitch pine. The pews, underneath the seats is of pitch pine, and the passages being laid with Yorkshire flags, the passages being lighted by gas. The warming up on the low-pressure system, and is worked by two boilers. The stone used for facing the walls both internally and externally is fluted red Runcorn stone from the quarry at Wren Point, near Runcorn, Cheshire. The work of completing the church has been carried out by Messrs. B. Rathbone & Sons, of Atherton, Lancashire, under the direction of Mr. T. Strong, clerk of the works, Mr. G. Bain, and Mr. A. Walsban. The architects were Messrs. Paley, Austin, & Paley, their designs being accepted in competition. The total cost of the site, including the portion previously carried out at a cost of 28,000l.

**CHURCH, BRESTON HILL, LIVERPOOL.**—The new Church of the Holy Spirit at Breston Hill has just been consecrated. The building is of stone, and is Late Perpendicular in style. It is 110 ft. long and 30 ft. wide, and is on a much lower level than either the nave or the porch at the west end, where the principal entrance is situated. Thus it is possible for a section of the consecration



to occupy a position somewhat analogous to a west gallery. The architect is Mr. H. A. Prothero, of Cheltenham, and the total cost is estimated at 11,000. Space has been left for the erection of a transept on some future date.

**CHURCH, WIMBLEDON.**—On the 3rd inst., the new church of St. Winefred, in South Wimbledon, was opened. The church is in the Romanesque style, and is built externally of red brick with a considerable amount of rough cast for the plain wall surface. The plan consists of a wide nave with narrow aisles serving for passages or porches, a large and elevated chancel, with Lady Chapel on one side, and on the north side a transept, which is connected with the sacristies. There is also a baptistry at the north-west corner. The total internal length is 111 ft., the width being 49 ft., exclusive of the chancel. The internal height to the ceiling is 40 ft. from the floor, and externally it is 58 ft. to the ridge from the floor level. The internal treatment consists of large bays formed by lofty semi-circular arches carried on brick piers, which bays are sub-divided below the clearstory windows into two bays. The whole interior is finished in brick of two tints of red, relieved by stone voussoirs in the arches and black bands. The roofs are entirely of unvarnished pitch pine. The architect was Mr. Frederick A. Walters, F.S.A., of Westminster, the cost of the church itself having been about 6,500. The buildings were Messrs. James Smith & Sons, Ltd., of South Norwood.

**NORTH AISLE, COMPTON CHURCH, BERKSHIRE.**—The foundation-stones were recently laid of the north aisle of the Parish Church of St. Mary, Compton. The scheme is to re-build the aisle which once existed on the north side of the church, the foundations of which have been discovered during the recent excavations. It has been known that the church once had this aisle, although there is no actual knowledge when it ceased to exist, one, two, or even three hundred years ago. There was an old picture in the parish drawing which of the north wall, from which these were discovered at a depth of some 5 ft. below the floor level of the present church. They were almost perfect except where they had been disturbed for the purpose of burials. One unexpected discovery was made—that the original church could not have been so wide as the present structure. The diocesan architect, Mr. J. Oldrid Scott, has shown that the Easter tomb and the cover of the font are of the same date, not so the font itself, which is Norman, and therefore, considerably older than its cover, but he discovered on the font the place of the old lock and key. The base of the font was designed for the font, he thinks, but that the stump of the font has undergone some special treatment, possibly with a view of ornamentation, which was never carried out. The rim of the font is of considerably later design, as also the apex of the font cover. The plans for the new aisle provide extra accommodation for fifty or sixty people. It will have a separate side roof, carried on three pillars and five arches. The contractor for the general building is Mr. E. T. Taylor, of East Isley; and for the stonework, Messrs. Bond & Co., of Newbury. *Newbury Weekly News.*

**CHURCH EXTENSION, SWINDON.**—The Church of St. Paul's has recently been enlarged by the addition of a side aisle providing accommodation for between 200 and 300 seats. The work was carried out by the members of the congregation from plans prepared by Mr. Francis L. Wait.

**METHODIST CHURCH, HINDLEY GREEN.**—A new Methodist Church is being built on a site in Leigh, Hindley Green, at a cost of about 2,000. The building is to be of red brick, having a terraced front, with a clock tower, and will provide seating accommodation for 375. Messrs. Potts, Ross, & Henning, of Manchester and Bolton, are the architects, and Mr. J. Cocker, of Walton, has acted the contractor.

**METHODIST CHURCH, CROSS FLATS, LEEDS.**—In the Cross Flats district of Leeds the Methodist New Connexion are building a new church in "Tempest-road, off Dewsbury-road. The site covers an area of 2,960 sq. yds., and the plans—prepared by Mr. W. S. Braithwaite, architect, of Leeds—provide for a church, school, and caretaker's house. The church, which is to be in the Gothic style, will be flanked by an octagonal tower, and surmounted by a spire, and is to give total seating accommodation for 680 people. The plan of the building is cruciform. The adjoining school, which is to include a large assembly hall, will give accommodation for 600 scholars. All the buildings are to be faced with stone, and the scheme is estimated to cost about 7,000.

**CONGREGATIONAL CHURCH, BITTERS PARK, SOUTHAMPTON.**—The foundation-stone has just been laid of a new church at Bitters Park, in Cobden-avenue, west side, between Cobden Bridge and Bullar-road. The building has a frontage of 50 ft., and a depth of 170 ft. The church is in the Gothic style, and is cruciform in plan, and will accommodate 500 persons, including the choir and a small end gallery, placed behind the entrances. The total length, including the choir and organ space, is 70 ft., the width of the nave, chancel and choir being 26 ft., and the aisles 4 ft. The aisles are passages only to

the transepts and nave. There are three separate entrances from the Cobden-avenue, placed opposite each aisle for the purpose of affording direct ingress and egress to the church. Adjoining the entrances are vestibules and cloak-rooms, and a staircase in tower leading to the gallery. The choir arrangements provide for the organ to be placed, facing the congregation, in the back gable, the choir being grouped on the platform in front, and the pulpit at one end of the platform, approached by steps from the choir. On either side of the choir is a vestry for the pastor and deacons, respectively, and under one vestry a chamber is provided for the heating apparatus. Local red bricks are being used for the wallings, with Doubling stone dressings and traceried windows. The roofs will be covered with tiles; internally the walls will be plastered; the joinery work will be of deal, stained in the roof and painted elsewhere. The heating will be by a low pressure, hot-water system; the lighting will be by gas. The heating arrangements and seats are not included in the present contract, the amount of which is 2,880. Mr. John H. Blizard is the architect, and Mr. W. Jupp the builder.

**ST. LUKE'S PARISH CHURCH, WALLSEND.**—The work of completing St. Luke's Parish Church, Wallsend, is now in progress. The building now proceeding comprises chancel, transept, and morning chapel, and also the completion of the tower and spire. The new chancel will be 42 ft. long, of the same width as the nave, and will give accommodation for fifty persons. Communications by a large arch on the south is the transept, which will be seated for sixty-four, and to the east of this will be the Lady Chapel, seating twenty-four, and having its own altar for week-day services. The lowest story of the tower on the north side of the chancel will form an organ chamber. The east end of the chancel will be occupied by a five-light window with stone shafts. The Lady Chapel will terminate in an apse, having a sanctuary arch resting on coupled columns, and communicating with the chancel by two arches also resting on coupled columns. The tower will be surmounted by a broached spire rising to a height of 133 ft. to the top of the cross. The architects for the new work are Messrs. Oliver, Lesson, & Wood, of Newcastle; and the contract has been let to Mr. Braithwaite, of Newcastle.

**BAPTIST CHAPEL, ABERBEEG, WALES.**—The stone-laying ceremony in connexion with the Ebenezer, Glandwr, Baptist Church, Aberbeeg, took place recently. Mr. W. Beddoe, of Cardiff, is the architect. The chapel itself will seat between 600 and 700 people, and can be enlarged to accommodate 850 when necessary. In addition, a lecture-hall is provided, with sitting accommodation for 300, together with a suite of classrooms, etc. A feature of the scheme is an institute, which, while connected with the main building, is so arranged that it can be shut off entirely, and has a separate entrance from a side street. The building will be of local stone, with blue Newbridge stone facing, and Cornish Down dressings. The internal woodwork will be selected pitch-pine. The contractor is Mr. David Lewis, Aberllyry.

**WEST HAM HIGH SCHOOL.**—The new building erected in the Grove for the West Ham High School was opened recently by the Mayor (Alderman J. Byford). The building, which is of red brick with stone dressings, occupies a position at the east end of St. John's Church, and forms a compact block of three floors. The central feature is the hall on the ground floor. The hall is 80 ft. long by 32 ft. wide, and has seven classrooms, a principal's room, and a cloak-room on three sides of it. Six balconies overlook the hall from the first floor. A corridor divides these balconies from seven classrooms, a teachers' room, and the secretary's office on the first floor. The classrooms are so arranged that all obtain direct light from the left side of the scholars. On the sub-ground floor is the dining-room and kitchen department, which is arranged to provide for about fifty students staying to dinner. The playground, which occupies the rear of the sub-ground floor and adjoins the playground, has the whole of one front enclosed with folding glazed partition, so that in summer it may be thrown open. In addition to the principal entrance to the ground floor and the caretaker's entrance on the sub-ground floor, there are three other entrances, and all five are available as exits in case of emergency. The buildings have been erected by Mr. F. J. Coxhead, contractor, of Leytonstone, whose tender amounted to 9,987*l.*, from the designs of Messrs. J. T. Newman & Jacques, architects.

**CHURCH HALL, ALLOMBY.**—The foundation-stone of Allonby Church Hall was laid a short time ago. The building will provide accommodation for nearly 200 adults, and will comprise an entrance lobby, a hall, and a committee-room. There will also be a boiler-house, coalhouse, and lavatory in the rear. Mr. Higginson, of Carlisle, is the architect, and the following is a list of the contractors who have been entrusted with the work:—Mr. William Marshall, Maryport, builder; Mr. Joseph Hill, Wigton, joiner; Messrs. Thompson Brothers, Maryport, plumbers; Mr. J. T.

Kellett, Carlisle, slater; Mr. George Nicholson, Wigton, plasterer; Mr. James McKay, Maryport, painter.

**ABERGWILL PALACE.**—Two years last April nearly the whole of the buildings which formed Abergwill Palace, the residence of the Bishop of St. David's, were burnt, an outbreak of fire having occurred during the night. The restored Palace is now all but ready for occupation. With the small exception of the main walls and of five rooms in the south-west wing, the Palace was virtually burnt out in the fire. With a wing remaining, and the main walls standing, a building within the old perimeter became a necessity, and the external aspect of the house remains much as it was. Cement in imitation of stone has been generally discarded. Internally are to be found the chief changes, for the whole has virtually been replanned, the chapel and the Bishop's library alone retaining their former positions. The space of the courtyard in the old building has been incorporated into the building in the form of a top-lighted central hall. The kitchen offices and dining-room, which were formerly at opposite ends of the building, have now been brought into reasonable proximity, and a new second staircase has been added in the west wing. The house lies low, and occasion has been taken to lay a solid concrete bed over the whole area, while the basement, formerly subject to floods, has been made waterproof. Bathrooms, a hot-water service, a new sanitary equipment, and an acetylene gas institution have also been introduced. The work has been carried out from the designs and under the supervision of Mr. W. D. Caroe, F.S.A. The builders were Messrs. A. Turner & Sons, of Cardiff, and Mr. Bolwell was clerk of works.

**SEAMEN'S REST, EAST INDIA DOCK-ROAD, E.**—The Queen Victoria Seamen's Rest buildings in East India Dock-road have been enlarged by the erection of an additional story, so as to increase the accommodation to a total of fifty-six beds, and the whole of the interior has been repaired and renovated, at an expenditure of 1,600*l.*, under the directions and superintendence of Mr. J. Guntton.

**BRAMPTON CONSERVATIVE CLUB.**—The new Conservative and Unionist Club at Brampton was opened recently. The club is situated in the Front-street, and consists of a reading-room on the ground-floor and billiard-room above it, together with a couple of small recreation rooms and living rooms for the caretaker. The premises were formerly the Black Bull, and the old building was pulled down and rebuilt from the designs of Mr. T. Taylor Scott, architect, Carlisle.

**A GARDEN CITY SCHEME, BRADFORD.**—The Building Committee of the Bradford Corporation have been approached with a proposal for the erection of a number of dove-tailed through houses. A scheme has been prepared by Messrs. Mawson & Hudson, architects, and a description with plans has been sent to the Corporation, but before proceeding with working drawings the promoters have asked for an expression of opinion on the scheme from the Building Committee. One of the proposals is to make the roads 14 yds. wide. In bringing their scheme before the Building Committee, Messrs. Mawson & Hudson state that instead of hammer-dressed wallstones for the fronts and backs they propose rubble walls covered or faced with cement rough cast. Hundreds of good houses and cottages all over the country have been erected in this manner—to do away with all out-buildings, have narrower asphalt roads (where not thoroughfares or main streets) doing away with the cost of paving with setts, and to have gardens both back and front. In doing away with backyards and privies and making two fronts to one house it will be a great inducement to the tenants to keep the scullery side as clean and tidy as the living-room side. Two plans are given, with remarks on the style and arrangement of erection. No. 1 plan deals with dove-tailed through cottages. These cottages have accommodation as follows:—Basement, small larder, and coal place; ground-floor, living-room and scullery; first floor, two bedrooms and bath and water-closet; and attic, two bedrooms. Instead of having a width of 17 yds., an appropriation for one house and the minimum required by the Corporation by-law—of streets, causeways, and backyards to pave and drain there will only be a width of 10 yds. to each house (in asphalt instead of paving), thereby minimising the collecting ground and saving a considerable amount in the cost of drains. The cottages will have on each front a 12-ft. deep garden (the depth might, of course, be increased if required), a 6-ft. deep shrubbery fenced off from the garden with rustic trellis work instead of the usual stone boundary wall, a 6-ft. wide causeway and 6 yds. wide road, both in asphalt. The width from row to row will be 22 yds., though, of course, if the road were a thoroughfare it could be made wider. The No. 2 plan for through cottages shows structures which differ from No. 1 in that they take up a little more frontage, but are less in depth, and also in getting three bedrooms on the first floor, omitting the necessity for attic, unless the cottages are required for very large families. The accommodation is as follows:—Basement, small larder and coals; ground floor, living-room, scullery, bath-room..



and water-closet; and first floor, three bedrooms. The following arrangement is suggested as regards position:—At the back a garden 16 ft. deep, separated from the back road 15 ft. wide with trellis work, making the distance from back to back of two rows 18½ yds.; front garden 12 ft. deep, separated from a 6-ft. shrubbery with trellis work, a 6-ft. wide causeway with an 18-in. wide asphalted road, making 22 yds. from front to front of cottages.

**ISOLATION HOSPITAL, TROWBRIDGE.**—The new isolation hospital at Trowbridge was opened on the 14th inst. The buildings are of brick, and have been erected from the plans of Mr. W. J. Mann, at a cost of 7,000*l.*, excluding furnishing, etc.

**NEW MACHINE SHOP, DEVONPORT DOCKYARD.**—The foundations have recently been commenced at Devonport Dockyard of a new machine shop, 200 ft. by 100 ft. The estimated total cost of the new structure and attendant works, exclusive of machinery, is 12,700*l.*, and accommodation will be provided for about 160 men. The contract for the steel-framed superstructure has been placed with Messrs. Francis Morton & Co., Garston, Liverpool. The foundations, railways, and latrines will be carried out by the Director of Works Department.

**MUSEUM AND LABORATORIES, LIVERPOOL UNIVERSITY.**—On the 18th inst. the new museum and laboratories of the Department of Zoology, situated in Brownlow-street, were inaugurated. The building committee appointed by the council selected Messrs. Willink & Thicknesse as architects, and the contract for the erection of the block of buildings containing the departments of natural history, electrotechnics, and geology, was given to Messrs. Thornton & Sons, of Liverpool. The electrotechnics laboratories were finished and opened last July; the geology-rooms are not yet completed. This Zoological Institute has a frontage of 123 ft. on the western side of Brownlow-street, is 41 ft. from front to back, and 84 ft. in height from the street level. It is built of red-pressed brick relieved with white sandstone from the Stretton quarries. On the north it adjoins the Hartley Botanical Laboratory, and on the south the new Electrotechnics Department, which also extends underneath the zoology building in the basement. The building consists of a central tower containing the entrance hall and staircase and some of the smaller rooms on each floor, and of two blocks.

In the south block the three floors accommodate (1) the museum with its large gallery; (2) the lecture theatre; and (3) the large junior laboratory at the top of the building. In the north block, on the two lower floors, there are extensions of the museum to receive special collections, and the rest of the space is devoted to the senior classes, senior and honours students' laboratories, the departmental library, and laboratory and store-room accommodation for the Sea Fisheries Department, the work of the Economic Entomologist, of the Marine Biological Committee, and other practical applications of zoology. In the central tower, along with the staircase, there are small rooms for the professor and two demonstrators, the laboratory assistant, with diagram, chemical, aquarium, photographic, macerating-rooms, and students' lavatories.

#### SANITARY AND ENGINEERING NEWS.

**DOCK, SEAHAM.**—The new dock and piers at Seaham Harbour have just been opened by the Prime Minister. Up to six years ago the water area of the docks was only about 12 acres—an outer harbour 3½ acres, the north dock 2½ acres, the south dock 2½ acres, and the tidal harbour 2½ acres. By the Seaham Harbour Dock Act of 1898 a company was formed, and it was decided to construct at once an up-to-date dock and piers. The contract was let to Messrs. S. Pearson & Son, Ltd., of Westminster, for 378,000*l.*, and the work was begun in 1899. Coal shipping from the old docks has gone on during the construction of the new, and for many months the new dock has been in use, vessels coming and going by a temporary entrance until the new gateway was ready. The old north dock and the old protecting piers still remain, but the remainder of the old harbour has been absorbed in the new. The new dock is 1,000 ft. long by 450 ft. wide, and has an area of 10 acres. It will accommodate vessels up to 5,000 tons burthen, whereas the utmost capacity of the old docks was for ships of about 1,000 tons carrying capacity. The depth of the new dock is 27 ft. 6 in., while at the sill the depth is 26 ft. 6 in., against the 10 ft. of the old docks. The gateway is 66 ft. wide. The new piers run out from the north and south, curving seawards and enclosing a water space of 28 acres. They are built of concrete blocks—the outside ones being stone-faced—and are tunnelled throughout, so that the lighthouse-keepers can reach the lights without danger in the stormiest weather. They have not, roughly speaking, about 90*l.* per lineal foot. That on the north side is 1,333 ft. long, and that on the south 878 ft. The entrance is 280 ft. wide, and the distance from the entrance to the new gateway is about 900 ft. The channel has been dredged to the requisite depth. Up-to-date stalths and

spouts have been erected. They are of a great height, and laid out on the gravity system, enabling them to be very easily worked. They are built to accommodate high-capacity waggon. Steamers up to 2,500 tons burthen have been regularly loaded at them for several weeks past. The company expect to ship 2,000,000 tons annually.

**ELECTRICITY WORKS, FOCHABERS, N.B.**—Works have been erected at Fochabers for the purpose of providing the town with an electricity supply, the power being derived from the River Spey. Messrs. Drake & Graham, London, supplied the electric fittings, and the engineering work was in the hands of Messrs. Carrich & Ritchie, Edinburgh. The Western Cable Company, London, laid the cables; the power-house was constructed by Messrs. Bannochie & Sons, Aberdeen; the walls by Messrs. Robert Mitchell, Huntly, and William Legge, Fochabers; and the intake was executed by Messrs. Sellar & Co., Aberdeen. The architect of the works was Mr. Thomson, Fife-Keith, who was represented by Mr. James H. Marshall. Mr. Alex. Keir and Mr. George Russell had charge of the workmen.

**KEYHAM DOCKYARD EXTENSION.**—It is only by comparisons that the magnitude of public can appreciate the magnitude of undertakings so colossal as the dockyard extension at Keyham, and the means of comparison is supplied by the fact that whereas there are 39 acres in Devonport Park, the acreage of the extension works is 114. As a further comparison, it may be mentioned that the closed basin on the works is 35½ acres in extent, or only 2½ acres less than the park. The original contract entered into by Sir John Jackson, Ltd., for the completion of their part of the work was about 3,000,000*l.*, but the original scheme has been considerably altered and extended, and it is probable that when the whole works are completed the total cost, including the expenditure on factories, workshops and general equipment, will be not much less than 6,000,000*l.* The works have been carried out under the provisions of the Naval Works Act of 1896, and were commenced in February, 1896. They have, therefore, been in hand nearly ten years, and during the greater part of that time as many as 3,400 men have been employed. As the result of the employment of so large a number of men, there was created at Weston Mill a new residential district, inhabited almost exclusively by men engaged on the works and their families. Through the consideration and public spirit of Sir John Jackson, it was in some respects a "self-contained" community, with its own mission church and schools. In other parts of the three towns the employees of the extension works also found habitation. Many of the men have now left the district to find employment in the north country or on public works which the firm have taken in hand in other parts of the world. Still there are about 1,700 men employed on the extension works. It is expected that the contract will be completed by the summer of 1908, and that the works will be formally opened in the autumn. The "beginning of the end," so far as the contractors' work is concerned, may be said to have been marked on the 13th inst., when sea-water was admitted to the tidal basin at the southern end of the works. The party included Sir John Jackson, Mr. Whately Eliot (Superintending Civil Engineer), Mr. G. Crocker, C.B. (Civil Technical Assistant to the Admiral-Superintendent), Mr. Chas. Colson, C.B. (Deputy Civil Engineer-in-chief, Navy Loan Works, Admiralty), Mr. G. H. Scott (Sir John Jackson, Ltd.), Mr. R. H. Andrews (Chief Engineer, Devonport Dockyard), and others. The tidal basin into which sea-water was first admitted is 10 acres in extent, and will give a depth of water not less than 33 ft. in any part, but as the rock at the entrance from the Harnosse has not yet been removed, the full depth of water will not be available for some time. Outside the granite wall of the basin is a cofferdam, through which, as well as through a mass of rock and debris, ten sluices have been cut, and it was through these that the water was first admitted, the doors of the sluices being operated from a platform over the cofferdam. It may be mentioned that, in addition to the closed basin of 35½ acres and the tidal basin which is now being filled, there are between the two basins three large graving docks and a lock entrance. The tidal basin has a length of quayside of about 2,100 ft., and the closed basin 4,500 ft. of quayside; while the length of the three docks is 480 ft., 741 ft., and 745 ft. respectively, and the entrance lock, which can be used as a dock, is 780 ft. long inside caissons. Messrs. Easton & Co., Ltd., of Ironworks, Kent, have manufactured and laid down all the machinery belonging to the docks, consisting principally of ten marine type return tube cylindrical boilers, with a working pressure of 120 lb. to the square inch. Of the engines, the most important are two large duplicate, horizontal, centrifugal pumping engines, with a pump capacity of 5,000 tons per hour, and also the main reciprocating pumping engines, three-throw in duplicate, capable of pumping 1,500 tons per hour. The machinery has been constructed and erected under the supervision of Mr. A. D. Byrne, formerly of Plymouth, who has charge of the pumping operations.—*Western Morning News.*

#### FOREIGN.

**SWITZERLAND.**—The new bridge across the Rhine at Basle was opened on November 11; the bridge has been built from designs by the firm A. Buss & Co. of Basle, and Ph. Holmann & Co., of Frankfurt.—Dr. Maximilian Maerker has been elected Director of the Meteorological Institute at Zurich in the place of the late Dr. Robert Billwiler.

**GERMANY.**—The new museum at Mannheim is to be built from designs by Professor Brunschmütz, of Charlottenburg.—A new law is to be built at Bernkastel at a cost of 1,000,000*l.*

**ARGENTINA.**—The Government has approved the plans for the water supply, sanitation and drainage works of the port area, at a cost of 1,786,111 paper dollars. Part of the work, estimated to cost 1,151,000 dollars (about 108,700*l.*), will be done by contract. No tenders have yet been called for. According to the *Boletín* of the French Chamber of Commerce of Buenos Ayres, the Argentine Government has also sanctioned the following works:—(1) The construction of a post and telegraph office at Buenos Ayres at the cost of 3,000,000 paper dollars (about 262,500*l.*), and (2) the construction of a stage and refuge for immigrants. The cost of these works, exclusive of drainage and electric lighting (for which separate tenders will be invited), is fixed at 1,365,225 paper dollars (about 110,700*l.*).

**BUILDING MATERIALS AND HOUSE BUILDING IN ZANZIBAR.**—In his report on the trade and commerce of Zanzibar for the year 1904, Mr. Vice-Consul de la Roche de la Motte reports under the heading of building materials include ready-made doors and windows from Bombay, and cement, paints, oils, and corrugated iron sheets principally from the United Kingdom and Germany. It may be anticipated that the time when the houses of the British and German East Africa, and perhaps also from Madagascar, will before long come into more general use, though probably teak will always command a good sale on account of its immunity from the attacks of the white ant. The ordinary native house is built on a framework of upright poles, known as "bontu," a large quantity of which comes every year from British East Africa; on each side of these are tied, with cane rope, thinner sticks called "fito," the intervals being filled with mud and sometimes lime plastered; the thatch is usually made of the leaves of the coconut palm cleverly twisted, and known as "makaka"; this thatch is not, however, entirely impervious to the heavy rains, and these rains can afford it always prefer to use corrugated iron, in spite of the heat which it radiates. Corrugated iron is also largely used for roofing by the European and Indian population, though tiles from Mangalore are now taking its place in all the principal new buildings erected by the Government and the richer residents. It is possible that a really sound roofing material, which can be easily fixed and is impervious to tropical rains and heat, might find a good market, provided that it could be sold at a reasonable price.

**SOUTH AFRICA.**—Sir Walter Hild-Handman is to lay the foundation-stone of the new girls' school at Rondebloem, Woodstock, the contract price of which is 15,838*l.* It will accommodate a thousand scholars, and is intended to be the best school of its kind in Cape Colony. Messrs. McGillivray, Grant, & Co., of Cape Town, are the architects. A new light-house, costing 5,000*l.*, has been erected at a spot called Alval Shoal, near Durban, Natal.—A new building to be used as an institute for seamen, has just been completed in Cape Town. The foundation-stone of the building was laid twelve months ago by the Princess Christian.

#### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—The company trading under the title of "Wall Paper Manufacturers, Ltd.," has purchased, as from January 1, 1905, the Ligonista business of Messrs. Ernest Walton & Co., Ltd.

**"LUTAL" LIQUID FUEL SYSTEM.**—At the Princes Dock power station of the Clyde Trust, Glasgow, one of the boilers is fitted with "Lutal" burners for the use of oil as fuel. The boiler to which we refer is of the marine type, measuring 10 ft. long by 11 ft. diameter, and having two furnaces. The boiler is set in brickwork forming external flues. Each furnace tube has three oil burners, which were tested in May last by Messrs. Flannery, Baggallay, & Johnson, of London. Oil for feeding the burners was supplied by Oil for feeding the burners was supplied by fuel being drawn direct from the boiler under test. Most of the air required for combustion was drawn into the furnaces by the chimney draught, although a proportion entered through the burners owing to the induced draught established by the flow of oil and steam. From the test the engineers mentioned the fuel, from an average evaporation of water, from an average evaporation of 14 lb. per pound of fuel, a satisfactory showing represents an evaporation



efficiency of 77 per cent. An interesting point is that the fuel employed is blast furnace oil, which has a low calorific value of 17,600 thermal units per pound, which burned steadily, and gave a clear blue flame. It is to be regretted that the inspecting engineers were unable to observe the effect of the burners in diminishing the amount of smoke and soot from the chimney, the former boilers burning coal were discharging from the same shaft during the conduct of the tests.

**WAR MEMORIAL, GATESHEAD.**—The South African war memorial, which has been erected in Salway Park, Gateshead, was unveiled by Lord-General Sir John French on the 11th inst. It consists of a decorated column of granite, surrounded by a life-size bronze-winged figure representing "Peace crowning the Heroes," the height is 24 ft. from the ground. Mr. F. W. Jones, sculptor, of West Hartlepool and Chelsea, executed the work, his design being accepted in open competition.

**"CALENDARUM LONDINENSE."**—We noticed last year the sheet calendar issued by Mr. Elkin Matthews for 1905, with an etching of a London scene by Mr. W. Monk filling the upper half of the sheet. The "Calendarium" for 1906 is a letter. The etching by Mr. Monk shows a view from opposite the bottom of Ludgate Hill with the dome of St. Paul's rising in the middle of the composition, above a mass of street buildings. The calendar is arranged in a more attractive form than last year, and the sheet is one which an artist can hang up with satisfaction.

**THE ANNUAL MEETING OF THE BIRMINGHAM MASTER BUILDERS' ASSOCIATION** was held at the Grand Hotel, Birmingham, on the 13th inst., Colonel Barnsley in the chair. The committee, in presenting their annual report, regretted to still have to record the fact that in common with most trades in the building trade during the last year, showed a very depressed state. With this depression there had been a corresponding decrease in the keenness of competition. There was, however, signs of increased activity amongst manufacturers, and it might be hoped this would result in a more prosperous state of affairs in the building trades. In the last annual report, reference was made to the recommendation of the committee as to the increase in the number of men to be offered for competition by students in the classes connected with the building trade at the Municipal Technical School. After consideration by the headmaster at the school, it had been arranged that the 57, 6s. offered by the Association should be divided amongst the following classes:—Sanitary science, 11. 1s.; sanitary surveyors, 11. 1s.; masons, 11. 1s.; carpenters (practical), 11. 1s.; carpenters (theoretical), 11. 1s. A deputation from the Association, consisting of Mr. W. J. Brown, Mr. J. J. Brown, and Mr. J. J. Brown, were present to urge the importance of supplying prizes when inviting tenders for work of any magnitude. An amendment of the standing order in Parliament, obtaining a *locus standi* for Associations, had been secured mainly through the instrumentality of the Metropolitan Dairy-keepers' Society. The committee had contributed towards the costs incurred in placing the matter before the Court of Referees. The committee decided, after careful consideration, to refrain from disturbing the trade by giving notices to the effect of any alterations in working rules, and in their opinion, existing circumstances would have justified the committee in giving notice in wages. The claims of the National Reserve Fund of 10,000, had already been brought to notice. Up to the present promises and contributions had been received from members amounting to 416s. 6s. 6d. The total amount allocated for collection in the Midland area was 1,600s. The committee strongly urged those members who had not yet responded to contribute to give the matter their prompt consideration, as it was felt very desirable that all members should interest themselves in the project, which was undoubtedly of great importance to the trade. It was hoped that the Birmingham Association would show such a lead as would ensure the collection of the sum allocated to the Midland Centre. A set of rules had been proposed by the members of the National Federation and the various societies of operative masons, bricklayers and bricklayers for the establishment of governing bodies of conciliation boards in the building trades, with a view to obtaining a amicable settlement of disputes without resorting to strikes or lock-outs. The committee had agreed with the above-mentioned branches of the trade for these rules to apply in this district.

The balance-sheet showed total ordinary receipts for year, 216s. 9s. 9d., which, with the balance from last year, made a total of 1,000s. 11s. 6d., and the various disbursements to 1,000s. 11s. 6d., leaving a sum of 195s. 4s. 3d. to the credit of the Association. The report having been read, the officers for the year were chosen, Mr. W. J. Brown, being elected President, Mr. Thomas Jones, vice-president, and Mr. Bigwood, secretary. The retiring President was accorded a vote of thanks. The annual banquet followed at Grand Hotel, and was attended by 200 members representative of the various branches

of the trade. Mr. J. B. Whitehouse (President) occupied the chair, and Mr. T. Johnson was in the vice-chair. The toast "Success to the Birmingham Builders' Association and the Trade of the City" was proposed by Lieutenant-Colonel J. Barnsley, who pointed out that combination had engendered mutual respect between capital and labour. It was capable of wider and more sympathetic development. Progress would continue to be gradual, but signs were not wanting that common sense and sweet reasonableness were taking the place of the old brutal methods of the lock-out or the strike. During the year considerable advances had been made in the establishment of national conciliation boards for the settlement of disputes. Combinations of employers were the natural sequence of trades unions. The toast was honoured, and the President responded. He regretted that in the building trade many had resorted to the disastrous system of price cutting. Mr. W. Sepucha gave the toast of the "Architects and Surveyors," and Mr. Cooper and Mr. A. Rowe replied. Mr. Thomas Johns submitted the toast of "Kindred Associations." Their primary objects were to prevent disputes. It was a fallacy to suppose that their mission was to reduce wages. They were prepared to pay a fair day's work. He hoped every encouragement would be given to apprentices to receive technical education. If they did this both builder and artisan would benefit. The advantage was mutual. The toast was replied to by Mr. John Price, Mr. H. Wilcock, and Mr. C. H. Barnsley. The other toast honoured was "Our Visitors," submitted by Mr. A. S. Smith, and acknowledged by Mr. F. W. Amphlett.

**BUILDING BY-LAWS, DURHAM.**—In his quarterly report to the County Council, Dr. T. Eustace Hill, Medical Officer to the county of Durham, refers to the question of rural building by-laws. In districts, he says, which are purely rural or agricultural in character, building by-laws different from those necessary for urban districts may with advantage be adopted, but in many of the so-called rural districts in this county, such as Chester-le-Street, Auckland, Durham, and Easington, the conditions under which the bulk of the population live are essentially urban and by-laws suitable for purely rural districts would be most undesirable in these areas. In some of our populous rural districts action has already been taken for the remodelling of the by-laws, and, if effected, will, the doctor very much fears, result in less sanitary houses being erected in the future. In the Durham rural district the by-laws require that the sites of all new buildings shall be covered with impervious material, so as to ensure the exclusion of ground air and dampness, but Dr. Hill understands that, in the by-laws which have recently been remodelled, this most necessary and important requirement has been modified. The Medical Officer is of the opinion that the Chester-le-Street rural district, in his annual report, expresses strong disapproval of some suggestions which are being made for the modification of the by-laws for that district, which will have the effect of diminishing the height of certain rooms in a house, and of reducing the area of the yards of dwellings. While it may be possible to modify by-laws in certain particulars, especially as regards building materials, so that the cost of erecting workmen's dwellings may be reduced, it is most undesirable that any modification should be permitted which will in any way diminish the healthiness of new dwellings. Any modification of the by-laws which does away with the necessity for the cementing of the sites of dwelling-houses, or which diminishes the height and ventilation of living-rooms, or the area of the house yards, is a retrograde and undesirable step from the health point of view, especially in a populous county like Durham, where the great majority of the people live under urban conditions. The doctor thinks the attention of the Local Government Board should be called to the serious results which would follow in this country from any relaxation of the sanitary requirements of building by-laws, and he recommends that the Board should be asked to inform the County Council of any proposed modification in the sanitary provisions of the building by-laws in force in this county before they receive the approval of the Board.—*Stockton Herald.*

**INCORPORATED CHURCH-BUILDING SOCIETY.**—This Society held its usual monthly meeting on Thursday, the 16th inst., at the Deanery, West. The Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Plymouth, S. Simon, 175s. for the first portion; South Tottenham, S. Philip, Middlesex, 150s. for the first portion; Churchdown, S. Andrew, near Cheltenham, 100s. for the first portion, in lieu of a former grant of 50s.; and Plaistow, S. Peter, Essex, 225s. in lieu of a former grant of 200s.; and towards enlarging or otherwise improving the accommodation in the churches at Barry, S. Paul, Glam., 100s.; Cardiston, S. Michael, near Shrewsbury, 25s.; Little Ilford, S. Barnabas, Essex, 150s., making in all 2605s. Landefelle, S. Maebilla, near Talgarth, Brecon, 35s.; Nenthead, S. John, Cumberland, 10s.; Newchurch, S. Peter and S. Paul, Kent, 25s.; Rye Harbour, The Holy Spirit, Sussex, 30s.; S. Mary Bourne,

S. Peter, near Andover, Hants, 35s.; Seaton Hirst, S. John, near Morpeth, 100s., and Haverfordwest, S. Mary, Pembro., 120s. in lieu of a former grant of 75s. A grant was also made from the Special Mission Buildings Fund towards building the first portion of a mission church in the parish of Christ Church, Tunstall, Staffs., 25s. The following grants were also paid for works completed:—Richmond, S. John, Surrey, 55s.; Llantwit Major, S. Illtyd, near Cardiff, 50s.; Wrenningham, All Saints', near Norwich, 20s.; Caerphilly, S. Martin, South Wales, 75s.; Brandon, S. John, Co. Durham, 50s.; Jarvis Brook, S. Michael and All Angels, 50s.; Callowland, Christ Church, near Welford, 200s.; Ferndale, S. Dunstan, Glam., 100s.; Lynton, S. Mary, Devon, 45s.; S. Ives, S. Nicholas, Cornwall, 50s.; Leyton, S. Edward, Essex, 50s.; Charlton in Dover, S. Bartholomew, 30s.; and Chelsfield, Kent, 25s. In addition to this the sum of 505s. was paid towards the repairs of thirty-two churches from trust funds held by the society.

**Huddersfield Builders' Exchange.**—The annual meeting of the Huddersfield Builders' Exchange was held on the 18th inst. at their rooms, Northumberland-street, Huddersfield, Mr. J. W. Mallinson, who was elected President for the coming year, presided over a large attendance. Mr. W. B. Evans (treasurer) and Mr. C. Whewill (auditor) were re-elected. Mr. J. E. Sykes, the secretary, presented his annual report, which showed a slight decrease in the membership.

**NEW ROADS AND THE BUILDING ACT.**—The Works and Highways Committee of Lewisham Borough Council on Monday reported having received a letter from the London County Council referring to a communication from the Borough Council as to the necessity for providing outlets into Bromley-road, for the roads on the St. German's Estate, Catford, and for linking up these roads with those on the Forster Estate. The London County Council pointed out that, while they considered the application unobjectionable, they in 1901 refused their consent to the formation of certain of the roads on the two estates in question, on the ground that no arrangement had been made to provide communication between them and the existing main highways, and that their decisions were subsequently reversed by the Tribunal of Appeal. In these circumstances they had no authority under the London Building Act to deal with the matter. The London County Council also pointed out that by the London Building Acts (Amendment) Bill, introduced into Parliament last session, they sought to obtain authority to deal with questions of this kind, but the Bill was not strongly supported by the Metropolitan Borough Councils, and did not become law. The Works and Highways Committee of Lewisham Borough Council, referring to the foregoing, state that the London Building Acts (Amendment) Bill of last session dealt with a number of questions, some of which were deemed objectionable. Lewisham, however, raised no objection to the proposals of the London County Council in relation to the point under consideration.

**APPOINTMENT OF SANITARY OFFICERS.**—The Local Government Board has sanctioned the appointment of the undermentioned persons as sanitary inspectors in metropolitan boroughs as follows:—Fulham, Mrs. M. E. Davies (in the place of Miss J. J. Brown, resigned), as from October 30, 1905; Lewisham, Miss Irene Whitworth.

**GAS LIGHTING AT BUCKINGHAM PALACE.**—A great improvement has been effected this week in the lighting of the courtyard and roadway in front of Buckingham Palace by the substitution of a high-pressure gas installation for the ordinary incandescent burners formerly in use. The new burners are Sugg's high-pressure burners fitted with specially prepared mantles, and the pressure of the gas supplied to the burners is raised to about 16 inches by means of a small gas engine and compressor.

**SALE OF ARCHITECTURAL AND ARCHEOLOGICAL BOOKS.**—A sale of books, manuscripts, and autographs, the property of the Earl of Cork and Orkney, removed from Marston, Frome, took place at Christie's Rooms, King-street, St. James's, on November 21, 22, and 23. Amongst the lots sold, and prices realised, were the following:—"Vitruvius Britannicus, or the British Architect," by Colin Campbell, with 300 large engravings of mansions and public buildings in Great Britain, 3 vols., 1715-31, and "Architecture of Painting, Statuary, etc.," by James Leoni, 3 vols., 1726, 11. 12s.; "Westminster, or the History and Antiquities of St. Peter, Westminster," by John Dart, 1742, and "History and Antiquities of the Cathedral Church of Canterbury," 1726, 11. 14s.; "Book of Architecture," by James Gibbs, 1728, containing designs of building and ornaments, 150 fine plates, 21. 12s.; a second edition of the same, 1739, together with G. Turnbull's "Treatise on Ancient Painting," 1740, and A. Pozzo's "Perspective Proper for Painters and Architects," 1693, 21. 2s.; T. J. Carver's "New Designs of Ceilings, Chimney-pieces, Picture Frames, Stands for China, Grates, etc.," four parts, 56 plates with 150 designs, 1761, 5s. 15s.; "Londinopolis, or Perustration of the City of



London," fine folding view of London showing Shakespeare's Globe Theatre, etc. by James Powell, bound in old calf, published in 1657, 3l. 10s.; "Designs of Inigo Jones and Others," by Isaac Ware, 53 plates engraved by Fourdrinier, no date, 3l. 3s.; "Views of Whitehall and the Horse Guards," etc., by Inigo Jones, 1l. 15s.; "Some Designs of Inigo Jones and William Kent," with 50 plates engraved by Vandyke, 1744, 3l.; "Inigo Jones's Designs, consisting of Elevations and Plans for Publick and Private Buildings," by W. Kent, 1727, and Batty Langley's "Plans of Windsor Castle and Radcliffe Library, 1743, 3l. 10s.; "English Architecture, or the Publick Buildings of London and Westminster," with plans of streets and squares, 123 folio plates, no date, 1l. 12s.; "The Architecture of A. Palladio, in four books, revised, designed, and published by Giacomo Leoni," 5 vols., 1715, and Isaac Ware's "The Four Books of Andrea Palladio," 1738, 2l. 5s.

**PROPOSED NEW INFIRMARY, PLYMOUTH WORKHOUSE.**—On the 21st inst, the Special Purposes Committee of the Plymouth Board of Guardians brought forward plans for a new workhouse infirmary which had been drawn up by Messrs. Thornely & Rooke, architects. The revised scheme provides for 300 patients and twenty-one nurses, and is based on the estimate of the architects for 1000, per bed. The wards are to be grouped centrally round the administrative block, which comprises the usual offices for such an institution. The site is upon the garden attaching to the present workhouse premises. The adoption of the report having been moved and seconded, Mr. T. G. Mill said he thought they should have fireproof floors. It would be a death-trap in case a fire broke out. Mr. Govier asked what was the difference between the original plans and the plans at present before the board, and the comparative estimates. The Clerk said the former plans made provision for tuberculosis patients, a new laundry, and 303 patients, and the estimated cost was 66,000l. These things were omitted from the present plans, which provided for 300 patients and the cost was 30,000l. Mr. Govier moved as an amendment that the committee's recommendation be referred back for a fortnight, so that the guardians might thoroughly investigate the plans. He was in favour of fireproof flooring, and he also thought the walls should be strong enough to bear another story. Mr. Hawley seconded. There were no dry rooms or laundry included in the present plans. He would also like to see a three-storied building instead of a two-storied building. The Rev. W. H. Child said he regretted that no provision was made to deal with consumptive patients, and also the omission of an operating theatre. But these things might be added later on, and meanwhile they should press forward the present plans. The Clerk said there was a room which could be used for an operating theatre, although it was not what would be expected where a large number of students usually attended. Mr. A. N. Coles said as a member of the committee he had given long and careful consideration to the plans, and in his opinion they were satisfactory. All the points raised that day were pointed out in committee and fully considered. As regarded the thickness of the walls, it was estimated that at the end of twenty years they could build an extra story if desired. Every provision would be made against fire, although it was not decided to have fireproof flooring. Mr. Tamlyn said he should vote for the plans being sent to the Local Government Board. He believed the Local Government Board would send back the plans and insist on the inclusion of fireproof floors, a general room for convalescents, and provision for consumptives. He did not believe they would be allowed to go forward with any scheme that did not include these things. The amendment having been rejected, the original motion was agreed to. The plans of the new infirmary will therefore be sent to the Local Government Board for approval.

**BEDFORD COLLEGE FOR WOMEN, LONDON.**—A building and endowment fund (150,000l.) has been opened for the provision of a site and new premises consequent upon the approaching expiration of the two leases under which the premises in York-place, Baker-street, are held, the freeholder having declined to extend the leases. The College was first opened in Bedford-square fifty-six years ago; it was then removed to a house on the east side of York-place, where two adjoining houses were afterwards acquired and altered for purposes of the College. Towards the sum of 50,000l., which is urgently required for the speedy acquisition of a suitable site, 20,000l. is thus far obtained, and Lady Tate will give, it is stated, 10,000l. for a library in memory of her late husband.

**OXFORD MILITARY COLLEGE.**—The College buildings at Temple Cowley, near Oxford, which have just been offered for sale, extend over 3½ acres, and comprise the XVIIIth century manor house, a chapel built in 1870 for the former Diocesan School after designs by Mr. E. G. Bruton, of Oxford, and an extensive range of workshops, which were lately vacated by a firm of mechanical engineers, Alfred Breese, Ltd.

The buildings were taken over thirty years ago, and were then altered and enlarged for the purpose of a college for the preparation of candidates for commissions in the Army.

**CHERTSEY BRIDGE.**—We read that an examination is about to be made into the condition of the fabric of Chertsey Bridge. There are indications of settlement at the western end, by the Surrey side of the structure, where, it is stated, a long crack or fissure is manifest between the stone facing and the brickwork. The building of the bridge, which has seven segmental arches, was begun in 1783 by Brown, of Richmond; the work was carried on and completed in 1786 by James Payne, who at that time resided at Sags, near Chertsey, and was building the bridges at Walton and Kew. Payne used Purbeck for the stone work of Chertsey Bridge; the cost, about 13,000l., was borne by the county funds of Middlesex and Surrey.

### CAPITAL AND LABOUR.

**STATE OF THE BUILDING TRADES.**—Employment in the building trades continued dull during October, and on the whole was much the same as a month ago. Bricklayers, slaters, and tilers in England and Ireland, and masons in Scotland, report a slight improvement; but with carpenters and joiners, plumbers, and masons in England employment was worse. Compared with a year ago employment was slightly worse. With carpenters and joiners, however, it was about the same, and with bricklayers, and in Scotland with slaters, there was some improvement. From some towns in Lancashire also improvement was reported. The percentage of Trade Union carpenters and joiners unemployed at the end of October was 8.2, as compared with 7.1 per cent. a month ago, and 8.3 per cent. in October, 1904. The percentage of Trade Union plumbers unemployed at the end of October was 12.0, as compared with 8.9 a month ago, and 9.3 a year ago. —*Labour Gazette.*

**YORKSHIRE BUILDING TRADES FEDERATION AND DISPUTES.**—The monthly meeting of the Yorkshire Federation and Building Trade Employers was held at the Grosvenor Hotel, Hull, on the 16th inst. Mr. P. Rhodes (Leeds) presiding over representatives from Barnsley, Bradford, Huddersfield, Leeds, Sheffield, York, Scarborough, Bridlington, Halifax, Hull, Malton, Wakefield, Dewsbury, and Harrogate. A discussion took place on the arrangements which have been approved by six operatives' societies, representing a membership of 134,000, and the National Federation of Building Trade Employers. These provide for the reference of all matters in dispute to local and national boards of conciliation. One of the principal clauses stipulates that no strike or lock-out shall take place until the question in dispute has been before the National Conciliation Board. The Conciliation Boards are arranged in three grades—local, central or county federations, and national—any dispute being first considered by the local boards, and failing a settlement, it is to be referred to the county board, and in case of a failure to settle it is again referred to the national board, and should this fail to bring about a settlement, powers are given to refer the matter to Messrs. Marsden, Townsley, & Stanley, who were the primary inaugurators of the scheme, was expressed by several members. The scheme has already been adopted by the central bodies of the masters and men in three-quarters of the kingdom, and augurs well for a lasting and beneficial effect, not only in the building trades immediately affected, but in the general inland commerce of the kingdom. At the close of the business the members of the Hull Association entertained the council to tea, which was provided by Mr. Foster, and a hearty vote of thanks was accorded the Hull Association, the President (Councillor G. L. Scott, J.P.) responding. —*Eastern Morning News.*

### Legal.

#### ACTION BY ARCHITECT FOR FEES.

The case of Chambers v. Edwards and Wallace came before the Lord Chief Justice and a special jury, in the King's Bench Division, on the 21st inst.—an action by the plaintiff, Mr. William Isaac Chambers, A.R.I.B.A., to recover from the defendants, Mr. William Maitland Edwards and Mr. William Alfred Wallace, 1,200l. odd for work and labour done.

Mr. Moreby appeared for the plaintiff, and Mr. Walter A. Shaw for the defendants.

Mr. Moreby, in opening the case, said the plaintiff, an architect, sued the defendants to recover 1,200l. odd fees for professional work, and for moneys expended by him as architect for the defendants at their request. The main defence relied upon was that a sort of verbal agreement was made between the parties that the plaintiff was not to be paid anything unless two building schemes, in respect of which the claim arose, were carried out and the buildings actually erected.

His lordship asked if there was any dispute as to the amount?

Mr. Shaw said there was no question of amount at all in dispute.

Mr. Moreby, continuing, said the facts were these: There were two quite distinct schemes and separate claim arose in respect of each. Both the schemes related to building sites at Eastbourne. The first scheme was the following way. In June, 1900, the three last-named were undoubtedly associated together in a scheme, called upon the plaintiff as joint architect in London, and told him they had got possession of a site at Eastbourne, that they had arranged that the building scheme should be financed through a London firm of solicitors, and they asked the plaintiff to get out a sketch showing a proposed block of flats to be erected on the site. Plaintiff prepared the sketch and submitted it to the defendants, and they were very much pleased with it. Edwards, in July, 1900, ordered the plaintiff to prepare a complete set of plans, elevations, and sections. Plaintiff was told that there was no line on as to height, and that seven stories would be the right thing. Plaintiff then prepared plans for a block of flats seven stories high, and drew out the plans to the defendants in July, 1900. Edwards was then told by the architects of the Duke of Devonshire, but they were rejected because the proposed building was too high. That was not, of course, the plaintiff's fault, but the Duke's architects said that the plans would have to be amended. Later on in July Edwards told the plaintiff what had taken place, and that he wanted plaintiff to abandon the old plans and to make a new set. Edwards producing a rough sketch of what he desired. These plans plaintiff prepared, and at the request of Edwards had them printed at a quantity surveyor to get out the quantities on the plans which had been made. This was done, and it was estimated that the building would cost between 28,000l. and 30,000l. On October 15, 1901, the plaintiff wrote to Edwards asking if it was intended to proceed with the building. He received no reply to that letter. Early in 1901 plaintiff became seriously ill, and was in bed until June. But on February 24, 1902, he got his solicitors to write to Mr. Wallace asking for 25l. formally on account, but Wallace did not reply to that letter. In June, 1902, it appeared that the defendants had succeeded in getting an option over another site at Eastbourne from a gentleman who was interested in the property. Defendants called upon plaintiff at his office, and told him of the scheme. They said it was impossible for them to pay him anything in respect of the first scheme then, and asked him to let that matter stand for a time, promising him that he would be the architect for the second scheme, which would certainly be a success. On June 1, 1902, Edwards gave the plaintiff a cheque for 25l. on account of his fees in respect of the first scheme. Plaintiff said he gave a receipt for that cheque, but did not produce it to the effect that the 25l. was received on account of professional fees. Defendants then instructed plaintiff to prepare a second lot of plans, no special instructions being given him as to the cost of the building or the height. In July, 1902, plaintiff prepared a complete set of plans, elevations, sections, and specification, Wallace paid 10l. for printing these. When these plans got before the Duke's architects difficulties arose, these architects considering that only two houses should be erected on the site, the defendants proposing to erect many more, and it was further said that the proposed buildings would offend against the rights to light of houses on the other side of the road. In August, 1902, Wallace instructed plaintiff to get out amending plans by reducing the height of the flats and also their length. This not satisfying the Duke's architects, Wallace, in September, 1902, instructed plaintiff to alter the plans by taking off one story altogether, and that on September 29 the plans were passed and that was the last the plaintiff had got for his work. All the time the defendants were 70l. which amount the defendants counter-claimed, for alleging that it was a loan to the plaintiff. The total amount of the plaintiff's claim with regard to the first scheme was 774l. 12s., made up of out-of-pocket expenses, and the usual architects commission of 2½ per cent. on 30,000l. the estimated cost of the building. On the second scheme the cost was 516l. 16s., made up of out-of-pocket expenses and 2½ per cent. on 20,000l. the estimated cost of the second building.

The plaintiff having given evidence in support of the learned counsel's opening statement, it was the learned counsel's turn to cross-examine. By Mr. Shaw evidence was given that the cross-examination by Mr. Shaw said that the scheme for the erecting of certain flats at Eastbourne having failed, Edwards said that he thought Eastbourne would be a good place to



The action was originally constituted, was brought by a Mr. Thomas Boyce (since deceased) against the present appellants, the Borough of Paddington and the Rev. Walter Abbott, the Vicar of Paddington (also deceased), and by the judgment of the Court of Appeal, the appellants were ordered to be perpetually restrained from using the disused burial-ground of St. Mary's, Paddington, for any purposes other than the purposes pointed out in their behalf by the Metropolitan Open Spaces Acts, 1877, 1881, and 1887, and the Disused Burial-grounds Act, 1906, and an injunction was granted to restrain them from the purpose of erecting thereon any building or screen so as to prevent the access of light coming over the ground to the windows of Mr. Boyce's premises. The short facts of the case were as follows:—In September, 1892, Mr. Boyce became the leaseholder for twenty-five years of certain land adjacent to the north-east of the church-plans by the Borough Council and the London County Council, Mr. Boyce erected a block of flats known as St. Mary's Mansions upon the land. These flats were lighted by means of oil-lamps by windows overlooking the churchyard. The Vestry at the time approved of a plan of gates and railings and the boundary wall proposed to be erected on the south-west boundary of his land. Difficulties arose with regard to the demolition of a stone wall and the displacement of tombstones. Mr. Boyce refused to open up the boundary wall, and was contemplating the erection of a gateway and entrance into the churchyard, but he afterwards bricked it up, and refused to re-open it until his claims were met. In January, 1901, the Corporation passed a resolution empowering their surveyors to erect a screen in front of the burial-place adjoining St. Mary's Church, and Mr. Boyce refused to agree to an agreement to open the gateway originally formed in the wall of the churchyard, Mr. Boyce then brought the present action, claiming *inter alia* to restrain the erection of the screen. Mr. Abbott died during the proceedings, and Mr. Henry Rainford, his successor, the executor of Mr. Boyce's estate, continued as respondents. The Attorney-General was also added as plaintiff at the relation of Mr. Boyce. The only question before the House of Lords was whether the appellants were entitled to erect the screen, the respondent being that such a screen would obstruct a building, which was prohibited by section 5 of the Metropolitan Burial-grounds Act, 1881, and section 3 of the Disused Burial-Grounds Act, 1884. Mr. Justice Buckley decided the case in favour of the Borough Council and the Vicar, but his decision was reversed by the Court of Appeal. HONORABLE LORDS.—Mr. Haldane, K.C., Lord Halsbury, Lord Macnaghten, Lord Lindley, Lord Atkinson, Lord Macmillan, Lord Blandford, Lord Crompton, Lord Coleridge, Lord Fry, Lord Glynne, Lord Harcourt, Lord James, Lord Kekewich, Lord Macpherson, Lord Penzance, Lord Russell, Lord Sharncliffe, Lord Sumner, Lord Tuckey, Lord Viscount Alington, Lord Viscount Ashurst, Lord Viscount Cave, Lord Viscount Fitzhardinge, Lord Viscount Gage, Lord Viscount Grey of Fallodon, Lord Viscount Halifax, Lord Viscount Ive, Lord Viscount Lathom, Lord Viscount Milford, Lord Viscount Northbrook, Lord Viscount Radnor, Lord Viscount Selborne, Lord Viscount Sutherland, Lord Viscount Thurlston, Lord Viscount Wimborne, Lord Viscount Yarnborough, Lord Viscount Zetland.

LORD SUMNER. For the respondents.



Their lordships allowed the appeal, holding that there was no evidence that the appellants intended to erect a building, the Lord Chancellor stating that he was not prepared to say that any screen would be a building. It seemed to him that the public body was doing what every proprietor could do—viz., preventing the acquisition of adverse rights by adjoining owners.

#### ACTION AGAINST THE ASSOCIATION OF OPERATIVE PLASTERERS.

THE case of Smithies (trading as C. Smithies & Son) v. the National Association of Operative Plasterers and others came before the Court of Appeal, consisting of the Master of the Rolls and Lord Justice Romer, on the 11th inst., on the appeal of the defendant Association from an order of Mr. Justice Bucknill in Chambers.

Mr. S. T. Evans, K.C., M.P., in opening the case, said that the appeal was brought by the leave of Mr. Justice Bucknill, who had ordered discovery of documents in the action. The point raised was of great importance—viz., whether or not in an action of this kind, involving criminal charges, discovery of documents could be ordered, and whether in this particular case discovery ought to be ordered. The Master and the Judge, after long consideration, made the order, and invited an appeal to this court on the question. The action was brought by the plaintiff against the Association, its trustees and officials, for damages for conspiracy to induce and persuade certain workmen not to fulfil their contracts with the plaintiff, and not to enter into fresh contracts with him. The points for discussion were whether in an action of this kind, where a claim was made for damages for what, if established, would be an indictable offence, any discovery of documents could be made since the Judicature Act, and if discovery could be ordered, whether in this case it ought to be ordered. He submitted that discovery could not be ordered in such a case.

Without calling upon counsel for the respondent their lordships held that on the authority of the decision in the case of Stokes v. the Grosvenor Hotel Company discovery was properly ordered and dismissed the appeal.

Mr. Evans said that defendants would take the case to the House of Lords.

#### PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.\*

24,263 of 1904.—P. STEVENS: *Parquetry*.

This relates to a method of applying parquetry, veneer parquetry, and panels on plaster, and is characterised by the interposition between the parquetry and the plaster of an insulating material, such as oakum or other felt, its faces intended to receive the plaster being roughened by gravel or the like, being caused to strongly adhere thereto, the other face being intended for the reception of the parquetry which is cemented thereto in any convenient manner.

27,805 of 1904.—G. HIGGS: *Domestic Fire-grates, Fireplaces, and Stoves*.

This relates to a bottom for domestic fire-grates, fireplaces, and stoves, and consists of a fixed main frame and a grid or barred frame which is suspended by jointed links from the said main frame, and is capable of being oscillated or moved in a horizontal plane.

28,420 of 1904.—J. D. BENNET: *Folding Desks for School and other use*.

This relates to a folding desk, whose top is fitted to swing on pivoted brackets, on the end standards, so that it may rest in the usual sloping position, and consists in being tilted up to approximately vertical position or be supported in a horizontal position by means of swinging bracket supports.

28,427 of 1904.—J. S. PULLAN, W. H. MANN: *Machines for Moulding Earthenware Pipes*.

This relates to a pipe moulding machine, and consists in providing a bearing for the lower end of the screw shaft on the top of the carrying stud of the internal die.

2,805 of 1905.—PELINGTON'S TILE AND POTTERY CO., LTD., and J. BURTON: *Manufacture of Glazed Tiles*.

This relates to a tile constructed with an indentation or indentations, projection or projections on one or more edges, for the purpose of support during glaze firing.

4,418 of 1905.—W. MURRAY: *Combined Hot and Cold Water Fitting for Baths, Lavatories, and the like*.

This relates to a hot and cold water fitting for baths, lavatories, and the like, and is characterised by two screw down valves, whose spindles are geared together in such a manner that by turning one of the spindles a certain distance the cold-water valve can be opened without opening the hot-water valve, so as to give a cold supply;

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

and then, by turning the spindle a further distance, the hot-water valve can be opened also, so as to give a tepid supply, and again, by turning the spindle still further, the hot-water valve can be fully opened, whilst the cold-water valve can be closed, so as to give a hot supply.

6,180 of 1905.—W. S. WHITMORE: *Hot-water Apparatus for Heating Conservatories, and the like*.

This relates to a hot-water heating apparatus, and consists in the combination of an inner inclined pipe, an outer pipe closed at its ends, a helical endless band upon the inner pipe, a space between the inside of the outer pipe and the outer edge of the helical band, a pipe from the upper end of the inner pipe to a chimney, a chamber communicating with the inner end of the pipe, and a heating device.

6,248 of 1905.—H. S. MOORWOOD and J. M. MOORWOOD: *Construction and Combination of Washing Boilers with Kitchen Ranges*.

This relates to the combination with a kitchen range of ordinary construction fixed in one room, of an independent water boiler, with a fireplace and flue located in an adjoining room at the back of the said range, being accessible only from that room, and having a horizontal fuel passage between the two fireplaces.

7,887 of 1905.—A. BRANCAET and E. MICROTTE: *Tiles for Lining Purposes*.

This relates to a tile for lining purposes completely vitrified, and consists in having on its adhering face, catches or spurs forming part of the tile itself, and on the other side the lustre of the vitrified material fully preserved.

8,740 of 1905.—T. H. JORDAN: *Combined Door Check and Closer and Pivot*.

This relates to a combined door check, closer, and pivot, having a spring box mounted to turn, a check within the casing carrying the pivot spindle and connexions between the box, check, and spindle, the construction comprising a pitman connected to the rotatable spring box, the connexion normally resting near a dead centre, whereby greater pressure is required to start the turning movement of the box than is required to continue the said movement.

11,593 of 1905.—W. BERRYMAN: *Pipe Coupling*.

This relates to a flexible coupling for pipe or metal tubing, and comprises a sleeve secured on one pipe end, a washer of india-rubber or the like, interposed between the second pipe end, and an internal shoulder sleeve, a second similar washer encircling the second pipe a short distance from its end, and means for compressing the washer between the second pipe and the coupling sleeve.

14,131 of 1905.—R. HADDAD (Aktiengesellschaft Industrie für Holzverwertung): *Construction of Sound-proof Telephone Cabinets and other Chambers*.

This relates to a sound-proof telephone cabinet or other chamber, provided with hollow, preferably curved, wooden walls, filled with suitable sound insulating material, such as compressed cotton-wool, asbestos wool, or the like, and consists in the arrangement by which a settling of the said sound insulating material is prevented by means of suitable rods or pins inserted into the walls in a systematic manner, in order to hold the wool in position.

16,213 of 1905.—H. BROWN: *Window Sash Fittings*.

This relates to window sash fittings in which a flanged plate secured on the bottom swinging sash engages the flange of a sliding plate by which the sash counterweight cord is attached, and consists in the combination with said sliding plate of a hand actuated sliding locking bolt adapted to engage a catch plate under the batten rod.

16,851 of 1905.—C. H. MUCKENHORN: *Water-closets and Seats therefor*.

This relates to water-closets and seats therefor, and consists in arranging the seat so as to have an inclination from front to back, and in providing the seat towards the rear with the concave surface.

18,304 of 1905.—A. MORALT: *Closet Seats*.

This relates to a closet seat composed of middle and side pieces, a metal ring let into each part of the closet seat where the said pieces join, the said ring securely connecting the said pieces.

22,617 of 1904.—J. J. BURNESS: *A Machine to Break up Roads, or Earth, or Ore, or other Metals or Substances*.

This relates to a machine to break up roads, or earth, or ore, or other metals or substances, and consists of a wheel with rows of cams attached thereto, actuating sets or a number of blades or frames, for the purpose of picking, digging, or breaking, the machine to work and travel at the same time and to work the reverse way.

24,381 of 1904.—H. RIGBY: *Metal Plates for use in the Construction of Floors, Roofs, and the like*.

This relates to plates of curved or bent form for the construction of floors, roofs, and the like,

and consists in forming the plate with transverse corrugations to increase the transverse rigidity.

26,632 of 1904.—W. H. HOYLE and T. BARKIN: *Ventilating of Mills, Workshops, and other Buildings, and in Apparatus for such Purposes*.

This relates to a method of ventilating mills and other mills or workshops, by drawing the air or a portion of the air at a low velocity through a greatly extended collecting area, and a filtering area and is suitably arranged in a room, the air being drawn through the extended filtering area and discharges by a fan or equivalent into the mill.

27,982 of 1904.—L. N. S. PARMORE: *Pavements*. This relates to a street or other pavement having a perforated top, supports for each perforated top, and a space or spaces beneath such perforated top.

1,879 of 1905.—W. H. LUTHER: *Roofing Skylight Windows, Side Lights, Glass Frames, and the like*.

This relates to the forming skylight windows and side lights out of corrugated metal sheets, and consists of the corrugated frame work being formed out of the corrugated sheets themselves, instead of a separate frame being riveted or attached to a hole cut in the sheet, and combining with same a lead "flashing," or apron, to secure and make weather-tight the glass without the use of putty.

18,201 of 1905.—H. HELZEL: *Staircases for Theatres, Circuses, and other Public Buildings*.

This relates to a staircase arrangement for theatres, circuses, and other public buildings, in which outside the building and on the stairs, cases or are provided, to which lead rails from the various rows of seats and which increase in width towards the bottom.

19,693 of 1905.—E. LINES: *Bricks for Use in the Construction of the Walls of Bateria Beds*.

This relates to a brick having in one of its large faces eight equidistant circular recesses, and on the reverse face four cylindrical projections of a smaller diameter than the said recesses and exactly in line with those of the said recesses which are nearest the ends of the brick.

#### SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

November 7.—By G. P. PHILLIPS & S. SMITH (as Auctioneers).  
Clodock, Hereford.—"Tanhouse Farm," 79 a. 2 r. 26 p. 1, yr. 76l. 10s. 6d. 2,300  
"Treasure Farm," 100 a. 2 r. 26 p. 1, yr. 100l. 2,175

November 13.—By BLAKE & DAVENPORT.  
Putney.—22 and 23, Stratford-st., 44 yrs. g.r. 4s. 6d. 500  
Chalk Farm.—1 and 2, Bedford-st., 44 yrs. g.r. 18s. 1, 1, yr. 80l. 670

By DUNCAN & KEMPES.  
Finsbury Park.—14, Beaufort Villa, 41 yrs. g.r. 14s. 1, yr. 100l. 530  
By HAYES & CO.  
Wimbledon.—29, 31, and 33, Hatfield-st., 41 yrs. 180l. 2,265

By JENKINS, SON & CO.  
Rotherhithe.—4, Lower-rd., 41, 44 yrs. g.r. 6l. 10s. 7, yr. 35l. 215  
4, 6, and 8, St. Mary Church-st., 41 yrs. g.r. 18s. 1, yr. 122l. 4s. 400  
Brookley.—159, Brookley-rd., 41 yrs. g.r. 10s. 1, yr. 135

November 14.—By RILEY & SONS.  
New Cross.—58, Repton-st., 41 yrs. g.r. 11s. 1, yr. 36l. 8s. 145  
Deptford.—5, Lardet-gt., 41 yrs. g.r. 4l. 10s. 215  
Bermundsey.—413, Southwark-rd., 41 yrs. 40l. 140

100a, Vienna-rd. (workshop), 41, 44 yrs. g.r. 10s. 1, yr. 100l. 140  
Rotherhithe.—St. Mary Church-st., 41 yrs. g.r. 18s. 1, yr. 122l. 4s. 400  
Timber Yard, area 7,500 ft. 1, yr. 40l. 750

By MONTAGU HOLMES & SONS.  
Battersea.—294 and 296, Battersea Park-rd., 41 yrs. 71s. 1, yr. 180l. 2,825

By KESSELY.  
Romford, Essex.—Rush Green, The "Coopers Arms," 41, with Goodall, 41 yrs. g.r. 18s. 1, yr. 122l. 4s. 400  
Cottages and two blocks of land adjoining, 1, 1, yr. 40l. 140

By ROBERTS, CHAPMAN, & THOMAS.  
Pimlico.—64, Warwick-st., 41 yrs. g.r. 8l. 10s. 7, yr. 70l. 450

By FRANK WALKER.  
Tillingham.—13, Collegiate-st., 41 yrs. g.r. 11s. 1, yr. 45l. 125  
7, 10s. 7, yr. 45l. 125  
Crouch End.—45, Glasbury-rd., 41 yrs. g.r. 8l. 10s. 7, yr. 45l. 125

By H. DONALDSON & SONS.  
Holloway.—43 and 45, Cornwall-rd., 41 yrs. g.r. 8l. 10s. 7, yr. 45l. 125  
Uxbridge, Middlesex.—Beckett-rd., 41 yrs. g.r. 11s. 1, yr. 45l. 125  
reversion in 74 yrs. 41 yrs. g.r. 14s. 1, yr. 45l. 125  
Surrey.—Portsmouth-rd., 41 yrs. g.r. 14s. 1, yr. 45l. 125

November 15.—By PERCY H. CLARKE.  
Walthamstow.—41, Coppenhall-st., 41 yrs. g.r. 6l. 1, yr. 31l. 4s. 110  
By H. DONALDSON & SONS.  
Stoke Newington.—11, Spencer-rd., 41 yrs. g.r. 8l. 10s. 7, yr. 45l. 125



By HAROLD GRIFFIN.	
Bathurst—75, Myrtle-rd., u.t. 84 yrs., g.r. 71.7s.	£370
By WM. GROOM & BOYD.	
Wendell—83, Seaford-rd., u.t. 53 yrs., g.r. 100f., improving to 150f. p.	3,500
By HOLCOMBE, BETTS, & WEBB.	
Leameth—44, Waterloo-rd., u.t. 17½ yrs., g.r.	450
6th Kensington—17, Pelham-pl., u.t. 13 yrs., g.r. 5½, y.r. 75f.	400
By SAMUEL, REX, & CO.	
Chiswick Town—High-st., f.g. rents 36f., reversion in 18½ yrs.	4,000
By A. W. TAYLOR & CO.	
Windsor—West Hill, a freehold site, area 5,598 ft.	1,110
West Hill, a freehold corner plot 7½ yrs.	300
By BARNHILL, TAYSON, & CO. with MATTHEWS, MATTHEWS, & Co. (at Winchester House).	
Winchester, Kent—20 to 40 (even), New-rd. (100), area 2,800 sq. ft.	1,800
20 New-rd. (unimproved shop), f. p.	550
New-rd., f.g. 40f., reversion in 5½ yrs.	1,075
New-rd., "Duke of York" b.h. f., rental 45f.	2,350
One-rd., f.g. 7f., reversion in 7½ yrs.	1,800
One-rd., f.g. 30f., reversion in 7½ yrs.	1,800
New-rd., f.g. 12f. 18s., reversion in 12½ yrs.	3,400
11½ New-rd. (6), area 7,984 ft., g.r. 123f.	2,125
Damage-rd., f.g. rents 41f. 7s., reversion in 13½ to 24½ yrs.	3,010
Damage-rd., f.g. 9f., reversion in 13½ yrs.	580
May-rd., f.g. rents 27f. 18s., reversion in 18½ to 24½ yrs.	1,500
Damage-rd., f.g. rents 28f. 15s., reversion in 14½ to 24½ yrs.	1,930
Damage-rd., f.g. rents 76f. 12s., reversion in 21 and 23½ yrs.	3,600
May-rd., f.g. rents 90f. 6s., reversion in 19½ to 44½ yrs.	4,540
May-rd., "Percy Arms" p.h., f.g. 16f. 6s., reversion in 26½ yrs.	1,000
May-rd., f.g. 26f. 6s., reversion in 10 to 26½ yrs.	1,475
Compland-rd., f.g. 20f., reversion in 27½ yrs.	670
Leam-rd., f.g. rents 80f. 18s., reversion in 28½ to 29½ yrs.	2,340
Edmond-rd., f.g. rents 63f. 6s., reversion in 20½ to 35½ yrs.	2,640
Edmond-rd., f.g. 29f. 6s., reversion in 19½ to 29½ yrs.	1,800
Compland-rd., f.g. rents 68f. 4s., reversion in 19½ to 27½ yrs.	3,140
Bathurst-rd., f.g. rents 30f. 6s., reversion in 15 to 18½ yrs.	2,005
May-rd., f.g. rents 29f. 16s., reversion in 18½ to 21½ yrs.	1,770
May-rd., f.g. rents 113f. 17s., reversion in 19½ to 41½ yrs.	4,830
Viage-rd., "Bramblebury Arms" b.h., f.g. 1f., rental 60f., reversion in 15½ yrs.	1,500
Viage-rd., f.g. rents 46f. 16s., reversion in 24½ to 29½ yrs.	1,870
Viage-rd., f.g. 25f. 16s., reversion in 20½ to 27½ yrs.	1,050
Viage-rd., f.g. rents 46f. 6s. 3d., reversion in 20½ to 48 yrs.	1,680
Leam-rd., f.g. rents 34f. 7s., reversion in 21 to 27½ yrs.	1,360
St. Margaret-rd., f.g. rents 38f., reversion in 6½ yrs.	1,310
Damage-rd., f.g. rents 95f. 12s. 8d., reversion in 17 to 23½ yrs.	4,380
Finchdale-rd., f.g. 110f., reversion in 51 yrs.	500
reversion in 55 yrs.	500
By P. WORTNER SMITH (at Mitcham).	
Worcester-rd., f.g. rents 46f., "Cott Cottage" and plot of land, f.g. 20f.	350
November 16—By BELLAMY & CO.	
North—34, Lion-st., f.g. 23f. 3s.	200
By J. G. DEAR & CO.	
Edmond—50, Fernland-rd., u.t. 59½ yrs., g.r. 7½, w.r. 138f.	250
By HIGGINS & SON.	
John's Wood—14, Blenheim-ter., u.t. 38 yrs., g.r. 12f. 12s., y.r. 60f.	320
By GEO. JOSLIN.	
Wentworth Park—19, Waltham-rd., u.t. 57 yrs., g.r. 10f., e.r. 50f.	565
21, Barnsley-rd., u.t. 57 yrs., g.r. 8f., y.r. 53f.	500
25, Southam-st., u.t. 60 yrs., g.r. 7f. 10s., y.r. 67f. 12s.	305
By C. C. & T. MOORE.	
Forest Gate—112, Clarendon-rd., u.t. 83 yrs., g.r. 6f., y.r. 84f.	365
By SIMMONS & SONS.	
Hawley Wick—Wick-rd., The "White Lion" p.h., etc., f.g. 110f., reversion in 51 yrs.	2,420
Forest Hill—No. 45, u.t. 60 yrs., g.r. 7f. 10s., y.r. 44f.	425
Forest Hill—No. 45, u.t. 60 yrs., g.r. 7f. 10s., y.r. 44f.	425
Forest Hill—No. 45, u.t. 60 yrs., g.r. 7f. 10s., y.r. 44f.	425
Forest Hill—No. 45, u.t. 60 yrs., g.r. 7f. 10s., y.r. 44f.	425

By ROOTES & WINTLE (at Ross).	
Ruardean, Glos.—Knights Hill Farm House and 7 a. 3 c. 1 p. l.	£385
By J. B. ELLIS & SON.	
Barnsley—88 and 90, Richmond-rd. (4), area nearly 4,500 ft., f.g. 42f.	810
By GILBERT & HOW.	
Finney Park—321, Green-lanes, u.t. 51 yrs., g.r. 12f. 15s., y.r. 12f.	750
Dalston—16 and 17, Land-rd., u.t. 17 yrs., g.r. 12f., y.r. 52f.	855
Holloway—25, Williamson-st., u.t. 40 yrs., g.r. 8f., w.r. 41f. 12s.	200
25 and 27, Rupert-rd., u.t. 60 yrs., g.r. 10f., w.r. 88f. 8s.	600
Dalston—11 and 13, Shrubland-gr., u.t. 12½ yrs., g.r. 10f., y.r. 58f.	225
54, Malvern-rd., u.t. 40½ yrs., g.r. 6f. 6s., y.r. 38f.	345
Contractions used in these lists.—F.g. for freehold ground-rent; L.g. for leasehold ground-rent; L.g. for improved ground-rent; r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; g.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; l. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; area for acre; eq. for square; eq. for garden; yd. for yard; g. for gas; p. for paving; b.h. for barhouse; p.h. for public-house; o. for office; s. for shops; c. for court.	
MEETINGS.	
SATURDAY, NOVEMBER 25.	
Royal Sanitary Institute.—A provincial sectional meeting in the Council Chamber, Town Hall, Hastings. A discussion will be opened on "Water Filtration—The Health Aspect," by Mr. A. Scarth Wilson, D.P.H., M.O.H., "Pressure Filters," by Mr. Philip H. Palmer, M.Inst.C.E.; and "The Chemical Aspect," by Mr. F. P. Cheshire, B.Sc., F.I.C.	
MONDAY, NOVEMBER 27.	
London Institution.—Sir Charles Eliot, K.C.M.G., on "The Upper Nile," illustrated. 6 p.m.	
Society of Arts (Lecture Series).—Dr. J. A. Fleming, F.R.S., on "The Measurement of High Frequency Currents and Electric Waves," 11 p.m.	
Surveyors' Institution.—Discussion on Paper by Mr. J. D. Wallis, entitled "The Licensing Act, 1904: with Special Reference to the Questions of Compensation and Monopoly Value," 8 p.m.	
TUESDAY, NOVEMBER 28.	
Institution of Civil Engineers.—Further discussion on Mr. J. A. Sauer's Paper on "Waterways in Great Britain," 8 p.m.	
WEDNESDAY, NOVEMBER 29.	
Edinburgh Architectural Association (Associates' Meeting).— Mr. T. Hadden on "Wrought-Iron Work"—a practical demonstration. 8 p.m.	
Society of Arts.—Sir W. H. Preece, K.C.B., on "The British Association in South Africa," 8 p.m.	
FRIDAY, DECEMBER 1.	
Architectural Association.—Mr. B. F. Reynolds on "Turkish Architecture," illustrated with lantern views. 7.30 p.m.	
Institution of Civil Engineers (Students' Meeting).—Mr. W. L. Jenkins on "An Installation for the Bacterial Treatment of Sewage at North," 8 p.m.	
TERMS OF SUBSCRIPTION.	
"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum (26 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.	
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PRICES CURRENT OF MATERIALS.	
* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.	
BRICKS, &c.	
Hard Stocks.....	£ s. d.
Rough Stocks and	7 0 1000 alongside, in river.
Grizzles.....	1 4 0 " " "
Paving Stocks.....	2 0 0 " " "
Shippers.....	2 0 0 " " "
Flettons.....	1 5 6 " at railway depôt.
Red Wire Cuts.....	1 11 0 " " "
Best Farnham Red.....	3 12 0 " " "
Best Red Pressed.....	" " " " "
Ruabon Facing.....	5 0 0 " " "
Best Blue Pressed.....	4 1 0 " " "
Saffordbury.....	4 6 6 " " "
Do. Bulhouse.....	" " " " "
Best Stourbridge.....	3 15 6 " " "
Fire Bricks.....	" " " " "
GLAZED BRICKS.....	" " " " "
Best White and	" " " " "
Ivory Glazed.....	" " " " "
Firebricks.....	12 0 0 " " "
Headers.....	11 0 0 " " "
Quoins, Bullnose,	" " " " "
and Flats.....	46 0 0 " " "
Double Stretchers.....	16 0 0 " " "
Double Headers.....	" " " " "
One Side and two	" " " " "
Ends.....	19 0 0 " " "
Two Sides and one	" " " " "
End.....	30 0 0 " " "
Spalls, Cham-	" " " " "
ferred, Squints.....	20 0 0 " " "
Best Dipped Salt	" " " " "
Glazed Stretchers	" " " " "
and Headers.....	12 0 0 " " "

BRICKS, &c. (continued).	
GLAZED BRICKS—Continued.	
Quoins, Bullnose, & s. d.	
and Flats.....	14 0 0 per 1000 at railway depôt.
Double Stretchers.....	15 0 0 " " "
Double Headers.....	14 0 0 " " "
One Side and two	" " " " "
Ends.....	15 0 0 " " "
Two Sides and one	" " " " "
End.....	15 0 0 " " "
Spalls, Cham-	" " " " "
ferred, Squints.....	14 0 0 " " "
Second Quality	" " " " "
White and	" " " " "
Dipped Salt	" " " " "
Glazed.....	2 0 0 " less than best.
Thames and Pit Sand.....	6 9 per yard, delivered.
Thames Ballast.....	5 3 " " "
Best Portland Cement.....	25 0 per ton, " "
Best Ground Blue Lias Lime.....	19 0 " " "
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.	
Grey Stone Lime.....	11s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. depôt.	
STONE.	
BATH STONE—delivered on road wag- s. d.	
gons, Paddington Depôt.....	1 6½ per ft. cube.
D. do. delivered on road waggon,	" " " " "
Nine Elms Depôt.....	1 8½ " " "
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road	" " " " "
waggon, Paddington Depôt, Nine	2 1 " " "
Elms Depôt, or Fimble Wharf.....	" " " " "
White Basebed, delivered on road	" " " " "
waggon, Paddington Depôt, Nine	2 2½ " " "
Elms Depôt, or Fimble Wharf.....	" " " " "
ANCASTER in blocks.....	1 10 per ft. cube, delivered, rly. depôt.
Beer.....	1 6 " " "
Greenhill.....	1 10 " " "
Darley Dale in blocks.....	2 4 " " "
Red Corshill.....	2 2 " " "
Cloaburn Red Freestone.....	2 0 " " "
Red Mansfield.....	2 4 " " "
YORK STONE—Bolin Head Quality.	
Scrapped random blocks.....	3 10 " " "
6 in. sawn two sides land-	" " " " "
ings to sizes (under	2 3 per ft. super, " "
40 ft. super).....	" " " " "
6 in. rubbed two sides	" " " " "
ditto, ditto.....	2 6 " " "
3 in. sawn two sides slabs	" " " " "
(random sizes).....	0 11½ " " "
2 in. to 2½ in. sawn one	" " " " "
side slabs (random	" " " " "
sizes).....	0 7½ " " "
13 in. to 2 in. ditto, 0 6	" " " " "
HARD YORK—	
Scrapped random blocks.....	3 0 per ft. cube, " "
6 in. sawn two sides land-	" " " " "
ings to sizes (under	2 8 per ft. super, " "
40 ft. super).....	" " " " "
6 in. rubbed two sides	" " " " "
ditto.....	3 0 " " "
3 in. sawn two sides slabs	" " " " "
(random sizes).....	1 2 " " "
2 in. self-faced random	" " " " "
flags.....	0 5 " " "
Hoplon Wool (Hard Bed) in blocks 2 0 per ft. cube, deliv.	
ry. depôt.	" " " " "
" " " " " 6 in. sawn both	" " " " "
sides landings 2 7 per ft. super, deliv.	" " " " "
ry. depôt.	" " " " "
" " " " " 3 in. sawn both	" " " " "
sides random	" " " " "
slabs.....	1 0 " " "
" " " " " 2 in. do. 0 8½	" " " " "
SLATES.	
In. In. s. d.	
20x10 best blue Bangor.....	13 2 6 per 1000 of 1200 at r. d.
20x12.....	13 17 6 " " "
20x10 first quality.....	13 0 0 " " "
20x12.....	13 15 0 " " "
16x8.....	7 5 0 " " "
20x10 best blue Port-	" " " " "
madoc.....	12 12 6 " " "
20x10 best Dureks un-	6 12 6 " " "
fading green.....	15 17 6 " " "
20x12.....	15 7 6 " " "
18x10.....	13 5 0 " " "
16x8.....	10 5 0 " " "
20x10 permanent green.....	11 12 6 " " "
18x10.....	9 12 6 " " "
16x8.....	6 12 6 " " "
TILES.	
Best plain red roofing tiles.....	48 0 per 1000 at rly. depôt.
Hip and Valley tiles.....	3 7 per doz. " "
Best Broseley tiles.....	50 0 per 1000 " "
Do. Ornamental tiles.....	32 6 " " "
Hip and Valley tiles.....	4 0 per doz. " "
Best Ruabon red, brown, or	" " " " "
brindled do. (Edwards).....	57 6 per 1000 " "
Do. Ornamental do.....	60 0 " " "
Hip tiles.....	4 0 per doz. " "
Valley tiles.....	3 0 " " "
Best Red or Hotbed Stafford	" " " " "
shiro do. (Penkes).....	51 9 per 1000 " "
Do. Ornamental do.....	54 6 " " "
Hip tiles.....	4 1 per doz. " "
Valley tiles.....	3 8 " " "
Best "Rosemary" brand	" " " " "
plain tiles.....	48 0 per 1000 " "
Best Ornamental tiles.....	50 0 " " "
Hip tiles.....	4 0 per doz. " "
Valley tiles.....	3 8 " " "
Best "Hartshill" brand	" " " " "
plain tiles, sand-faced.....	50 0 per 1000 " "
Do. pressed.....	47 6 " " "
Do. Ornamental do.....	50 0 " " "
Hip tiles.....	4 1 per doz. " "
Valley tiles.....	" " " " "
PRICES CURRENT.—Continued on page 574.	



## CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
*MAK-UP MUSCATEL-PI. AND COPELAND-AV...	Borough of Cambervell	Borough Engineer, Town Hall, Peckham, S.E.	Nov. 28
Metals	Southern Maharashtra Railway Co.	E. Z. Thornton, Sec., 46, Queen Anne's-gate, London, S.W.	Nov. 29
Street-making	Gateshead Corporation	N. P. Pattinson, Borough Engineer, Town Hall, Gateshead	Nov. 29
Piping, Wrought Iron	East India Railway Co.	C. W. Young, Sec., Nicholas-lane, London, E.C.	Nov. 29
Belted (Leather), Hides, etc.	do.	do.	do.
Boilers, Two Lancashire, at Public Baths	Burton-on-Trent Corporation	G. T. Lynam, Borough Engineer, Town Hall, Burton	do.
Drainage Works, Winton	Bournemouth Corporation	F. W. Lacey, Boro' Eng'r., & Sur., Municipal Office, Bournemouth	do.
Church Mission, Dulham Bridge, N.B.	Salford Corporation	Mr. Campbell, Royal Bank, Grantown-on-Spy, N.I.	do.
Wiring of Higher-Grade School for Girls, Victoria-st.	Plymouth Corporation	Boro' Elec. Engineer, Electricity Works, Frederick-st., Plymouth	Nov. 29
Police and Fire Station at Princes Road, Plymouth	Cadbury Bros., Ltd.	Cadbury Bros., Bourneville, Birmingham	do.
Engineering Stores	Great Western Colliery Co., Ltd.	J. V. Wardle, Borough Surveyor, Court House, London, Staffs.	do.
Concrete and Granite Set Paving, Anchor-road	Edinburgh Corporation	R. Morham, Public Works Office, City-chambers, Edinburgh	do.
Sewer (700 yds. in length)	Barnstable R.D.C.	A. Thorne, The Square, Barnstable	do.
House, Manager's, near Mass-y-coed, Pontypridd	Midland Railway Co.	Engineer's Office, Derby Station	do.
Sewer (700 yds. in length)	Hull Corporation	A. B. White, City Engineer, Town Hall, Hull	Dec. 1
Stores	Bradford Corporation	Tramway Offices, 15, Bridge-street, Bradford	do.
Stores	North-Eastern Railway Co.	E. H. Clark, Stores, Gateshead	Dec. 2
Telegraph Stores	do.	H. Ellison, Telegraph Superintendent, York	do.
Clock, etc., Kay's, Clayton W. W., Huddersfield	West Riding Education Committee	J. Vickers-Edwards, County Architect, County Hall, Wakefield	do.
Pipes (720 yds. 12-in. & 2,000 yds. of 9-in. & 4-in. socket)	Herts and Essex Waterworks Co.	T. & C. Hawley, Engineer, 30, St. George-st., Westminster, S.W.	do.
Hydrant Mains Extension, etc., Workhouse, Southampton	South Stoneham Guardians	Mitchell, Son, & Gutteridge, Surveyors, 9, Portland-st., Southampton	do.
School Classroom, Farningley, Doncaster	Perth Town Council	T. H. Wilde, Surveyor, Willesborough, Kent	do.
Reservoir, Covered Service, at Thorpe	The Managers	Rev. Dr. Lewis, Farningley Rectory, Doncaster	do.
Roadworks, Bushwood-road, Forest-road, & Maze-road	Rothwell U.D.C.	W. E. Richardson, Rothwell, near Leeds	Dec. 4
Causewaying Mill-street and Kinross-street, Perth	Richmond (Survey) Town Council	J. P. Brierley, Borough Surveyor, Town Hall, Richmond, Surrey	do.
Painting, etc., Town Clerk's Office, Fisher-street	Perth Town Council	B. M. Killip, Burgh Surveyor, Tay-street, Perth	do.
School (Infants') Depart., Hanson Sch., Barkerend-rd.	Carlisle Corporation	H. C. Marks, City Engineer, 36, Fish-street, Carlisle	do.
Road Materials, etc.	Bradford Education Committee	Architect's Department, Education Offices, Manor-row, Bradford	do.
School Repairs and Asphalt Paving, Marley-hill	Norwich Corporation	A. E. Collins, City Engineer, Guildhall, Norwich	do.
Latrine, Danfield Lea Council School	Durham Education Authority	W. Rushworth, Architect, County Education Office, Durham	Dec. 5
Conversion of Earth Closets into Water Closets	do.	do.	do.
Ventilation of Washington Colliery School	do.	do.	do.
Road Metal	Elgin County Council	A. Hogg, County Road Surveyor, 24, Academy-street, Elgin, N.B.	do.
Sewerage, Heath End-road	Nuneaton & Chivers Cotton U.D.C.	F. C. Cook, Engineer, Council Offices, Nuneaton	do.
Roadworks	Woodford U.D.C.	W. Farrington, Surveyor, Council Offices, Woodford Green	do.
Pipes (470 tons of C.I., 3 to 12 in. in diameter)	Edinburgh and District Water Trust	Superintendent of Works Office, 12, St. Giles-street, Edinburgh	do.
Sewerage Works, Coniston	Ulverston R.D.C.	Engineer, Town Hall, Ulverston	do.
Alterations to Property, South-street, Egrement	Willesdon District Council	J. Cowan, Town Hall, Egrement, Cumberland	do.
*SLUCE GATES (78)	North Dublin Guardians	Council's Engineer, Public Offices, Dyne-road, Kilburn, N.W.	Dec. 6
Fireproof Safe in Clerk's Office	Lytham U.D.C. Gas Committee	J. O'Neill, Clerk, Boardroom, North Brunswick-street, Balle	do.
Railway Coal Wagons	Fulham Borough Council	C. A. Myers, Clerk, Lytham	do.
*MAKING-UP CARRIAGEWAY OF FINLAY-ST.	Mr. J. Mackinder	Borough Surveyor, Town Hall, Fulham, S.W.	do.
Repairs, etc., to Property in the Park, etc., Lincoln	Bristol Docks Committee	Thew, Stephen, & Co., Saltersgate, Lincoln	Dec. 7
Tender Chms. for Lock of R.I. Edw. Dock, Avonmouth	Rhonda U.D.C.	W. J. Jones, Engineer & Surveyor, Public Offices, Pentz, Rhonda	do.
Street Improvement, Dinas	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	Dec. 8
*NEW SORTING OFFICE, PECKHAM	Guy's Hospital	Superintendent, Guy's Hospital, S.E.	do.
*SUPPLIES FOR TWELVE MONTHS	Birkenhead Corporation	Reginald Phillips, Waterworks Engineer, Town Hall, Birkenhead	Dec. 11
Pumping Machinery in Connection with Waterworks	Midsex C.C.	C. Brownridge, Boro' Engineer & Surveyor, Town Hall, Birkenhead	do.
Painting Market Hall	do.	County Architect, Middlesex Guildhall, Westminster, S.W.	do.
*MAGISTRATES' COURTS, ACTON	Kent County Asylum Committee	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	Dec. 12
*ADDITION, ETC., TOWN HALL, BRENTFORD	Newcastle-on-Tyne Corporation	City Engineer's Office, Town Hall, Newcastle-on-Tyne	do.
*CON. DOV. WAX, ETC., AT BARMING HTS. A.S.V.	London C.C.	Council's Chief Engineer, County Hall, Spring-gardens, S.W.	Dec. 13
Culv., Ferro-Con., Ouseburn Val. (Hennibique Patent)	Dublin Port and Docks Board	N. Proud, Sec., Port and Docks Office, Westmoreland-st., Dublin	Dec. 13
*REPAINT. ENG. HSE., CROSSNESS OUTFL. WKS.	South Oxfordshire Water and Gas Co.	F. C. Robus, Secretary, 20, Bucklersbury, London, E.C.	Dec. 13
Stores	London C.C.	Superintendent, Architect's Department, 16, Pall Mall East, S.W.	do.
*PUBLIC CONVENI., BROMLEY RECREA. GRD.	Kewick U.D.C.	D. Balfour & Son, Engln., 9, St. Nicholas-bldg., Newcastle-on-Tyne	Dec. 14
Sewerage Disposal for Kewick	East Suffolk County Education Com.	Colquhoun, Maidstone	do.
Road Materials	Basel Light Railway Co., Ltd.	A. Pells, Architect, Beccles	Jan. 9
Room for Laundry, etc., at Bungay Council School	do.	R. Calthrop, Engineer, 3, Crosby-square, London, E.C.	No date
Coaches, 24 Pilgrim Bogie	Staffs C.C. Education Committee	G. Malm Wilson, Architect and Surveyor, 37, Surrey-st., Sheffield	do.
Coaches, Composite	do.	Graham Balfour, Stafford	do.
Residence, Graham-road, Sheffield	do.	Mines & Sutherland, Ltd., 65, South John-street, Liverpool	do.
*NEW COUNCIL SCHOOL, DARLSTON	do.	E. G. O. Down, Architect and Surveyor, 31, High-street, Cardiff	do.
House, Small Detached, Liverpool	do.	W. H. Treadler, Borough Surveyor, Falmouth	do.
Additions to Premises, Canton, Cardiff	do.	Phillip Stock, Surveyor, 349, Coldharbour-lane, Bristol, S.W.	do.
Drainage, Surface-water, Falmouth	Tottenham Education Committee	G. E. T. Laurence, Architect, 22, Buckingham-street, Adelphi, W.C.	do.
*TWELVE MASONNETTES AT NORWOOD	do.	do.	do.
*SCHOOL AT PARKHURST-ROAD	do.	do.	do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*THIRD ASSISTANT DRAUGHTSMAN	Metropolitan Borough of Stepney	1402, per annum	Nov. 2
*SURVEYOR AND INSPECTOR OF NUISANCES.	Hale U.D.C.	1651.	Dec. 6

Those marked with an asterisk (\*) are advertised in this number.

Competitions, — — — Contracts, Iv. vi. vii. x.

Public Appointments, vii.

## PRICES CURRENT.—Continued from page 573.

WOOD.		At per standard.		1 in. and 1½ in. by 7 in.		0 10 0 more than battens.		White Pine: first yellow deals, 2½ in. by 11 in.	
BUILDING WOOD.				3 in.		1 0 0		3 in. by 11 in.	
Deals: best 3 in. by 11 in. and 4 in.	13 s. d.	13 10 0		13 0 0				2 in. by 9 in.	
by 9 in. and 11 in.	12 s. d.	12 10 0						Battens, 2½ in. and 3 in. by 7 in.	
Deals: best 3 in. by 9 in.	13 0 0	13 0 0						Second yellow deals, 3 in. by 11 in.	
Battens: best 2½ in. by 7 in. and 8 in.	11 0 0	11 0 0						Battens, 2½ in. and 3 in. by 7 in.	
8 in. and 3 in. by 7 in. and 8 in.	11 0 0	11 0 0						Third yellow deals, 3 in. by 11 in.	
Battens: best 2½ by 6 and 3 by 6 in.	0 10 0	0 10 0						and 3 in.	
								Battens, 2½ in. and 3 in. by 7 in.	
Deals: seconds	1 0 0	1 0 0							
Battens: seconds	0 10 0	0 10 0							
2 in. by 4 in. and 2 in. by 6 in.	8 10 0	8 10 0							
2 in. by 4½ in. and 2 in. by 6 in.	9 10 0	9 10 0							

WOOD (continued).

Joists: Woon (continued).	At per standard.	
Timbering: first yellow deals, 8 s. d.	22 10 0	
Do. 3 in. by 11 in.	18 0 0	19 10 0
Do. 3 in. by 9 in.	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	14 0 0
Do. 3 in. by 9 in.	10 0 0	11 0 0
Do. 3 in. by 7 in.	10 0 0	11 0 0

White Oak and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
Do. 3 in. by 9 in.	12 10 0	13 10 0
Do. 3 in. by 7 in.	10 0 0	11 0 0
Yellow Pine—deals, 3 in. by 11 in.	10 0 0	11 0 0
Do. 3 in. by 9 in.	10 0 0	11 0 0
Do. 3 in. by 7 in.	10 0 0	11 0 0
Yellow Pine—planks, per ft. cube.	0 3 6	0 5 0
Do. 3 in. by 7 in.	0 3 0	0 3 6
Do. 3 in. by 5 in.	0 2 0	0 2 8
Do. 3 in. by 4 in.	0 1 0	0 1 6
Do. 3 in. by 3 in.	0 0 8	0 0 9
Do. 3 in. by 2 in.	0 0 7	0 0 8
Do. 3 in. by 1 in.	0 0 6	0 0 7
Do. 3 in. by 1/2 in.	0 0 5	0 0 6
Do. 3 in. by 1/4 in.	0 0 4	0 0 5
Do. 3 in. by 1/8 in.	0 0 3	0 0 4
Do. 3 in. by 1/16 in.	0 0 2	0 0 3
Do. 3 in. by 1/32 in.	0 0 1	0 0 2
Do. 3 in. by 1/64 in.	0 0 0	0 0 1
Do. 3 in. by 1/128 in.	0 0 0	0 0 0
Do. 3 in. by 1/256 in.	0 0 0	0 0 0
Do. 3 in. by 1/512 in.	0 0 0	0 0 0
Do. 3 in. by 1/1024 in.	0 0 0	0 0 0
Do. 3 in. by 1/2048 in.	0 0 0	0 0 0
Do. 3 in. by 1/4096 in.	0 0 0	0 0 0
Do. 3 in. by 1/8192 in.	0 0 0	0 0 0
Do. 3 in. by 1/16384 in.	0 0 0	0 0 0
Do. 3 in. by 1/32768 in.	0 0 0	0 0 0
Do. 3 in. by 1/65536 in.	0 0 0	0 0 0
Do. 3 in. by 1/131072 in.	0 0 0	0 0 0
Do. 3 in. by 1/262144 in.	0 0 0	0 0 0
Do. 3 in. by 1/524288 in.	0 0 0	0 0 0
Do. 3 in. by 1/1048576 in.	0 0 0	0 0 0
Do. 3 in. by 1/2097152 in.	0 0 0	0 0 0
Do. 3 in. by 1/4194304 in.	0 0 0	0 0 0
Do. 3 in. by 1/8388608 in.	0 0 0	0 0 0
Do. 3 in. by 1/16777216 in.	0 0 0	0 0 0
Do. 3 in. by 1/33554432 in.	0 0 0	0 0 0
Do. 3 in. by 1/67108864 in.	0 0 0	0 0 0
Do. 3 in. by 1/134217728 in.	0 0 0	0 0 0
Do. 3 in. by 1/268435456 in.	0 0 0	0 0 0
Do. 3 in. by 1/536870912 in.	0 0 0	0 0 0
Do. 3 in. by 1/1073741824 in.	0 0 0	0 0 0
Do. 3 in. by 1/2147483648 in.	0 0 0	0 0 0
Do. 3 in. by 1/4294967296 in.	0 0 0	0 0 0
Do. 3 in. by 1/8589934592 in.	0 0 0	0 0 0
Do. 3 in. by 1/17179869184 in.	0 0 0	0 0 0
Do. 3 in. by 1/34359738368 in.	0 0 0	0 0 0
Do. 3 in. by 1/68719476736 in.	0 0 0	0 0 0
Do. 3 in. by 1/137438953472 in.	0 0 0	0 0 0
Do. 3 in. by 1/274877906944 in.	0 0 0	0 0 0
Do. 3 in. by 1/549755813888 in.	0 0 0	0 0 0
Do. 3 in. by 1/1099511627776 in.	0 0 0	0 0 0
Do. 3 in. by 1/2199023255552 in.	0 0 0	0 0 0
Do. 3 in. by 1/4398046511104 in.	0 0 0	0 0 0
Do. 3 in. by 1/8796093022208 in.	0 0 0	0 0 0
Do. 3 in. by 1/17592186044416 in.	0 0 0	0 0 0
Do. 3 in. by 1/35184372088832 in.	0 0 0	0 0 0
Do. 3 in. by 1/70368744177664 in.	0 0 0	0 0 0
Do. 3 in. by 1/140737488355328 in.	0 0 0	0 0 0
Do. 3 in. by 1/281474976710656 in.	0 0 0	0 0 0
Do. 3 in. by 1/562949953421312 in.	0 0 0	0 0 0
Do. 3 in. by 1/1125899906842624 in.	0 0 0	0 0 0
Do. 3 in. by 1/2251799813685248 in.	0 0 0	0 0 0
Do. 3 in. by 1/4503599627370496 in.	0 0 0	0 0 0
Do. 3 in. by 1/9007199254740992 in.	0 0 0	0 0 0
Do. 3 in. by 1/18014398509481984 in.	0 0 0	0 0 0
Do. 3 in. by 1/36028797018963968 in.	0 0 0	0 0 0
Do. 3 in. by 1/72057594037927936 in.	0 0 0	0 0 0
Do. 3 in. by 1/144115188075855872 in.	0 0 0	0 0 0
Do. 3 in. by 1/288230376151711744 in.	0 0 0	0 0 0
Do. 3 in. by 1/576460752303423488 in.	0 0 0	0 0 0
Do. 3 in. by 1/1152921504606847968 in.	0 0 0	0 0 0
Do. 3 in. by 1/2305843009213695936 in.	0 0 0	0 0 0
Do. 3 in. by 1/4611686018427391872 in.	0 0 0	0 0 0
Do. 3 in. by 1/9223372036854783744 in.	0 0 0	0 0 0
Do. 3 in. by 1/18446744073709567488 in.	0 0 0	0 0 0
Do. 3 in. by 1/36893488147419134976 in.	0 0 0	0 0 0
Do. 3 in. by 1/73786976294838269952 in.	0 0 0	0 0 0
Do. 3 in. by 1/147573952589676539904 in.	0 0 0	0 0 0
Do. 3 in. by 1/295147905179353079808 in.	0 0 0	0 0 0
Do. 3 in. by 1/590295810358706159616 in.	0 0 0	0 0 0
Do. 3 in. by 1/1180591620717412319232 in.	0 0 0	0 0 0
Do. 3 in. by 1/2361183241434824638464 in.	0 0 0	0 0 0
Do. 3 in. by 1/4722366482869649276928 in.	0 0 0	0 0 0
Do. 3 in. by 1/9444732965739298553856 in.	0 0 0	0 0 0
Do. 3 in. by 1/18889465931478597107712 in.	0 0 0	0 0 0
Do. 3 in. by 1/37778931862957194215424 in.	0 0 0	0 0 0
Do. 3 in. by 1/75557863725914388430848 in.	0 0 0	0 0 0
Do. 3 in. by 1/151115727451828776861696 in.	0 0 0	0 0 0
Do. 3 in. by 1/302231454903657553723392 in.	0 0 0	0 0 0
Do. 3 in. by 1/6044629098073151074466784 in.	0 0 0	0 0 0
Do. 3 in. by 1/1208925819614630214933376 in.	0 0 0	0 0 0
Do. 3 in. by 1/2417851639229260429866752 in.	0 0 0	0 0 0
Do. 3 in. by 1/4835703278458520859733504 in.	0 0 0	0 0 0
Do. 3 in. by 1/9671406556917041719467008 in.	0 0 0	0 0 0
Do. 3 in. by 1/19342813113834083438934016 in.	0 0 0	0 0 0
Do. 3 in. by 1/38685626227668166877868032 in.	0 0 0	0 0 0
Do. 3 in. by 1/77371252455336333755736064 in.	0 0 0	0 0 0
Do. 3 in. by 1/154742504910672667115472128 in.	0 0 0	0 0 0
Do. 3 in. by 1/309485009821345334230944256 in.	0 0 0	0 0 0
Do. 3 in. by 1/618970019642690668461888512 in.	0 0 0	0 0 0
Do. 3 in. by 1/1237940039285381336923770024 in.	0 0 0	0 0 0
Do. 3 in. by 1/2475880078570762673847540048 in.	0 0 0	0 0 0
Do. 3 in. by 1/4951760157141525347695080096 in.	0 0 0	0 0 0
Do. 3 in. by 1/9903520314283050695390160192 in.	0 0 0	0 0 0
Do. 3 in. by 1/19807040628566101390780320384 in.	0 0 0	0 0 0
Do. 3 in. by 1/39614081257132202781560640768 in.	0 0 0	0 0 0
Do. 3 in. by 1/79228162514264405563121281536 in.	0 0 0	0 0 0
Do. 3 in. by 1/15845632502852881112624256272 in.	0 0 0	0 0 0
Do. 3 in. by 1/31691265005705762225248512544 in.	0 0 0	0 0 0
Do. 3 in. by 1/6338253001141152445049625088 in.	0 0 0	0 0 0
Do. 3 in. by 1/12676506002282304890099251176 in.	0 0 0	0 0 0
Do. 3 in. by 1/25353012004564609780198452352 in.	0 0 0	0 0 0
Do. 3 in. by 1/50706024009129219560396904704 in.	0 0 0	0 0 0
Do. 3 in. by 1/101412048018258439120793809408 in.	0 0 0	0 0 0
Do. 3 in. by 1/202824096036516878241587618816 in.	0 0 0	0 0 0
Do. 3 in. by 1/405648192073033756483175237632 in.	0 0 0	0 0 0
Do. 3 in. by 1/811296384146067512966350475264 in.	0 0 0	0 0 0
Do. 3 in. by 1/162259276292135025193260950528 in.	0 0 0	0 0 0
Do. 3 in. by 1/324518552584270050386521901056 in.	0 0 0	0 0 0
Do. 3 in. by 1/649037105168540100773043802112 in.	0 0 0	0 0 0
Do. 3 in. by 1/1298074210337082015466087760424 in.	0 0 0	0 0 0
Do. 3 in. by 1/2596148420674164030932175520848 in.	0 0 0	0 0 0
Do. 3 in. by 1/5192296841348328061864351041696 in.	0 0 0	0 0 0
Do. 3 in. by 1/10384593682776656137288702083392 in.	0 0 0	0 0 0
Do. 3 in. by 1/20769187365553312274577404166784 in.	0 0 0	0 0 0
Do. 3 in. by 1/41538374731106624549154808333568 in.	0 0 0	0 0 0
Do. 3 in. by 1/83076749462213249098309616667136 in.	0 0 0	0 0 0
Do. 3 in. by 1/166153498924426498196619233334272 in.	0 0 0	0 0 0
Do. 3 in. by 1/332306997848852996393238466668544 in.	0 0 0	0 0 0
Do. 3 in. by 1/664613995697705992786476933337088 in.	0 0 0	0 0 0
Do. 3 in. by 1/1329227991395411985772953866674176 in.	0 0 0	0 0 0
Do. 3 in. by 1/265845598279082397154590773334832 in.	0 0 0	0 0 0
Do. 3 in. by 1/531691196558164794309181546669664 in.	0 0 0	0 0 0
Do. 3 in. by 1/106338239311632958861836309339328 in.	0 0 0	0 0 0
Do. 3 in. by 1/212676478623265917723772618678656 in.	0 0 0	0 0 0
Do. 3 in. by 1/425352957246531835447545237357312 in.	0 0 0	0 0 0
Do. 3 in. by 1/850705914493063670895090474714624 in.	0 0 0	0 0 0
Do. 3 in. by 1/1701411828986127341790180949429248 in.	0 0 0	0 0 0
Do. 3 in. by 1/3402823657972254683580361898858496 in.	0 0 0	0 0 0
Do. 3 in. by 1/6805647315944509367160723797716992 in.	0 0 0	0 0 0
Do. 3 in. by 1/13611294631889018734321447595433984 in.	0 0 0	0 0 0
Do. 3 in. by 1/27222589263778037468642895190667968 in.	0 0 0	0 0 0
Do. 3 in. by 1/54445178527556074937285790381335936 in.	0 0 0	0 0 0
Do. 3 in. by 1/10889035705511214987457158076267872 in.	0 0 0	0 0 0
Do. 3 in. by 1/21778071411022429974914316152535744 in.	0 0 0	0 0 0
Do. 3 in. by 1/43556142822044859949828632305071488 in.	0 0 0	0 0 0
Do. 3 in. by 1/87112285644089719899657264610142976 in.	0 0 0	0 0 0
Do. 3 in. by 1/17422457128817943979931452922028592 in.	0 0 0	0 0 0
Do. 3 in. by 1/34844914257635887959862905844057184 in.	0 0 0	0 0 0
Do. 3 in. by 1/6968982851527177591972581168811436672 in.	0 0 0	0 0 0
Do. 3 in. by 1/139379657030543551839451633762287344 in.	0 0 0	0 0 0
Do. 3 in. by 1/27875931406108710367890326752457488 in.	0 0 0	0 0 0
Do. 3 in. by 1/55751862812217420735780653504914976 in.	0 0 0	0 0 0
Do. 3 in. by 1/11150372562443484147156130999829952 in.	0 0 0	0 0 0
Do. 3 in. by 1/22300745124886968294312261999759904 in.	0 0 0	0 0 0
Do. 3 in. by 1/44601490249773936588624523999519808 in.	0 0 0	0 0 0
Do. 3 in. by 1/89202980499547873177249047999039616 in.	0 0 0	0 0 0
Do. 3 in. by 1/178405960999095746354498095980679232 in.	0 0 0	0 0 0
Do. 3 in. by 1/356811921998191492708996191961358464 in.	0 0 0	0 0 0
Do. 3 in. by 1/713623843996382985417992383922716928 in.	0 0 0	0 0 0
Do. 3 in. by 1/142724768799276597083598476784543856 in.	0 0 0	0 0 0
Do. 3 in. by 1/285449537598553194167196953569087712 in.	0 0 0	0 0 0
Do. 3 in. by 1/570899075197106388334393907138175424 in.	0 0 0	0 0 0
Do. 3 in. by 1/114179815039421277666878781427350848 in.	0 0 0	0 0 0
Do. 3 in. by 1/228359630078842555333757562854701696 in.	0 0 0	0 0 0
Do. 3 in. by 1/456719260157685110667515125709403392 in.	0 0 0	0 0 0
Do. 3 in. by 1/913438520315370221335030251418806784 in.	0 0 0	0 0 0
Do. 3 in. by 1/1826877040630740442670060502837613696 in.	0 0 0	0 0 0
Do. 3 in. by 1/36537540812614808853401210056752273392 in.	0 0 0	0 0 0
Do. 3 in. by 1/73075081625229617706802420113504546784 in.	0 0 0	0 0 0
Do. 3 in. by 1/146150163250459235413604840227009088 in.	0 0 0	0 0 0
Do. 3 in. by 1/292300326500918470827209680454018176 in.	0 0 0	0 0 0
Do. 3 in. by 1/584600653001836941654419360908036352 in.	0 0 0	0 0 0
Do. 3 in. by 1/116920130600367388330883872181672704 in.	0 0 0	0 0 0
Do. 3 in. by 1/233840261200734776661777644363345408 in.	0 0 0	0 0 0
Do. 3 in. by 1/467680522401469553323555288726680816 in.	0 0 0	0 0 0
Do. 3 in. by 1/935361044802939106646710577453361632 in.	0 0 0	0 0 0
Do. 3 in. by 1/1870722089605878213293422154906723264 in.	0 0 0	0 0 0
Do. 3 in. by 1/3741444179211756426586844309813446528 in.	0 0 0	0 0 0
Do. 3 in. by 1/7482888358423512853173688619626893056 in.	0 0 0	0 0 0
Do. 3 in. by 1/14965776716847025706347377239253780112 in.	0 0 0	0 0 0



**HANDSWORTH.**—For the erection of stables, cart sheds, etc., at Perry Barr, for the Urban District Council. Mr. H. Richardson, Surveyor, Council House, Handsworth.

J. A. Turton .....	£863	Gowing & Ingram .....	£791
Whitehouse & Sons .....	849	Hulbert & Ladbury .....	787
W. H. Gibbs .....	835	D. Roberts .....	757
J. E. Harper .....	815	W. Jackson .....	750
E. Garfield .....	813	H. J. Pitta .....	733
G. Webb .....	805	G. E. Jackson .....	707
J. Webb .....	785	Oldbury .....	707

**HASTINGS.**—For 800 yds. of cast-iron socket pipes, for the Corporation. Mr. P. H. Palmer, Borough Engineer, Town Hall, Hastings.

The Clay Cross Co., Clay Cross Iron Works, near Chesterfield—

9-in. Pipes at £4 19 2 per ton.  
Irregulars at 9 15 0 per ton.

**LINCOLN.**—For cast-iron pipes and special castings, for the Waterworks Committee. Mr. Neil McK. Barron, C.E., Corporation Offices, Lincoln.

Sheepbridge & Co. & L. Clay Cross Co. ....	£1,385
Co. ....	1,658
D. V. Stewart & Co. ....	1,569
Holwell Iron Co. ....	1,535
Cochrane & Co. ....	1,450
J. Oakes & Co. ....	1,409

**LINCOLN.**—For the construction of raw-water tank and clear-water tank, alterations to filter beds, etc. (Contract No. 2), for the Waterworks Committee. Mr. Neil McK. Barron, C.E., Corporation Offices, Lincoln.

W. Underwood & Co. A. & G. Harris .....	£5,447
Bro. ....	5,178
Hibbs & Copeman .....	4,992
Whyte & Co. ....	4,982
J. & T. Bins .....	4,981
C. Bell .....	4,917
G. Lawson .....	4,917
W. Wright & Son .....	4,778
E. Petherby & Co. ....	4,711
J. M. Patrick .....	4,600

**LANBRADACH.**—For paving, curbing, channelling, flagging, sewerage, forming, and metalling the following private streets, viz., Central-terrace, Rees-terrace, Fford-terrace, Glenview-terrace, Wingfield Villas, Llanbradach, for the Caerphilly Urban District Council. Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly.

Price & Smith .....	£1,101 8 8	G. Rutter .....	£902 2 8
T. F. Howell .....	1,099 2 8	E. Osmond .....	977 0 0
J. Sutherland .....	977 0 0	Sons, Ely, nr. Cardiff .....	850 5 4

**LONDON.**—For the supply of 4½ in. by 1½ in. by 5 in. Jarrah & Karri wood blocks, for the Westminster City Council.

Improved Wood Pavement Co. £3 9 per 1,000.

**LONDON.**—For the supply, delivery and erection of twelve steel coal trucks required for use at the Greenwich electricity generating-station, for the London County Council.

Brush Electrical Engineering Co., Ltd. ....	£1,598 0
Flaxell & Churchill .....	1,317 0
T. Davies, Ltd. ....	1,293 12
Hurst, Nelson & Co., Ltd. ....	1,280 0
Mountain & Gibson, Ltd. ....	1,254 0
S. J. Clays, Ltd. ....	1,098 0
Kerr, Stuart & Co., Ltd., London* .....	990 0

**LONDON.**—For thirty-four single-deck steel cars for through tramway route from Aldwych to the "Angel," Islington, for the London County Council.

**For Thirty-four Single-deck Car-bodies.**

Hurst, Nelson, & Co., Ltd. ....	£19,550
Metropolitan Amalgamated Railway Carriage and Wagon Co., Ltd. ....	16,252
United Electric Car Co., Ltd. ....	14,780
Brush Electrical Engineering Co., Ltd., Loughborough* .....	14,773

**For Thirty-four Car-trucks.**

Pockham Manufacturing Co., U.S.A. ....	£4,930
Metropolitan Amalgamated Railway Carriage and Wagon Co., Ltd., Birmingham* .....	4,862
United Electric Car Co., Ltd. ....	4,420
Mountain & Gibson, Ltd. ....	4,048
Hurst, Nelson, & Co., Ltd. ....	3,975
Brush Electrical Engineering Co., Ltd. ....	3,774

**For the Electrical Equipment and Assembly of Thirty-four Single-deck Cars.**

Brush Electrical Engineering Co., Ltd. ....	£11,696
British Thomson-Houston Co., Ltd. ....	11,084
British Thomson-Houston Co., Ltd. ....	10,948
Witting, Eborall, & Co., Ltd. ....	10,693
British Westinghouse Electric & Manufacturing Co., Ltd. ....	9,996

Or alternatively—

**For Thirty-four Single-deck Cars Complete.**

Dick, Kerr, & Co., Ltd. ....	£29,325 0	Alternative tender. £29,318
British Thomson-Houston Co., Ltd. ....	28,942 10	£29,376
British Thomson-Houston Co., Ltd. ....	28,942 10	£29,331
British Westinghouse Electric & Manufacturing Co., Ltd. ....	23,470 0	
Hurst, Nelson, & Co., Ltd. ....	38,994 0	
Brush Electrical Engineering Co., Ltd. ....	30,243 0	
British Thomson-Houston Co., Ltd. ....	23,808 10	

\* Amended and accepted. § Not to Specification.

**MATLOCK BATH.**—Accepted for waterworks, for the Matlock Bath and Searthill Nick Urban District Council. Mr. W. Jeffrey, Engineer, Matlock Bath. Quantities by Engineer—

Clay Cross Co., Clay Cross .....	£209 5 4
J. Walker, Matlock Bath .....	109 12 6
J. Walker & Son, Wirksworth .....	509 17 8
A. Axe, Bonsall .....	520 0 0

**NITON.**—For the erection of new schools at Niton, Isle of Wight, for the Isle of Wight Education Committee—

Jenkins .....	£2,198	Hayden .....	£1,946
Cruth .....	2,050	A. Sims, Ventnor, Cotton .....	1,982
J. Hunt .....	1,950	Isle of Wight* ..	1,840

**SALE.**—For erecting new Springfield Schools, for Sale and Ashton-upon-Mersey District Administrative Sub-committee for Education. Mr. J. Holt, architect, 9, Albert-square, Manchester. Quantities by Mr. H. H. Brown, Manchester—

J. E. Dean, Ashton-upon-Mersey, Cheshire £13,417  
[There were nineteen Tenders sent in.]

**SOUTHEAST-ON-SEA.**—For erecting lavatories and shelters on The Lea, for the Corporation. Mr. E. J. Elford, Borough Engineer, Southeast. Quantities by Borough Engineer—

Messrs. W. & B. H. Davey, Southeast\* £1,192

**STRATFORD-ON-AVON.**—For the erection of a pair of villa residences, Stratford-on-Avon. Mr. A. H. Callaway, architect and surveyor, Stratford-on-Avon.

Smallwood & Co. £1,575 0	Whateley & Son £1,375 0
Fincher & Co. ... 1,525 0	E. T. Kennard ... 1,370 0
Ward & Co. ... 1,518 0	J. Cox ... 1,295 0
G. Easton ... 1,480 0	Price & Sons* ... 1,185 15

**TRALEE (Ireland).**—For constructing a County Hall, for Kerry County Council. Mr. Wren, architect, 189, Gt. Brunswick-street, Dublin. Quantities by Mr. J. Mackey, 58, Dame-street, Dublin—

First Section.

Kennedy Bros., Tralee .....
 £5,280 |

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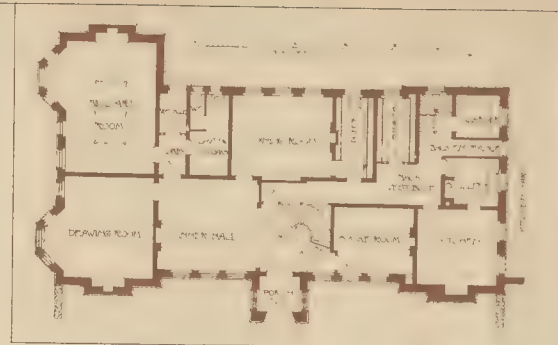
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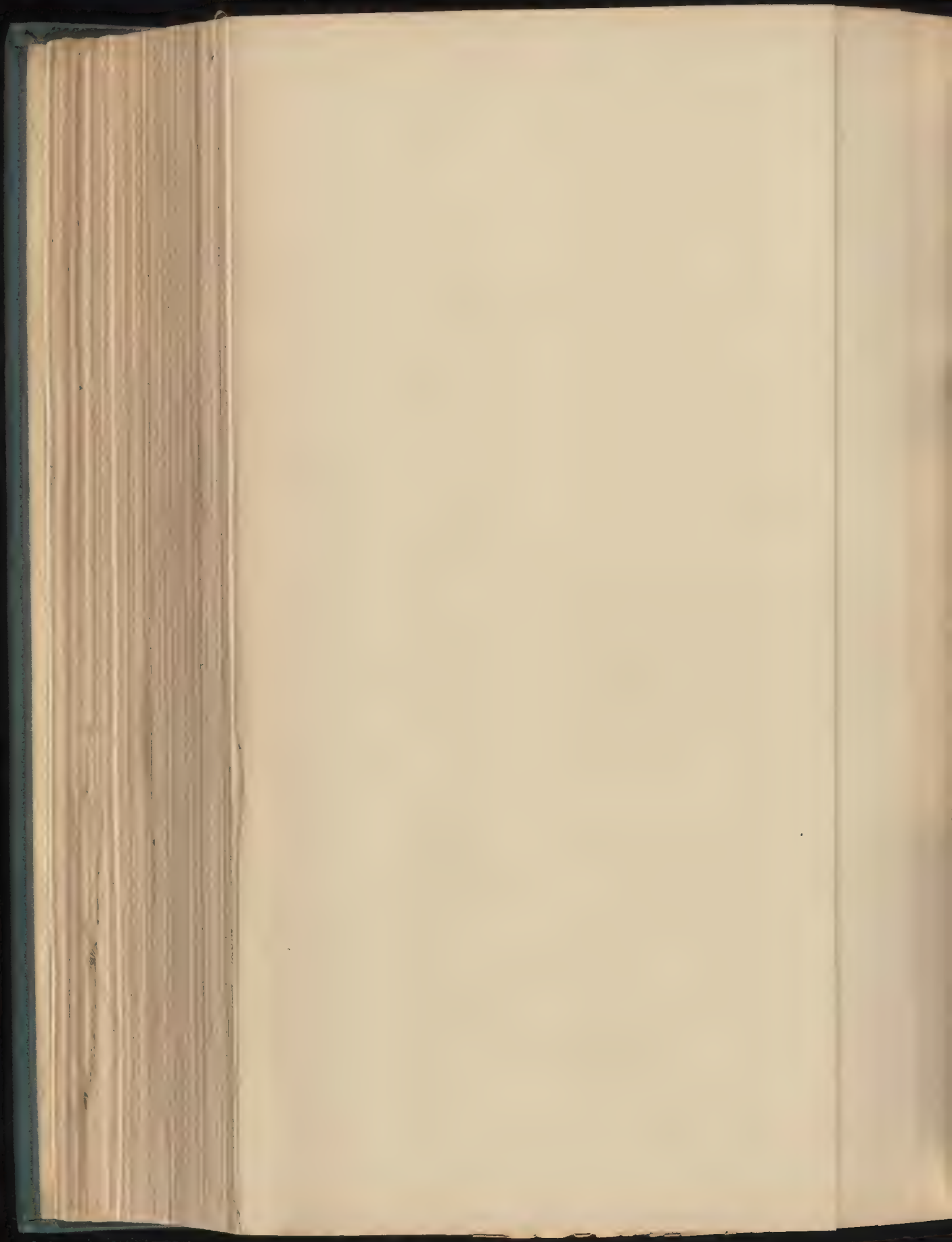
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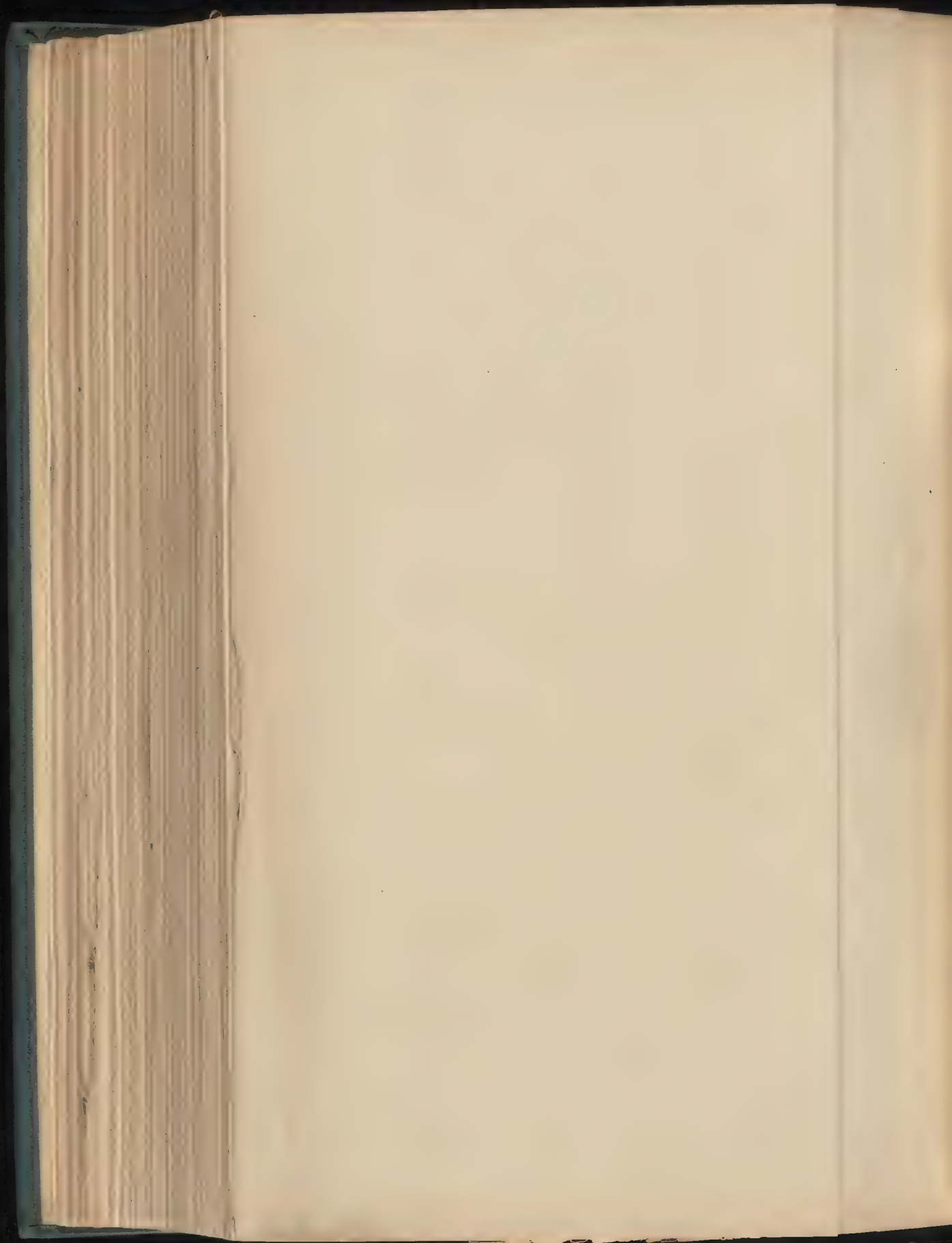


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# The Builder.

VOL. LXXXIX.—No. 3278.

DECEMBER 2, 1905.

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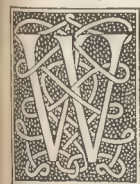
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### Rural Housing: An Analysis of Evidence.



We are still a long way from any general agreement of opinion in regard to the question of rural housing, and it may be worth while to analyse and sum up some

of the information on the subject which is to be found in the blue-book of evidence given before the Select Committee on the "Public Health Acts (Amendment) Bill," and also in the two important papers read at a recent discussion on Rural Housing at the Sanitary Institute, and which, along with the discussion, were reported at the time, but in a necessarily much abridged form, in our pages. The subject naturally falls under two main heads, that concerned with law and administration, and that concerned with the actual or possible construction of cottages—what is required and what can be provided; for even as to what is required there are very contradictory opinions, though the papers and discussion at the Sanitary Institute threw some new and useful light on the subject.

As we need not remind our readers, the discussion of the subject, and the proposals of the Public Health Acts (Amendment) Bill, were to a great extent brought about by complaints in regard to the inconvenient and oppressive action of by-laws in force in many Rural districts; complaints which we from the first believed to be considerably

exaggerated, and which were made in some instances by people who had sent in bad or unintelligible plans of cottages, and found these condemned for better reasons than their promoters were able to understand. It is naturally to the evidence before the Select Committee that we look chiefly for information on this subject of by-laws and their administration.

The burden of the complaint made against rural by-laws is the requirement that houses should be built only "of brick or stone or other incombustible material"; and it is contended that such a provision (which exists in the great majority of by-laws at present in force in England) renders it impossible for well-meaning landlords to provide cottages for their tenants at a reasonable cost. The special insertion of the word "incombustible," without any other characterising adjective, is unfortunate in a double sense. First, it appears to lay the whole stress on the question of liability to fire, which is only one, and (in country districts) one of the less important considerations in regard to the material of which cottages are to be built; for in the case of isolated cottages in the country danger from fire is a much less serious matter, both in regard to the probability of fires and to their possible results, than where houses are crowded together in towns; but the questions of warmth, freedom from damp, and structural stability, are as important in a country cottage as in a street house. Secondly, it furnishes the adverse critic of rural by-laws with a ready argument;

he says, in effect, you are laying stress on incombustible quality for walls, in situations where this is really of very secondary consequence, and thereby putting those who would build cottages to unnecessary expense. If it were not for this "incombustible" requirement we could build cottages much cheaper of wood, or of other materials which are really as incombustible as brick or stone, but which your by-laws will not admit as such.

Thus the whole subject is made to turn on a side issue, and the principal requirements of warmth and health, and structural stability (the latter point affecting the landlord as well as the tenant) are ignored. As far as danger from fire is concerned, we see little objection to the erection of isolated wooden or half-timbered cottages in the country. The question is whether such cottages are really suitable and healthful for habitation in winter, and whether, from the point of view of the landlord, they are really any saving, since they cannot last so long as a brick or stone cottage, and even during their shorter life are likely to need frequent repair. On this point some useful light was thrown by the first witness examined before the Select Committee: Mr. Munro, Assistant Secretary of the Local Government Board. He admitted that, judging from official correspondence, the chief complaint against the by-laws was this requirement to build in stone or brick. His own expressed opinion was that it would be difficult to say what was the saving in timber building, as it was not so



much cheaper than brick or stone to begin with, and cost more in keeping up; but the point of his evidence, on this head, was that in the Guildford Rural Districts there were fourteen parishes without any by-laws, as against four governed by by-laws; that therefore in those fourteen parishes builders were at liberty to put up cottages of wood or other materials as they pleased, "but no one has yet done so."

"211. That is to say, in the districts where they might have adopted wood, they had not done so?—Yes. So I think, that if wooden houses were conspicuously cheaper and equally good, they would be built."

That is an important statement in regard to one district, at all events.

In another portion of his evidence the same witness stated that the Local Government Board were in favour of by-laws of definite character, and objected to by-laws in a general form, with discretionary power attached to them. He cited for example an old by-law that an ashpit should be constructed "of such size and dimensions and in such manner as shall be approved by the local authority." Such a by-law was "too indefinite," and the Board in its present mind would not confirm it. As we know, one of the popular cries has been lately for discretionary power to dispense with a by-law in special cases. That would be a reasonable, even a desirable course, if one could always be sure how the discretionary power would be wielded, and what kind of people would exercise it. But as we cannot be sure of that, discretionary power vested entirely in a local authority is a dangerous privilege and might lead to a great deal of injustice and dissatisfaction.

Further points in regard to the advantages or disadvantages of by-laws are furnished in looking over the evidence. The evidence of Sir William Chance, who is chairman of the Building By-laws Reform Association, turns chiefly on the difficulty, which of course is constantly cropping up, of framing by-laws which will be fair to all cases. It would, as he says, be very difficult to draw a definite line between a crowded and a non-crowded district adjoining one another, and rule that those on one side of the line should be subject to by-laws while those on the other side should be exempt. He seems to suggest that circumstances and not locality should decide when there may be exemption. There is a good deal of force in his remark that "the principle of building by-laws ought to be to protect the man who cannot defend himself, but also to relieve the man who can defend himself. I can find my architect and builder, but another man, a poor man, cannot." There is something in that, in theory; but in practice we find that the poor man requires also to be "defended," not only from the speculating builder, but from the well-meaning but ignorant wealthy landlord. In the case of Sir W. Grantham's cottages, about which ignorant journalists have made such a foolish fuss, but for the by-laws his tenants would have had cottages put on them with absurd planning, and such as could never have been comfortable or healthy to live in. On the other hand, if local authorities had and exercised a right to exempt a man who employed a competent

architect, on the ground—"we know of course that you will do what is right," it might really be the most sensible course; but we know perfectly well that any authorities who took that course would soon get into hot water, and that we should hear the cry raised, "There is one law for the rich and another for the poor." On the other hand, what we should come to without by-laws is indicated in the evidence of Sir W. Grantham, who said that "these cottages are built without plans; the owners' workmen build them": which is likely enough for such plans as he proposed to build—one room opening through another, and every bedroom with an external door direct into the open air. Such cottages no doubt can be built without plans, but they are not fit to live in.

In spite of the difficulty of administration, there is evidence that by-laws have not been without their advantages. Dr. Franklin Parsons, one of the medical officers of the Local Government Board, gave evidence, arising from thirty years' experience, to the effect that there had been, in the districts that he was acquainted with, a great improvement in cottage building of late years; that the older cottages were generally the worst built; that even where there were no by-laws there was a higher standard of building, and that in his opinion the Model By-laws of the Local Government Board had greatly conducted to that higher standard; and we believe he is perfectly right. In regard to the idea of a dispensing power being given to the local authorities, he thought "it might, in some cases, lead to jobbery." Mr. Brooke Kitchen, Chief Architect to the Local Government Board, was of opinion, like the last-quoted witness, that the Model By-laws had certainly "had a good effect on the construction of villas. I think it has raised the standard of building very much indeed." Mr. Greatorex, Borough Surveyor of West Bromwich, thought that the by-laws had not caused any great amount of friction, considering the thousands and thousands of buildings erected: "certainly not that amount which has been made out"; and we have no doubt that he is right. The cry against by-laws was a good popular cry for the newspapers, and was taken up on that account. Mr. Walter Webb, Superintending Surveyor of the Board of Agriculture, mentioned one point on which a reasonable exemption would be granted: "we should not insist on concrete [under floors] where the Inspector reported that the soil was so good that it was unnecessary." This is in contrast with a case mentioned in Mr. Thackeray Turner's evidence, where a house was on solid rock, and the surveyor demanded that 6 in. deep of the rock should be excavated to replace it with concrete; which is surely not a reasonable exercise of authority.

There is much more evidence in regard to by-laws which we have not space to go into; but the conclusion from a consideration of the whole evidence is that by-laws in rural districts are necessary; that in the main they have had a salutary effect in raising the standard of building; and that the inconvenience and friction caused by them has been

greatly exaggerated. The conclusion seems to be that a reasonable amount of dispensing power should be permitted to the authorities; only there arises a doubt the question—*Quis custodiet custodes?* Mr. Lacy Ridge said in his evidence that "if they [the local authorities] were more competent bodies I should quite approve of its being wholly a question of discretion; but I am afraid they are not sufficiently competent bodies." In a letter to the *Times* in September Sir W. Chance suggested, as a way out of the difficulty, that if a District Council found that to enforce any particular by-law would be unnecessary, absurd, or unjust in any particular case, it should have power to exempt exemption subject to the approval of the Local Government Board, to which it would report the case; and if the proposal rested on reasonable grounds he thought it would not be likely to be over-ruled. We may quote the following sentence from his letter:—

"Everyone who has studied the subject, I think, agreed that there is a great danger in allowing a District Council to exercise an unlimited discretion as to when it should dispense with its building regulations; but if a final decision lay with a body which would deal with the case without local prejudice or bias, the danger would not be present. Further, the expense of Courts of Appeal established at once would be saved."

That appears to us to be a really reasonable and practical way out of the impasse; and we hope it may be acted upon.

We now come to the question of what materials should rural cottages be built, or be allowed to be built? There was the evidence of several architects before the Select Committee, who dealt partly with this subject; but the architects do not always show very well in the examination. Mr. Stanning, of East Grinstead, said that he found all over the country wooden cottages standing for hundreds of years in a good state of preservation to-day, and that in his opinion they were warmer and better houses than brick. "Wooden cottages" is a rather vague term; we do not know whether it means what are called half-timber houses, or houses entirely faced with wood externally. As to the statement that they are warmer than brick walls we are absolutely sceptical, on grounds of practical observation; and as to their having stood hundreds of years, one would like definite examples to be cited; and in any case, in regard to their endurance, how is one to know how often they have been repaired? The same witness goes on to recommend wooden framing, with boarding outside and lath and plaster inside: "therefore you get two skins and get an air-space which, in my opinion, is valuable both as regards heat and cold." We had this fallacy of the air-space flourished before us over and over again in the descriptions of the Letchworth exhibition cottages; and we repeat emphatically what we have already said in regard to those examples, that whatever truth there may be as to the efficacy of the "air-space" in keeping out heat or cold, the advantage is more than counterbalanced by the evil of having the house walls full of hollow spaces which cannot be got at or examined. You never know what may be going on



or collecting in them; and whether for town or country houses, our dictum is—no hollow spaces which are out of the possibility of inspection. Even hollow brick walls we believe to be a mistake. You may think you have built them so that nothing can get into them; but you can never be sure that weak points will not develop in process of time, and that they may not become haunts of rats and other vermin, and even receptacles for the damp which they were intended to keep out. And in regard to the question of wooden houses generally, there is a great deal in the shrewd suggestion made by Dr. Franklin Parsons in his evidence:—

"1098. But as regards the structure of the walls you have no objection to the exemption?—I have an objection, because a building which is built of timber or unsubstantial material like that very much sooner gets out of repair."

"1099. What do you call unsubstantial?—Barraged iron on a timber frame or lath and plaster."

"1100. Or timber?—Yes, or timber. Of course, I recognise that timber buildings may be built strongly and substantially, but if they are built for cheapness the probability is they will not be so built. If built of timber merely because it is the cheapest material with which houses can be built they will probably not be substantially built."

"1101. As regards cottages, do you think they should be built to last as many years as a very large house or castle?—Ordinarily, I should think they should be. If they are for agricultural labourers they ought to be made to last, because the probability is that they will always be required. There may be something from another point of view to be said in favour of buildings, of which the use is only temporary, being allowed to be built in a temporary way. For instance, navvies' huts are commonly built so when the work for which they are required is not likely to last long. There may be reasons for that, but not where houses are likely to be permanently used."

This is one of the wisest and most sensible utterances to be found in the whole bulk of the evidence. Mr. Ridge's statement that wooden cottages with weather tiling will keep out the wet, and that a 9-in. wall of Sussex bricks will not, may be correct—he has special experience in Sussex; but brick with rough-cast will surely do it as well and last much longer. We agree with Mr. Ridge as to there being no necessity, in country cottages built in couples, to turn the party-wall through the roof; we do not call it a necessity in semi-detached houses anywhere—the necessity is in long rows of town houses; and, as he said, unless it is carefully and rather expensively done, it leaves a weak place for rain leakage, "and that is a more serious evil on the South coast than fire." The only other point in the evidence of the architects that we touch upon is Mr. Thackeray Turner's evidence of the thatched roof. As far as the pleasant appearance of the thatched roof in a country landscape is concerned, which seems to be the main motive of his defence of it, of course everyone will agree with him; but to maintain that it is a better roof in a practical sense than a tiled one (corrugated iron is so odious a material that we prefer to say nothing about it) seems rather like special pleading. Thatched roof is now illegal in new buildings under the new laws, and we think rightly so. It looks picturesque, but it is a clumsy way of roofing, and affords any amount of harbour for insects. Country houses, especially, are not infested by the insect pests which beset town houses; but

even what may be called "clean insects" may be a nuisance in a house, and for this as well as other reasons thatched roofing is rightly regarded as out of date.

The best advice on this subject of the materials of the cottage is to be found in the summary at the close of Mr. Aldwinckle's paper read at the Sanitary Institute. It is an eminently practical paper, and it is that of an architect who has no special theory or prejudice to influence him. He answers the allegation that many old cottages of wood were very comfortable by pointing out that they had small windows, seldom opened, and no attempt at ventilation; nowadays the importance of ventilation and light are acknowledged, and a cottage of thin external walls of whatever material, with large windows, could not be kept warm in winter without a great expenditure of fuel. "As to durability," he adds, "it must be obvious that walls of timber framing or very thin slabs of plaster on concrete cannot be considered permanent in the true sense of the word, nor the class of construction on which money could be borrowed." That is the sound common sense of the matter. The experience of the Letchworth exhibition, impartially considered, really brings us back to the brick or concrete cottage; in either case with rough-cast coating; and we may say, brick by preference. The various experiments in timber, plaster, and various forms of what may be termed skin construction, may do very well for week-end cottages, but not as permanent property on an estate, nor as permanent dwellings for all seasons of the year.

The three conclusions left from the consideration of the evidence before us are therefore (1) that rural cottages must be of solid and durable and not of perishable materials; (2) that by-laws on main points of construction are a necessity, and that their existence, even in spite of some inconvenience or apparent injustice in their application, has been in the main beneficial and has already tended to raise the standard of rural building; and (3) that it is nevertheless desirable to allow of some elasticity in their application, under special circumstances, and that this would be best attained by allowing local authorities powers to grant exemption subject to a reference to, and the approval of, the Local Government Board.

SHOP LIGHTING IN OXFORD-STREET.—The Marylebone Borough Council, having now completed a system of public lighting in the district, have issued an order for the removal of all private lamp-posts in front of the shops in Oxford-street. Though the standard-lamps contribute to the lighting of the shops and of the thoroughfare during business hours, the Council are of opinion that, in view of the large increase of the pedestrian traffic, the private lamps should no longer remain, having become a source of inconvenience and obstruction to the public.

BLACKFRIARS BRIDGE.—The Bridge House Estates Committee of the Corporation of London have approved of Sir Benjamin Baker's report recommending that the bridge should be widened by 30 ft. along its western side, and that new foundations should be laid in the bed of the river in view of the increased load the structure would then be required to sustain. The measure which the Corporation accordingly intend to introduce in Parliament provides for the construction of a double-line tramway from near Upper Ground-street on the Surrey side to John Carpenter-street, Victoria-embankment, and having, across the bridge, a space of less than 9 ft. 6 in. between the outside of the footpath (west) and the nearest rail of the tramway.

## NOTES.

The National Gallery.

THE question of the purchase of the Rokeby Velasquez, as it is called, for the nation, has raised a side issue as to the management of the National Gallery. This institution is at present without a Director, and purchases for it are therefore in the hands of the Trustees. This state of things has caused a demand to be made for the appointment of a new Director, who is to be a "professional"; by a "professional" is to be understood one who has made art, whether as a painter or otherwise, a means of livelihood. But the subject is discussed without sufficient notice of two main points, namely, that the Director should be some one whose whole time can be given to the affairs of the Gallery; and next, that he must be competent for the post. The mere fact that a man has painted pictures ought not to be regarded as a test—special training and individual capacity are essential. But it seems to be clear that there should be a Director as well as a body of Trustees. It has, however, to be borne in mind that the Treasury hold the purse-strings, and in relation to this part of the question it seems to be worth consideration whether it would not be better for the authorities of the Gallery to ask the Treasury for special grants when a picture can be bought, rather than to keep in existence a small annual grant—not enough for the purchase of important works, and which tends to the buying of small pictures. Perhaps the most necessary point of all is to get the Treasury to understand that great works of Art are of some consequence to the nation, and are worth paying for; but we fear that is a hopeless undertaking.

ONE of the most interesting problems which have arisen in connexion with electric supply is the question of determining who is to have the privilege of supplying London with electricity in bulk. We have never thought much of the claims of the Administrative County of London Company: The London County Council scheme has many points in its favour, but the Council is hampered by its financial position, as the capital expenditure on tramways for the next two or three years will be very large. It is therefore advisable to consider the proposals of a new company who are seeking Parliamentary powers to carry out a novel scheme of electric supply. The Additional Electric Supply Company of London propose to build a power-house on the River Ouse, near St. Neots, on the boundary-line between the counties of Bedford and Cambridge. The electric power generated will be conveyed by overhead wires a distance of about 40 miles, at a pressure of 25,000 volts, to Enfield, and from this place it will be transmitted to various parts of London. The price at which the company will sell electricity is about  $\frac{1}{4}$ d. per unit, and it is hoped that when a good "load factor" is obtained the price may be reduced in certain cases to  $\frac{1}{4}$ d. per unit. It will be seen that this is a very substantial reduction in price to the prices quoted by the supply companies seeking Parliamentary powers last session, and



the question arises, is it possible to do it at this price? The company claim that they have exceptional facilities for procuring coal from the Nottinghamshire and Derbyshire mines at an average cost of about 6s. a ton. They have no heavy rents to pay, and the Great Northern Railway will grant them way-leaves. If their estimates stand examination, and they certainly have made out a *prima facie* case, we think that this company has a strong claim to favourable consideration. Cheap electric power will be a great boon, and it will be easy to insert clauses in their provisional order to safeguard the rights of municipalities and also to prevent a monopoly of supply being obtained. Overhead power transmission wires by the side of a railway line are not beautiful. We fail to see why the cost of using underground mains should be prohibitive. At present cable manufacturers in this country, when judging the thickness of the insulation required for high-pressure cables, proceed by rules which have no scientific basis. We would suggest that the "factors of safety" required for the underground cables could be considerably lowered, since the stress on the dielectric can now be accurately calculated, and French engineers have proved that spark-gap safety-valves are thoroughly trustworthy.

WE should like to draw the attention of our readers to the report on another page of the meeting, on Thursday last week, of the National Trust, held with the special object of promoting the raising of funds for the purchasing, for public enjoyment for ever, of the estate of Gowbarrow Fell, on the banks of Ullswater, which otherwise will probably sooner or later be sold for building on. The purchase is to include the lake shore and the lake bed for a certain distance out, so as to give a right of landing. The estate includes the fine waterfall known as Aira Force. By the report of the proceedings it will be seen that only a small proportion of the purchase money remains to be raised, but the offer for sale to the Trust closes on January 1. It would be a thousand pities that an effort to save a fine piece of country and the shore of a lovely lake from the builder should be frustrated for want of the comparatively small sum now required to make up the purchase; and we hope that those who can afford anything in such a cause will send in their cheques to the Secretary of the National Trust, before it is too late.

Mr. RICHARDSON EVANS, the Hon. Secretary of the Society for Checking the Abuses of Public Advertising, makes an appeal in the *Times*, with which we are entirely in sympathy, that some endeavour should be made, at the outset, to prevent the architecture of the new streets from being defaced, and whatever merits it may have rendered nugatory, by the disfigurement of advertisement lettering and placarding on a large scale. The architects, as he says, may do their best, but it rests at present entirely with the tenants whether the new streets

shall or shall not retain any architectural appearance. "It is not merely that the particular structure which bears the emblems ceases to be pleasing: the character of the whole avenue is affected." Mr. Evans suggests that if the public authorities as landlords were to insert a clause in the leases containing definite restrictions on this point, the mischief could be prevented from developing at the outset. It is certainly high time that some restrictive measure of this kind should be adopted, if we are to have any architectural dignity left in our streets.

A USEFUL and interesting example of the limit allowed by law for what is called

Unlawful Picketing. picketing was given in a case before the Court of Appeal on Monday last. Some French polishers were discharged by Messrs. Thomas Wallis & Co., Ltd., because they would not accept a reduction of their wages. With the results of the dispute we are not concerned. Then the Union, in this case the United French Polishers' London Society, sent men to walk up and down before the place of business of T. Wallis & Co., a large general shop in Holborn, with cards in their hats, on which the word "Picket" appeared, and a statement that the men were on strike against a reduction of wages. In the Vacation an injunction was obtained against this action, and the Court of Appeal has now held that it was rightly granted, on the ground that the action of the Union was "wrongfully watching and besetting a house" under the meaning of the Conspiracy and Protection of Property Act, 1875, and was not something done "in order merely to obtain or communicate information." Each case must depend more or less on its own special facts, and therefore this decision is illustrative only of a principle, but it is an illustration which tends to illumination.

Rights under Building Schemes. THE recent case of Whitehouse v. Hugh raised one or two interesting questions.

The action was brought by the owner of certain land and a house against the defendant for depriving him of a road which bounded one side of his property, and for building thereon in such a way as would obstruct the light and air to the plaintiff's house. Both plaintiff and defendant had derived their title from a certain freehold land society. The road in question had been merely an occupation road leading down to the railway line, which was crossed by a level-crossing, and then led to some meadows. In 1894 the land society had purchased these meadows and released the railway company from maintaining the level-crossing, and the road then was blocked at the railway line by railings. On the original conveyance made by the land society this road was not figured on the plan, but appeared as "vacant space," and the building scheme contained powers to vary the plans and conditions. The Court held that even had the road been shown on the plans, that alone would not have sufficed to support the claim, but that as it was only shown as "vacant space" it fell within the powers given to

the society to vary the scheme. The plaintiff contended that it had been dedicated to the public, but this contention also failed, as there was no evidence of dedication, and a dedication by user could not be inferred in the case of a *cul de sac*, this latter proposition having been laid down in the celebrated Stonehenge case. As regards the obstruction to light, the Court followed the recent decision in *Higgins v. Betts*, and, applying the test as to how much light would be left, held that it would be sufficient for the comfortable enjoyment of the house.

What is a "Factory"? ONE of the Metropolitan Police magistrates has had to decide a difficult question

under the Factory and Workshop Act, 1901. A summons was taken out by the Government Inspector against the Kensington Borough Council for a breach of the Factory Act in not fencing a planing machine. Amongst other operations carried on in the workshop certain iron bars were bent and drilled to make tyres for the carts of the Council. The provisions as to fencing machinery are contained in sect. 10 of the Act, and apply in "factories," and it was contended that the above operation rendered these premises a factory under sect. 149, because mechanical power was being used on the premises "by way of trade or for purposes of gain or incidental to the making of any article or part of any article, or the alteration, repairing, ornamenting, or finishing any article." The magistrate, while commenting upon the slender evidence brought before him on a complex question of law, intimated that although he considered the labour here was not exercised "by way of trade or for purposes of gain," yet the premises were used "for the making" of an article, since the metal was converted into an article different to what it was before, i.e., tyres for carts. In the case of *Nash v. Hollinshead*, decided by the Court of Appeal in 1901, where it was contended a farmer grinding meal as food for his own stock by machinery was the occupier of a factory, and therefore within the Workmen's Compensation Act, the Court intimated that the words "by way of trade or for purposes of gain" governed the rest of the definition. It would appear that this decision was not brought to the notice of the magistrate, as it would render the two findings inconsistent in this case.

A Building Lease. A CURIOUS question has arisen in the case of *Molyneux v. Pritchard* under a building agreement. The defendant

was lessee of certain land which contained a covenant that, within three years he should build seven dwelling-houses upon it "similar to the dwelling-houses already erected in Percy-street." This lease contained a reservation of the mines and minerals, with power to work the same without leaving any support for buildings which might be erected on the land. Shortly before the defendant had entered into this lease he had also taken a lease with power to work these minerals, etc. The owner of the freehold had mortgaged

Kingway and Aldwych.

these lands, and the action was brought by the mortgagees for specific performance to compel the defendant to build the houses. The Court held that the power contained in the lease relating to the minerals, which also contained powers to cover the surface of the land with pit hills and spoil banks, did not extinguish the covenant to build the houses, although the judge said he would not decide whether the lessee had power to pull down the houses when they were built, and he granted specific performance of the contract. It was also contended that the character of the houses to be built was not sufficiently clearly specified by the words "similar to the dwelling-houses already erected in Percy-street" to enable specific performance to be granted; but this contention was also negatived. We can only again point out the danger of entering into contracts which contain inconsistent terms, as so many persons are apt to do, trusting that all will come right in the end. In this case no doubt the matter could have been arranged between the parties directly interested in the land and the lessee, but the action was by mortgagees, who were entitled to the security for their money which the leases gave them, and this security the Court held could not in this case be obtained by giving damages for the breach, and the defendant is thus placed in an anomalous position.

River Pollution.

MANY people in this country still believe that rivers and streams are conduits intended by Providence for the economical disposal of sewage. The work of those authorities who have to fight against the continuance of this mistaken notion is certainly not rendered more easy by the fact that it seems to receive the active support of the Army Council—an important body representing the Crown. The Thames Conservancy Board deserve credit for the energetic course taken with regard to the insanitary condition of the effluent from various establishments of the Council on the banks of the Thames and its tributaries, and, although the argument has been put forward that the notices served are inoperative against the Crown, we are glad to find that, as soon as funds are available, remedial measures are to be adopted at Tilbury, Coalhouse, Cliffe, and Shornmead Forts. An additional filtration area has been brought into operation at Bordon Camp, whence effluent is discharged into the river Wey, but, as pollution continues in spite of repeated warnings, the Conservancy Board have decided to take legal proceedings against the military authorities. This decision is entirely to be commended, for it appears that the Army Council are the worst offenders with whom the Conservancy have to deal. Moreover, instead of setting a good example, they stand forth as breakers of the laws made in the interests of public health.

River Pollution Again.

At the last meeting of the Metropolitan Water Board discussion was raised upon a particularly scandalous violation of regulations necessary for the health of London. The question was brought forward in a report by the Finance Committee rela-

tive to new works proposed in the Lea Valley at an estimated cost of 685,000*l*. The Committee reported that the river, as a source of water supply, had suffered severely by the discharge of refuse from the War Office gunpowder works at Waltham Abbey. It is, indeed, a most unfortunate thing that the Government should have established this factory on the banks of the river, without taking any effective measures for guarding against pollution of the water which furnishes one-fourth of the entire water supply of the metropolis. As we pointed out in the previous note, and on other occasions, the representatives of the Crown have a most unfortunate predilection for setting bad examples to less privileged bodies and individuals. We are aware that the condition of the Lea is not improved by the effluent from the sewage purification works of the local authorities. The action of these bodies, however, is less blameworthy than that of the Government, for in one case it is difficult to avoid the discharge of more or less unsavoury effluent into the river except at very heavy outlay; while in the other it was perfectly unnecessary for the powder factory to be established on a manifestly undesirable site. Under the circumstances, the only effective remedy is to provide independent means of drainage for the local authorities and the Government works, so that the River Lea shall cease to be a source of danger to the inhabitants of the metropolis. A scheme of the kind was formulated some time ago by the Lea Conservancy, and we understand that the War Department will be asked to make a contribution towards the cost and maintenance of the proposed works—a suggestion which they ought to fall in with, if only as some amends for their past want of consideration for the welfare of the public.

Theatre Fire Tests.

A SERIES of interesting experiments was made last week in the model theatre built in Vienna for the scientific study of fires in theatres. The building, for the erection of which the necessary funds were largely provided by the Municipality and the Imperial Government, is of fire-resisting construction with an iron curtain between the stage and the auditorium, and has a water reservoir over the stage. One novel feature is to be found in the provision of several flues affording direct egress through the roof of the stage for air and the products of combustion. The company assembled in the auditorium included the Minister of the Interior and a number of architects and fire experts, who were able to witness in perfect comfort the effect of fires lighted on the stage. Two preliminary trials were made with the flues closed. In the first of these, with the curtain up, the combustibles used filled the auditorium with dense masses of stifling fumes; and in the second, with the curtain down, the protective metal screen was buckled by the heat and flames burst through. These tests were presumably made before the spectators had taken their seats, and they were followed by two other tests with the flues open. The effect in each case was that the

smoke and heated air passed away through the stage roof, even when the curtain was up, without inconvenience to those in the body of the building. Clearly the device is as rational as it is simple—characteristics that are quite sufficient to account for the fact that it has not been tried before.

An Unusual Method of Weir Construction.

A SCHEME recently devised for the construction of a submerged weir in the Niagara River is distinctly novel. The weir was designed to increase the head of water at the intake of the power plant of the International Railway Co., but, owing to the extremely rapid current of the river and the unknown depth of the water, it was not possible to follow ordinary methods of construction. Therefore it was decided to construct the weir by overturning a tower of concrete blocks to be built upon the bank of the river. Timber framework 15 ft. high was first erected at the water's edge in such a way that it could be tipped over into the river by means of timber levers fixed at the base. Upon this frame a tower, 7.35 ft. square and 50 ft. high, is in course of construction, consisting of six concrete blocks, one at the base 10 ft. high, and the other five 8 ft. high each. These blocks are separated by tarred paper, preventing adhesion between the successive sections of the obelisk. The blocks, however, are connected by cast iron dowels, 12 in. long by 2 in. diam., and also by a 1½-in. chain. The chain is attached so as to allow a few links between each pair of blocks to be tucked into a horizontal slot at the joint. The object of these arrangements is that when the tower is in the act of falling the blocks shall be held together simply by their own weight and by the dowels, and that when the structure strikes the bottom the breakage of the dowels shall allow the blocks to adjust themselves to the contour of the river bed, while at the same time the chain will prevent them from separating for more than the predetermined limit, thus maintaining the continuity of the line. Owing to lack of data as to the depth of water, it is not yet certain whether one tower will be sufficient to secure the desired result. If not, two more towers will be tipped into the stream, one of these to lie alongside the first, and the other upon the top of the first two. This system of construction is an interesting example of the ingenious devices which engineers often have to adopt for surmounting difficulties of exceptional character.

St. Lawrence Bridge, Quebec.

THE world is getting so accustomed to engineering works of great magnitude that very little attention is attracted by undertakings that a few years ago would have been regarded as "wonders of the world," and whose progress would have been followed with intense interest from beginning to end. Probably this condition of satiety is the reason why the great cantilever bridge now in course of construction across the St. Lawrence River at Quebec has received so little notice. The completed structure will include the longest single span ever erected, the length being 1,800 ft., or nearly 100 ft. longer than either river



span of the Forth Bridge. Briefly described, the bridge consists of (1) two double cantilevers each with a shore arm 500 ft. long and a river arm 562 ft. 6 in. long, between which is (2) a suspended girder 675 ft. long by 130 ft. deep, and (3) two land girder spans each of 214 ft., making a total length of 3,228 ft. The cantilever towers rise to the height of 315 ft., and at the portals to the centre span the height is nearly 100 ft., while the clear headway for navigation is 150 ft. at high water. The width of the bridge is 75 ft., and accommodation will be given for two railway and two tramway tracks, two carriage roads, and two footwalks. In some respects this magnificent structure embodies improvements upon the Forth Bridge, particularly in the employment of standard rolled sections of steel for the cantilever towers, which will include a system of braced columns instead of the 12-ft. diameter tubes used by Sir John Fowler and Sir Benjamin Baker. Further, in consequence of modified views on the question of wind pressure, the towers will be vertical instead of inclined, and the general results will be considerable reduction of cost and far more graceful appearance. Of course, it is generally possible to improve upon first ventures such as the Forth Bridge, and in the present case the process is undoubtedly aided by the availability of far heavier sections of steel than were produced by rolling mills at the time the former bridge was designed.

WE have seen a plan of a Garden City proposed to be laid out (from the plans of Mr. Beddoe Rees) a few miles from Cardiff, on an estate belonging to Mr. John Cory, in which the whole lines of buildings and roads are laid out in concentric circles, with five main roads radiating from the centre. The smallest circle in the centre is apparently to be occupied by blocks of shops, around a circular village green. We do not think the plan a good one. It is a kind of scheme which looks charmingly symmetrical on paper, but is not convenient in practice. Houses which are built on a similar plan will not have the light best for the rooms in all situations; the central shops will have awkwardly shaped plans; and the village green will be very much closed in, instead of being open and airy. The symmetrical plan, which pleases on paper, is not really taken in by the eye in execution. The plan seems to have been decided on, but it is not one that we should recommend.

It is announced that the Princess's Theatre, which has been closed during some while past, is shortly to be rebuilt for the new lessee. At a projected sale by auction in 1897 the property, being then held under a lease, to expire in July, 1940, granted by the Duke of Portland's trustees at a ground rent of 1,600*l.* per annum, was withdrawn after a bid of 20,500*l.* The present house was erected in 1880 upon a site covering about 21,500 ft. superficial, and extending to Castle-street East in the rear, from plans and designs by C. J. Phipps, who introduced what was at that time an unwonted feature of a London play-

house—the large apartment with a balcony above the chief entrance. The stage and wings measure 71 ft. in width by 42 ft. in depth; the auditorium affords seating-room for 2,150 persons. The first theatre was erected on the site of the Queen's Bazaar, which was rebuilt after a fire in 1829 for the "Physiorama" and other exhibitions. The house was then remodelled by Nelson and decorated by Crace in the Renaissance manner for Hamlet, the silversmith of Cranbourne-street, for opera in English and the then novelty of promenade concerts. The play-bill of the opening night, October 6, 1840, stated that Queen Victoria had given permission, before her accession, that the theatre should be named the "Princess's." The chronicles of the Princess's Theatre comprise the performances of Macready, and, under Charles Kean's management, the production of the French drama with Kean's memorable revivals, some fifty years ago, of Shakespeare's comedies and historical plays.

WITH the contemplated sale of the premises and site of the Horseshoe Brewery, at the corner of New Oxford-street and Tottenham Court-road, and the erection of new premises elsewhere will, it seems probable, disappear the last of the old breweries in that quarter of the town. Some of our readers may recall to mind the adjacent Star Brewery, situated on the west side of the Oxford Music-hall, of which the yard-gates in Oxford-street were faithfully guarded by two aged and implacable ravens. The Star Brewery gave way to the Bodega wine stores, subsequently rebuilt as a well-known restaurant. In Horwood's large-scale survey of London, 1795-9, are plotted a "Brewery" on the north side, at the east end, of Broad-street, in the parish of St. George, Bloomsbury, and "Stevenson's Brewery," between Bainbridge and Great Russell streets, in the parish of St. Giles-in-the-Fields; the latter since became the Horseshoe Brewery. In 1888 Meux's Brewery Co., Ltd., was formed to take over the business of Meux & Co., the freehold of the premises we mention being valued at 150,000*l.*, and their site extending over 70,000 ft. superficial. Horwood's survey of the locality is reproduced in our number of July 2, 1904, fig. 3, p. 13.

At Messrs. Carfax & Co.'s Gallery in Bury-street is an exhibition of water-colours by Mr. Arthur Ponsonby and Mrs. J. E. Talbot. The latter include some good landscape sketches, such as "Sun and Showers" (31) and "Ben Hope" (43), but are not as a collection remarkable. Mr. Ponsonby's drawings have a very distinct note; they are a revival of an old style of water-colour, going back to the days of Girtin, and making believe that the water-colour artist has no palette but a collection of browns and greys. The drawings include a good many more or less architectural subjects, with the buildings drawn in the prim naïve manner of the period imitated. In their way they are very clever, and some of the small landscapes are admirable compositions. It is an imitation, but an interesting one.

## LETTER FROM PARIS.

THERE is a great rivalry in the artistic world for the succession to the place occupied in the Académie des Beaux-Arts by the late M. Bouguereau. At present the contest has only gone so far as the arrangement of the most favoured candidates on *lycée* as follows: 1st, M. François Flameng; 2nd, M. Lhermitte; 3rd, M. Tony Robert-Fleury; 4th, M. Gervez; 5th, M. Bonnat. Among the unplaced candidates are MM. Tondoux, Gabriel Fevrier, Chartran, Frenet, and Albert Maignan.

At the same sitting, the Académie had the satisfaction of learning that the fine hotel of Thiers, built in the Place St. Georges from the designs of Aldrophe, had been presented to the Institut by the present owner, in order to form an addition to the Bibliothèque Mazarin, which is no longer large enough for the demands on its space.

On Saturday last there was held, at the Ecole des Beaux-Arts, the first exhibition of the Departmental, National, District, and Municipal Schools of Fine Art and Applied Art. Forty-eight schools were represented at this interesting exhibition, the credit of instituting which is due to M. Dujardin-Beaumetz, the Under-Secretary of State for Art, and which will be likely to have no little influence on the future of instruction in decorative art in France. Among the exhibits were to be noticed the anatomical drawings from the schools of Orléans and Douai, wood carvings from Bourges, paintings from Lyons and Bordeaux, textiles from Roubaix, etc. The works will remain here till the 12th, after which those which have received prizes will be lent for exhibition to any city which asks for them.

The competition in decorative design has just been adjudged at the Ecole des Beaux-Arts. The subject was "A Fountain." M. Emile Thomas, a pupil of M. Laloux, obtained a First Medal in the competition.

The Monument to the French Aeronauts (the last work of the late eminent sculptor Bartholdi), after having been successively proposed for the Square St. Pierre at Montmartre, the Place Eglise, and the Place Blanche, is in the end to be erected at the Porte des Terres at Neuilly. The monument, which will be inaugurated, it is expected, in the course of this month, is composed of a pedestal supporting an allegorical group, above which rises a balloon to which the aeronauts are clinging. Among the allegorical group one figure represents the City of Paris, as if fainting with exhaustion; others are dying soldiers, children defending their mother, etc.

A new gallery is shortly to be opened at the Louvre, next to the Egyptian gallery, in which will be exhibited the statues, rings, ornaments, toilet objects, etc., which M. Gayet brought back from his excavations at Arsinoë. Added to this collection is an instructive series of illustrations of the rites of the worship of Isis and of the successive incarnations of Osiris.

At the Petit Palais the gallery desired to the works of Henner is shortly to be opened, and also a small room to be entirely occupied by the drawings of Daniel Vierge. The municipality have been exceedingly fortunate in the series of bequests of works of art which have been made to them, one result of which is that the Petit Palais will soon prove to be too small for all that it is desired to exhibit in it.

At the Musée de l'Armée has been installed a collection of portraits of Marshals of the First Empire created in 1804. All are there, with the exception of Murat, Soult, and Bernadotte. These portraits in oil have not all the same artistic value, but of their historic interest there is no question.

On the 4th and 5th there will take place, at the Georges Petit Gallery, the sale of the art-collection formed by the late M. Crozier. This sale will be one of the most important artistic events of the present year. The first day is to be occupied by the sale of ancient and modern pictures, and of drawings and engravings. This collection includes works by Fragonard, Nattier, Porrochon, Gainsborough, Reynolds, Romney, Lavoye, Watteau, Corot, Delacroix, Diaz, Troyon, Th. Rousseau, etc. The second day's sale will be devoted to furniture and some fine generally, among which are some fine tapestries of Gobelin and Beauvais, from designs by Boucher, Coppel, and Casanova.



M. Marquette, the sculptor, has been commissioned to execute for the Pantheon a monument to the great orators and journalists of the Restoration. This monument, to be placed in one of the transepts, will include statues of Benjamin-Constant, Casimir Perrier, Manuel, Paul-Louis Courier, Armand Carrel, and Emile de Girardin. In the opposite transept will be placed a monument to the generals of the Revolution, which M. Mercie has been commissioned to carry out.

The Conseil Supérieur of the Ecole des Beaux-Arts has decided that the legacy of half a million francs recently left to the Ecole by M. Wilman, a wealthy American, should be applied to the foundation of twelve travelling scholarships of 1,200 francs each, which are to be given, to assist in holiday travel, to three painters, three sculptors, four architects, and two engravers.

The death is announced, at the age of 78, of the eminent sculptor Gustave Crank, a former Prix de Rome, and a pupil of Pradier. His first important work, the Greeks and the Trojans contending over the body of Patroclus, is in the museum at Valenciennes, his native town. He received medals in the Salons of 1857, 1859, 1861, 1865, and 1867; and received the distinction of the Legion of Honour in 1864, was created "Officier" in 1878, and "Commandeur" in 1903. Among his principal works are "Omphale," "Bacchante et Satyre"; "St. Jean Baptiste"; "La Victoire" (in the Square des Arts et Métiers); the pediment sculpture at the manufactory of Sèvres; "Euterpe et Melpomene" (façade of the Tuileries); "La Prudence" (in the church of La Trinité); the tomb of Cardinal Drouet (cathedral of Bordeaux), besides numerous statues of well-known personages in artistic, official, and military society.

#### METROPOLITAN ASYLUMS BOARD.

The usual fortnightly meeting of this Board was held on Saturday last week at the offices, Victoria-embankment.

**Southern Hospital.**—Among the correspondence received from the Local Government Board was a letter approving of the plan of the proposed coal storage at this Institution, and sanctioning the expenditure of 350*l.* on the work.

**Metropolitan Laboratories, etc.**—It was agreed that the commission to be paid to Messrs. T. W. Aldwinckle & Son, the architects for this work, should be at the rate of 5 per cent. on the total cost of the work.

**Joyce Green Hospital.**—Messrs. W. H. Barber & Co. were appointed to measure up the variations in Messrs. W. Smith & Son's contract for the erection of additional buildings at this hospital, at a commission of 14 per cent. on additions, and 10 per cent. on omissions.

**Millfield.**—The Works Committee reported having issued an order on the contractors, Messrs. L. Unfield & Sons, for work at this home to cost about 3,000*l.* The total amount of the contract is 4,250*l.*

**Park Hospital.**—It was agreed to apply to the Local Government Board for an order sanctioning the expenditure of 281*l.* on additional work in respect of the re-setting of the boilers and repair of the foundations at this hospital. The work has been completed.

**Milan International Exhibition.**—In response to a letter from the Hon. Executive Commissioner of the British Commission for the Milan International Exhibition, 1906, the Statistical Committee were empowered to arrange for placing in the Exhibition an exhibit illustrative of certain parts of the Board's work, and it was agreed to apply to the Local Government Board for sanction of a reasonable expenditure for that purpose.

**THE LATE COLONEL STANLEY BIRD.**—Many of the friends of the late Colonel Stanley Bird desire that there should be some permanent memorial to him in recognition of his services to the building trade; and as he was much interested in the work done at St. George's Hospital, and for many years occupied the position of Chairman of the House Committee there, it has been suggested that the endowment of a cot in that institution, of 500*l.*, or something of a similar nature, would be a suitable form for such a memorial to him. Already about 140*l.* has been promised, and an appeal has been issued for subscriptions. The late Colonel Bird was a well-known and respected member of the building trade, and the proposal to perpetuate his memory in this way has many friends. The appeal is signed by Messrs. Benjamin L. Greenwood, President of the Builders' Association; Frederick Higgs, President of the London Master Builders' Association; William Shepherd, President, National Federated Building Trade, England; and Thos. F. Rider, Chairman of the Builders' Accident Insurance Company.

#### FURTHER NOTES ON THE LONDON BUILDING ACTS (AMENDMENT) ACT, 1905.

It is, we think, not altogether unlikely that the analysis of the London Building Acts (Amendment) Act, 1905, which appeared in our issue of November 18, will have come as a more or less unpleasant surprise to not a few architects who have, during the last decade, made themselves familiar with the complex rules of the old Act, and to whom the retrospective and prospective action of the new Act may appear almost bewildering in its all-embracing inclusiveness.

These further notes may, therefore, be of assistance to those who will, in the course of the next few months, find themselves called upon to revise their hardly-acquired knowledge of the building regulations of London by the light of a Statute which, with one or two exceptions in favour of existing buildings, will come into operation on January 1 next.

#### NEW BUILDINGS AFFECTED ON JANUARY 1, 1906.

The "new building" of the new Act may be described as a building which, drawn on paper to-day in plan elevation and section, will not have been begun "bona fide and substantially" to be erected above the footings on January 1, 1906.

But, seeing that from the drawings of to-day spring the buildings of to-morrow, it follows that the architect who would faithfully serve his client must not only have a knowledge of the main features, but must also be familiar with the details of the requirements and procedure involved under the new Act.

Our readers will remember that there may be said to be six classes or groups of new buildings corresponding for practical purposes with the six classes of existing buildings, enumerated in the afore-mentioned analysis.

Taking the groups in their order:—

#### I. AND II.—NEW BUILDINGS HAVING MORE THAN TWO STORIES ABOVE THE GROUND STOREY, AND NEW BUILDINGS EXCEEDING 30 FT. IN HEIGHT (SECT. 12 OF THE NEW ACT).

**Preliminary.**—Ground story means "that story of a building to which there is an entrance from the outside on or near the level of the ground, and where there are two such stories, then the lower of the two; provided that no story of which the upper surface of the floor is more than 4 ft. below the level of the adjoining pavement shall be deemed to be the ground story" (sect. 5, subsect. 11, Act of 1894).

**Height** means "the measurement taken from the level of the footway (if any) immediately in front of the centre of the face of the building, or (where there is no such footway) from the level of the ground before excavation to the level of the top of the parapet, or where there is no parapet, to the level of the top of the external wall, or (in the case of gabled buildings) to the base of the gable" (sect. 5, subsect. 21, Act of 1894).

**Requirements.**—(1) A parapet or guard-rail, where necessary, to prevent persons slipping off the roof, and either (a) a dormer window or door opening on to the roof, with proper access thereto; or (b) a copper- or zinc-covered trap-door, hinged and counterweighted, and a step-ladder leading to roof; or (c) other proper means of access to roof.

**Exceptions.**—(1) Power reserved to Council or (on appeal) to Tribunal of Appeal to sanction reasonable exemptions.

(2) New and existing high buildings are excepted from this sect. 12.

(3) New and existing twenty-person buildings ditto.

(4) Factories are exempt.

(5) Common lodging-houses ditto.

**Procedure.**—Obtain approval of District Surveyor to the position of dormer window, door, or trap-door required under this section.

**NOTE.**—It is to be observed that the same requirements and procedure will, on and after January 1, 1906, apply both to (A) existing buildings either having more than two stories above the ground story, or exceeding 30 ft. in height, except (1) a dwelling-house occupied as such by not more than two families, and (2) factories (see above), and

(3) common lodging-houses (see above); and to (B) existing buildings in communication with shops projecting more than 7 ft. (without exception).

#### III.—PROJECTING SHOPS (BOTH NEW AND EXISTING) (SECT. 10 OF THE NEW ACT).

**Preliminary.**—Where a building is used or adapted to be used as a shop, and part of the building projects more than 7 ft. beyond the main\* front of the building, then, with one exception (see below), the following is the requirement:—

**Requirement** (retrospective and prospective).—Projecting portion of shop to be provided with roof of fire-resisting materials not less than 5 in. thick.

**NOTE.**—Lantern lights or ventilating cowls may be constructed or placed in or upon such projecting fire-resisting roof, provided:—

(1) Such light or ventilator be not less than 6 ft. from main\* front of building, and at reasonable distance from any other external or party-wall.

(2) Sides of light or ventilator (except side facing away from main building) to be carried up in fire-resisting material for 2 ft. above projecting roof.

(3) No part of light or ventilator to be more than 5 ft. high above projecting roof.

**Procedure.**—(1) Council may sanction whole or partial exemption of any projecting shop from provisions of sect. 10 "in any case where it is reasonable so to do."

(2) In event of appeal the Tribunal of Appeal may give such sanction.

**Exception.**—If no persons are employed or sleep in the building of which the projecting shop forms part, the fire-resisting roof is not required; the practical effect of this would seem to be to exclude lock-up shops from the operation of this section.

#### IV.—PREMISES (BOTH NEW AND EXISTING) USED FOR STORAGE OF INFLAMMABLE LIQUID (SECT. 11 OF THE NEW ACT).

**Preliminary.**—Sect. 11 of the new Act prohibits the use as a living-room, workshop, or workroom of any room constructed over, or communicating directly with any part of, a building used for the storage of petroleum,† or bi-sulphide of carbon or ether, or turpentine, or methylated spirit, "or any other inflammable liquid kept for sale or trade purposes in such quantities or in such manner as to cause fire or explosion," unless there be provided the following:—

**Requirements** (prospective and retrospective).—

(1) Adequate safeguards to prevent fire spreading to such living-room or workroom from the part where inflammable liquid is stored.

(2) Means of ready escape from such room in case of fire.

**Exception.**—Jurisdiction of the Corporation of the City of London under Petroleum Act, 1871, is safeguarded.

**Procedure.**—Owner may, if he think fit, appeal to the Tribunal of Appeal within two months of the Council making any requirements under this section of the new Act.

#### V. AND VI.—HIGH BUILDINGS AND TWENTY-PERSON BUILDINGS (SECT. 7 OF THE NEW ACT).

**Preliminary.**—A high building may be described as a building having any story the floor surface of which is more than 50 ft. above the footway.

The phrase "twenty-person building" has been used as a short formula for expressing a building in which sleeping accommodation is provided for more than twenty persons, or which is occupied or constructed, or adapted to be occupied, by more than twenty persons, or in which more than twenty persons are employed, or which is constructed or adapted for the employment therein of more than twenty persons.

**Requirements.**—New buildings of these two groups, V. and VI., must, on and after January 1, 1906, be provided "with all such means of escape therefrom in case of fire as can be reasonably required under the circumstances of each case."

\* It is submitted that this would apply to projections at the back or sides, as well as in the front of the building.

† As defined by sect. 3 of the Petroleum Act, 1871, whether or not petroleum within the meaning of that Act.



**Exceptions.**—(a) A dwelling-house occupied as such by not more than one family is excepted from this provision, even though it be a high building, or a twenty-person building.

(b) Any building, the whole of which is a factory or workshop within the meaning of sect. 14 of the Factory and Workshop Act, 1901, is also excepted.

(c) Any common lodging-house, within the meaning of any Statute for the time being in force relating to common lodging-houses within London, is also excepted.

**Procedure.**—(1) Deposit at County Hall notice and sun-print copy of plans showing proposed means of escape; this notice and plans should be deposited before or at the same time as notice given to District Surveyor under sect. 145 of Act of 1894.

(2) Within one month after deposit Council to give notice to applicant of either (a) refusal to approve; or (b) approval subject to conditions.

(3) Council failing within the time limited to give such notice, then "they shall be deemed to have approved such plans without conditions."

(4) Within two months of refusal or conditional grant by the Council, owner may, "if he think fit," appeal to the Tribunal of Appeal.

(5) Tribunal of Appeal may approve the plans.

(6) Give notice to the Council of completion of building.

(7) Council either to issue certificate or, within fourteen days, to refuse certificate.

(8) Appeal from refusal to issue certificate, as in (4).

(9) Occupation of upper stories in high building or any part of twenty-person building can only take place on issue of certificate.

**Note.**—The operation of the Act in regard to existing high buildings and existing twenty-person buildings is postponed until January 1, 1907 (see sect. 9 of the new Act).

#### GENERAL OBSERVATIONS.

##### CONVERSION.

It is to be noted that sect. 13 of the new Act prohibits the conversion (either by change of user or by structural alteration) of a building in such manner that, when converted, the building will not be in conformity with the provisions of the new Act.

**Procedure.**—(1) Owner or occupier to give notice to District Surveyor of intention to convert, even where no structural alteration but only change of user involved.

(2) Appeal in writing to Council for consent to conversion.

(3) Council, within one month,† either to consent in writing, or to notify owner that consent is refused (giving reasons for such refusal).

(4) Owner may appeal to Tribunal of Appeal.

(5) Tribunal of Appeal may give consent.

(6) Owner must not knowingly or wilfully suffer any building when converted to be used or occupied without consent in writing of Council or Tribunal of Appeal.

#### THE TRIBUNAL OF APPEAL.

Constituted by sect. 175 of the Act of 1894, consists of three members—one member appointed by a Secretary of State, one member appointed by the Council of the Royal Institute of British Architects, one member appointed by the Council of the Surveyors' Institution.

**Procedure.**—The Tribunal have made regulations as to the procedure to be followed in cases of appeal and the fees to be paid, which regulations have been approved by the Lord Chancellor, in accordance with sect. 184 of the Act of 1894.

\* It will be remembered that special exemptions are contained in sects. 28-32 (inclusive) of the new Act. Of these, the operation of sect. 34, subsect. 1, "as to banks and insurance offices," will be of more general application. The exempting clause runs as follows:—"Any new or existing building used or intended to be used to the extent of not less than three-fourths of its cubical extent as a bank or insurance office, or partly for one and partly for the other, of such purposes, by not more than two companies or firms, and used or intended to be used as regards the residue thereof only as a residence for or for providing sleeping accommodation for officers or servants of such companies or firms, shall, so long as such building is not used otherwise than as aforesaid, be exempt from the provisions of this Act."

† Two months during Long Vacation.

#### REPEAL.

The following provisions of the Act of 1894 have been repealed:—

Sect. 5, subsect. 36.—Definition of "fire-resisting material."

Sect. 61, subsect. 2.—Means of access to roof of building over 30 ft. high.

Sect. 63 (the whole section).—Means of escape at top of high buildings.

Second schedule.—The whole schedule of fire-resisting materials.

**Note.**—The new Act contains an amended and extended list of materials which, under the London Building Acts, 1894 to 1905, shall "be deemed to be fire-resisting materials."

Perhaps the most important amendment is the reduction in thickness of hardwood doors and staircases from 2 in. minimum in the Act of 1894, to "1½ in. finished thickness" in the new Act, whilst important additions are:—

For general purposes, "any combination of concrete and steel or iron," and, in the case of glazing for windows, doors, and borrowed lights, lantern, or skylights, glass not less than ¼ in. thick in direct combination with metal of high-melting point in squares and panels of a limited size in fire-resisting frames of hardwood or of iron.

#### THE NATIONAL TRUST FOR PLACES OF HISTORIC INTEREST:

##### PRESERVATION OF GOWBARROW FELL.

ON Thursday afternoon in last week a meeting, called by the National Trust for Places of Historic Interest or Natural Beauty, was held at the United Service Institution, Whitehall, under the chairmanship of Sir Robert Hunter.

The Chairman said the meeting had been convened by the National Trust to urge upon the public generally the importance of enabling them to complete the purchase of Gowbarrow Fell and Aira Force on Ullswater, and the broad fact he had to mention was that they had received 10,300l. out of the total of 12,000l. required for the purchase, and he hoped that would in itself prove that the proposal had met with the general acceptance of the public.

Still, they had to complete the purchase by the end of the year, and by that time he trusted they would be able to hand to Mr. Howard the full sum of 12,000l., or be able to make a binding contract with him for the purchase of the site.

Gowbarrow was pre-eminently a place of beauty, and it was impossible adequately to paint the attractions of such scenes as it possessed. All that one could do was to give the bare bones. They had at Gowbarrow every feature short of lofty mountains, which went to the constitution of a succession of lovely scenes. They had the bold fell, rising to a height of something like 1,400 ft. above Ullswater.

They had a lovely glen, from which tumbled down to the lake the Aira, making a succession of waterfalls, and down the glen they had a charming and endless variety of combinations of wood and stream, while beyond was the lake. From the top of the fell they had distant views over a great part of the lake country. In the second place, Gowbarrow was easily accessible. It was within four miles of Troutbeck Station, and was within easy carriage drive of Penrith, which was on the main line of the London and North-Western Railway. It was in the regular line of tourists to the Lake District. Not only was it accessible now, but in the natural course of events it would be more and more accessible as time went on, for motoring was now but in its infancy. Thirdly, he submitted very confidently that Gowbarrow was not costing too much. There had been some correspondence lately in the Press on the matter, and he would like to refer briefly to the subject. In all these cases too much importance could not be attached to buying before the land came into the building market. Where there was an urgent case for preserving land for the benefit of a great town, there were local authorities endowed with powers by Parliament to effect that kind of purchase, but it was where local authorities were not prepared to step in that the action of such a body as theirs was of especial value. That was eminently the case with Gowbarrow, and it was just such a case as this that the National Trust was established to deal with. The

purchase of Hindhead was a good example of what could be done, for the rights there had been secured for a comparatively small sum, and the place had been preserved against any risk of encroachment.

Another object of the Trust was to go into districts which were not in immediate danger of being built on, but which were of great beauty, and acquiring such districts for a comparatively moderate sum, and so preserving them for generations yet to come.

If they waited in such cases until building was about to commence the cost of acquiring them would be greatly increased, and so it was of importance that they should be a little in advance, and buy places of this kind when they were not at too high a price. In this case Mr. Howard, who was a large landowner, offered through Canon Rawnsley, the whole of Gowbarrow Fell and Aira Force, with Lylphs Tower, for 18,000l., and they took the advice of a competent surveyor in the district, who said the price was not too much. They felt, however, that the cost was a large sum to ask the public to subscribe, and so they asked what Mr. Howard would accept for the property without Lylphs Tower, and they came to an agreement to leave the house and forty acres of land and pay 12,000l. for the remainder. They were buying 740 acres of land, and the magnificent fell, rising from the shores of the lake to some 1,500 ft. above the sea, and the Aira Force, one of the most noted waterfalls in the Lake District.

He might mention that falls were not very safe, for the Falls of Taper had been put into a pipe and taken away to make acetylene gas, and such a fate might be that of the Aira Force. Then they purchased the exquisitely beautiful glen, through which the stream fell to the lake; a large area of parkland, sloping from the higher parts of the fell to the high road which ran from Pooley Bridge to Patterdale; while beyond the road they got the verge of ground upon which Wordsworth saw his daffodils, and which gave access to the lake. If a private person were to buy that strip of land he could prevent landing from the lake to get to the road. They were also buying the bed of the lake to the extent of about one-half, which would get rid of the difficulty which had arisen in other places with regard to boating. Further, they purchased a landing-place for steamers, which would enable people to take boats at Aira Force and go over to the other side, which at present was almost impossible.

The Lake District was a small one, and its mountains and lakes were on a very modest scale, and perhaps it was owing to its being so small that it was so exceptionally beautiful, because within a narrow compass they got great natural richness of growth and verdure and such combinations of wood and water. The fact that it was so small and had such a refined beauty, made it all the more easy to spoil. It was eminently a district which the nation should possess, and were it situated in the United States no doubt it would be treated as Yellowstone Park was. That could not be done in this case, and so he appealed to them, by the voluntary efforts of the Society, to strengthen the hold of the nation upon the Lake District and preserve its loveliness intact for that large and ever-growing section of the community which found its keenest pleasure in the splendour and glory of creation.

Mr. Alfred Austin (Poet Laureate) moved:—"That this meeting warmly sympathises with the aim of the National Trust in trying to secure Gowbarrow Fell for preservation for the nation, and wishes to express its earnest hope that the balance of the purchase-money still required may be immediately forthcoming." He said that, notwithstanding his warm sympathy with the object, he hesitated to accept the resolution to come there and propose the resolution, firstly, because he felt he had no money-collecting or subscription-raising power, and, secondly, because he knew that at present appeals were being made for the unemployed, and it might be said that this was an untimely occasion to appeal for funds for what some persons might describe as a prospective luxury rather than a pressing necessity. In answer to these causes of hesitation two reasons arose in his mind. In the first place, he had been pressed by Canon Rawnsley to come, and, in the second



Proposed Cottage at Letchworth, Herts. Messrs. Taperell & Haase, Architects.

place, the time left for the collection of the money was very short. He believed that now the fund amounted to 10,800. His personal recollections of the district were amongst the most pleasant of his life. He remembered enjoying the hospitality of Lynghs Tower, and on the morning after his arrival he saw the red deer looking into his bedroom window. His gracious hostess consulted him as to how a garden could be laid out round the house, and he advised her to make no garden there, but to leave the deer liberty to roam and browse as they had done for generations, for such a setting was worth all the gardens in the world. But he had a recollection which went still further back. It was at the time of an election turmoil, and he had been engaged in the strife, and then retired to Pattendale, and, "filled with peace which passed understanding," he contrasted it with the rapid discourses to which he had listened and which he had himself delivered, and when he heard the church bells chiming out their silvery notes he could not help exclaiming, "This is the truce of God." In the busy manufacturing north they must have the disagreeable committants of large towns, and the residents desired to repair to the districts such as the Chairman had described. It was to such districts that men turned for comfort, consolation, and balm; and in no period of the world's history was this refuge so much required as now. Some took a very sanguine and optimistic view of what was called progress and material civilisation; some of them contemplated its results with less hopeful minds, but, at any rate, I was impressed upon all that it was attended by grave difficulties and by much human suffering. Let them repair, then, to Gwylbarrow, which was to be purchased for them for all time, and listen to the music of its running streams and wander and wonder amongst its bracken-covered slopes. Miss Octavia Hill seconded the motion, and said that the process of enclosure, perfectly legitimate and quite inevitable, was proceeding all over England, and at an accelerated pace the more the town populations took holidays; and the delightful sense of freedom which walking over unenclosed land gave was becoming rarer year by year. There was a deeply-seated human longing for beauty which needed to be met—they wanted to go to nature and feel the blue sky over them and drink in silence the beauty of Nature in calm and storm. The National

Trust had taken as one branch of its work the satisfying of this great need. It had set itself to secure acres of special beauty here and there and preserved them, and they had secured such land in Cornwall, Wales, Kent, Surrey, Monmouthshire, Cumberland, and Cambridgeshire, and now they wanted the money to buy the largest area the Trust had yet attempted to secure. Could they readily imagine a more satisfactory gift to make to the nation than this land? Over 1,200 persons had subscribed, and in several cases groups of persons had subscribed as a memorial to some person. The purchase price worked out at 18s. an acre, and she knew of no way in which that money could be spent to do more lasting good.

Sir W. Lawson, in supporting the resolution, said he was not what was called an æsthetic man. He was delighted to see that the Poet Laureate a short time ago described the Derwentwater Lake as the most beautiful place in the world, and he had no hesitation in saying that Ullswater ran it a good second. He could not paint the lily himself, and was sorry that Canon Rawnsley was not present, because Canon Rawnsley, in a small way, was doing for Cumberland what Sir Walter Scott did for the Highlands a hundred years ago.

Mr. Nigel Bond, Secretary, read a letter which had been received from Canon Rawnsley, in the course of which he said:—"The work of the National Trust is too well known to need speaking about. Only in the present week a beautiful property in the South of England of 700 acres on Hindhead Hill and its surroundings has come to us to be cared for and safeguarded for the British people. The spirit that prompted the Surrey ladies and gentlemen in this wise and beneficent action to secure Hindhead and the Devil's Punch Bowl 'from rash assault' is the spirit of our Trust. You are asked to help us to make it possible for generations to feel that they have a right to a portion of the shore on Ullswater, to the glorious fell with its red deer and wild-bird life, to the mountain that, rising from the shore to a height of 1,500 ft. above sea level, gives one of the most magnificent prospects of lake and mountain in Cumberland, and the right, also, to one of the most bewitchingly beautiful glens and streams and waterfalls of the Aira Valley and Aira Force which remains to us in their virgin loveliness.

Wordsworth, who knew it well 100 years ago, speaks enthusiastically of the way in which its naturally sown and grown woodland has been untouched by the woodman's axe, and what Wordsworth saw and felt we can see and feel to-day. I certainly know nothing more exquisite in well-wooded growth than the birches one passes under and the thorns one passes by as one descends from Dockwray to the Aira Force."

The resolution was carried, and a vote of thanks to the Chairman, proposed by the Dean of Carlisle and seconded by Mr. Temple (Guildhall Art Gallery), concluded the proceedings.

#### PROPOSED COTTAGE AT LETCHWORTH.

We give an illustration of this as an experiment in treating a cottage with a flat roof; a point to which we have already drawn attention in our review of the Letchworth exhibition of cottages.

The cottage was designed to meet the requirements for a cheap, substantial building to cost not more than 250l. The walls and partitions to be built with grooved Fletton bricks; the external walls to be rendered with cement and pebble dashing, the upper part coloured a light cream, and the lower a natural grey.

The woodwork is generally square or chamfered; the external woodwork stained a dark oak and varnished; the ground floor covered with cement-concrete 6 in. thick, floated to receive cork lino.

The roof is covered with three-ply Ruberoid, laid on 1 in. boarding; the eaves project 2 ft. all round the building. It was originally intended to have a battened and local tiled roof, but by the use of a flat a saving of 24l. 10s. was effected.

The height of the rooms is 8 ft. 6 in. in the clear. The cube of the building is 18,454 ft., measured from top of concrete foundations to top of flat. The contract price is 240l., which is 3½d. per ft. cube. This price includes drainage and the house decorated and ready for occupation.

The builders are Messrs. W. & A. Cook. The architects are Messrs. Taperell & Haase, of London.

The flat roof is made with 7 in. by 2 in. joists covered with 1 in. boarding and Ruberoid. A flat roof in concrete-steel was found too costly, though of course it would be more satisfactory otherwise.



The architects obtained the following results as to the cost of three different forms of roof for this house, which it may be of interest to give. The figures on the small plans in the corner of the illustration will give the area to be covered:—

1. Batten and tile roof, pitch 45°, eaves projecting 1 ft. all round	2 s. d. 66 3 9
2. Concrete and steel flat, covered with two layers of 1-ply rubberoid	51 11 0
3. Wood flat boarding and 3-ply rubberoid, eaves projecting 2 ft. all round	42 14 4

#### PAVING OF ROADWAYS.

At a meeting of the Tramway and Light Railways Association, held on Thursday evening last week at the rooms of the Society of Arts, Mr. W. L. Green (Paving Manager of Millars' Karri & Jarrah Company, Ltd.), read a paper on "The Paving of Roadways." Mr. W. L. Green (Managing Director of the Metropolitan Electric Tramways, Ltd.) presided.

Mr. Green, in opening his subject, dealt with the famous ancient roads of Egypt, Greece, India, and Italy, and, coming to England, said that in 1285 the first Act of Parliament relating to roads was passed. He briefly referred to other Parliamentary measures passed till the time of Macadam, and remarked that although Macadam first adopted the system to English roadways, yet the idea of breaking stones had long been in use in Sweden, Switzerland, and other countries. The next development in road-making was effected by Telford, who laid out no less than 920 miles of roadway, and since his period there was little change in the manner and method of paving until they came to the time when modern requirements demanded qualities and conditions not previously insisted on. Tar-macadam was laid in Nottingham so far back as 1840, but the method of doing the work had been greatly improved. The advantages of tar-macadam over ordinary macadam, put briefly, were economy in upkeep, the insuring of a solid surface, the prevention of dust, and, consequently, mud, and increased facility of traffic. A new method of armouring macadam roads which was in use on the Continent was also worth consideration. It was first tried by Baurath Gravenhorst, of Strade, in the province of Hanover. He selected stones of approximately equal size and cubical shape, and placed them single and cubical, and the carefully-levelling and rolled surface of the old road. The result was a mosaic-like covering which proved to be of extraordinary durability. The next step was to increase the size of the stones, and the two sizes now in general use were  $\frac{3}{4}$  in. by 4 in. and 4 in. to 4½ in. depth. The entire cost of paving the Wiesbaden roads on this system was 5s. per superficial metre. The essentials of a perfect paving for cities was that it must have a perfectly solid foundation, be non-absorbent, have a smooth and even surface offering the least resistance to traction, non-slippery, noiseless, durable, not subject to expansion or contraction, easily cleaned and repaired, and, lastly, it must have a pleasing appearance. This was, of course, an ideal which had never yet been attained, and he did not suppose it ever would be. The value of any form of paving was according to its suitability to the locality in which it was used, and to the traffic which had to pass over it. There were few, if any, materials which were capable of adaptation to every purpose, and there was no standardisation of paving materials by which one could make a selection for a special set of conditions. Asphalt was undoubtedly a fine pavement for level thoroughfares, and was impervious to moisture, and formed a very sanitary pavement. It was, however, particularly susceptible to climatic conditions. In all paving operations the foundation was the true roadway, and the surface was the veneer or cushion, whether it be of asphalt, hardwood, softwood, or other material. To make a good asphalt carriage-way a proper foundation was as necessary as it was for any other material used for street paving. Mr. Green proceeded to quote the figures of Mr. Oxtoby, the Borough Engineer of Camberwell, as to the cost of asphalt. As regards first cost, mastic asphalt was the cheaper, but its life was not so long as when compressed. The London County Council would grant loans on it for seven years only. The compressed asphalt cost more in the first instance, for

the London County Council granted loans for ten years on it, but it had been down in the City and Holborn, with heavy traffic, from seventeen to twenty years. Wood pavement was laid in front of the Old Bailey as early as 1839 on the Stead system, and following this came De Lisle's method, Carey's pavement, Improved Wood from the United States, the Lingo mineral pavement, asphaltic wood pavement, Benson's pavement, and Mowlem & Co.'s method. All of these employed wood blocks as the surface pavement. Pine was the wood used, but amongst the woods now in general use for paving were deal, pine, jarrah and karri, and blackbutt, the latter being a New South Wales wood. The two best Australian hardwoods, jarrah and karri, were now most widely used. As a rule 5-in. blocks were used, but from long experience he believed that 4 in. was sufficient, and, in some instances,  $\frac{3}{4}$  in. The suggested saving in depth would make the paving considerably cheaper, and would not affect the wear. Blackbutt was not largely used in this country, and the slight loss in wear annually of this wood in the streets at Sydney he thought arose from the fact that the surface was treated once or twice each year with a dressing of distilled tar and sand—a method which he would strongly recommend in this country. For quietness, softwood stood before hardwood, and for safety both hardwood and softwood came before asphalt. For ease of cleansing hardwood stood before softwood, and for traffic resistance the hardwood must necessarily be first. The first cost of softwood was below that of hardwood, but when the question of maintenance was taken over a period the cost was greater than that of hardwood. But one of the most important matters in connexion with any paving was that of foundation, for a defective foundation meant a bad, irregular roadway, however excellent the paving used. Experience had shown that the best foundation was composed of cement-concrete, and it followed that the more perfectly this was done the longer the duration of the wood, granite, or asphalt veneer. But under this concrete roadway was another foundation, one of earth, which had frequently been disturbed for a considerable distance, and which, if not properly consolidated, would render all care afterwards of little avail, for the traffic followed the completed street so quickly that depressions must occur if this was not very well done. For wood paving it was imperative that the exact falls required should be given to the surface of the concrete, but for granite and asphalt this was not so important. There was a considerable difference of opinion as to the proper form of joints for wood paving. His own experience was that blocks should be laid as closely together as possible, consistent with the fact that sufficient space was allowed to ensure that the 4-in. pitch or cement grouting thoroughly penetrated the joints all round the blocks, thus providing a watertight surface. Blocks for close jointing, of course, needed special care in cutting, or they got rocking blocks.

Mr. Trier said Mr. Green had made some reference to the small setts which were now being used considerably on the Continent. This system of paving was started about ten years ago in Hanover by one of the county engineers there. Having experimented, this gentleman at last laid small setts in an irregular manner, like a mosaic, on the old macadam, and this was found to wear splendidly. He had seen roads in Hanover which had been down fifteen years, and they still looked very good. He admitted that the traffic was not such as they got in London, but, on the other hand, local lime and sandstone was used and not granite. The system was extending in Germany, and they were putting these small setts down in the streets of the German towns which were so famous for the beauty of their buildings and streets. Such setts had been put down on roads connecting large towns where the wear and tear of the macadam road necessitated the renewal of the macadam three times in two years, and they had found that this new paving paid for itself. One of the chief points in these, as with other setts, was that they should vary in depth. The usual sizes varied from 8 to 10 centimetres—the 8 centimetres were put by the abutments, the 9 centimetres in the crown, and the 10 centimetres at the sides. They also used this system of small setts in the side walks in Germany, but in

these cases they did not use the deeper setts. They used those more like hand-broken macadam, which was not slippery, and looked very well. He had also seen them used in some of the squares, where they were utilised to make patterns. In Hamburg it was laid in different coloured granites, and made a very fine impression. He knew that they put these setts down between the tram lines on main tram routes, but just outside the rails they put larger setts, as they found the foundation was not good enough for the small setts. One of the essentials of this paving was that it should be well bound, and he might mention that if one drove over a piece of this paving next to the large setts the immediate decrease in the rattle and noise was very noticeable.

Mr. Percy Morris, speaking from the contractor's point of view and as one who had had large experience in paving, said he thought that jarrah was better wood for paving than karri. Mr. Green said that a great deal of the bad results was due to bad cement. Whether that was so in times past he did not know, but, nowadays, engineers and surveyors were so strict in their specifications that it was a mistake to put down any subsidence in the road to inferior cement. Mr. Green had said nothing about granite setts generally for paving, but he (the speaker), while admitting that in the centre of cities, owing to the noise, granite setts were not in such favour as they used to be, yet, even now, he believed they would admit that granite setts were the cheapest in the long run for paving. With regard to the paving of tramways he believed that tramway engineers would have much better results if they could give a little more time for the execution of their work.

Mr. Pott said it was not the tramway engineers who hurried the work, but the surveyors in whose districts the work was being done. He would like Mr. Green to give them his opinion of what was best for paving. Assuming that they had to use wood paving, as most tramway men were now driven to, he would like to know what his view was with regard to dealing with the margins. He would like to know what Mr. Green considered the life of hardwood laid under the very best conditions for tramway margins, and, further, what he would think would be a fair price for contractors to take up the maintenance of these 18-in. margins.

The Chairman said that tramway people felt that they were suffering under a grievance with regard to paving. When horse traction was the rule the damage was done by the horses' hoofs, and it was fair that the tramway company should maintain the roadway, but now electric cars only used the rails, and yet the tramway company had to pay for the road which was destroyed by the other traffic. While, however, the system remained they would seek to lay down that which cost least, and which could be most economically maintained. He would like to know how jarrah compared in cost and durability with granite, and how it was possible to ensure uniformity in hardness of wood paving. He would also like to hear something about what had been recently done on the Thames-embankment. He believed that tar-macadam was put down there, and he must say that travelling over it in a rubber-tyred carriage was very agreeable. He noticed that this was being removed, and took it as an indication that the whole thing had been a failure. He expected, however, that whatever was put down on the Embankment was doomed to failure because the shifting foundation was the cause of the mischief. Mr. Green had mentioned the use of wrought-iron in connexion with concrete, and he would like to know if he had considered the use of expanded metal in this connexion.

Mr. Green, in reply, said the statement that karri was better than jarrah came from the Agent-General for Western Australia, and was not his own statement. He did not mention granite setts in particular, for there were so many forms of paving, and if he had gone into all of them his address would have been too long. He agreed that sufficient time was not given for allowing the concrete to set properly, and this did not give whatever was placed on it a fair chance. Some time ago he passed through a road in London at seven in the morning and 2 in. or 3 in. of floating was being put on. At seven o'clock the next morning the blocks were



being put on it, and they could not be surprised that the pavement did not prove satisfactory, laid under such conditions. It must be remembered that the weight of the present-day tramway was about 12 tons, as compared with about 4 tons in the old days, and no one was yet able to gauge what the effect of these heavy tramcars was going to be on the paving and rails. He preferred not to answer the question put as to which was the best wood for paving, as he was connected with a wood-paving company. It was also impossible to say what a contractor ought to undertake the maintenance of margins for. All the traffic in a road seemed to go within an inch or two of the tram rail, and whatever paving might be there it had to suffer. With regard to the tarmacadam on the Embankment he did not think it would stand for long because he knew that the subsoil of the Embankment was a very difficult matter to deal with. He had not seen expanded metal applied for concrete trenches, but saw no reason why it should not answer. As far as regarded wood and granite for tramways, there was little in it so far as durability was concerned. The cost of granite in the first place, he believed, was rather heavier than wood, but there was no doubt but that the cost of maintenance was less. Uniformity of hardness in the wood could only be secured by close inspection and selection of the woods.

#### THE BUILDERS' BENEVOLENT INSTITUTION: ANNUAL DINNER.

The fifty-eighth annual dinner of the Builders' Benevolent Institution was held on Thursday last week in the Whitehall Rooms, Hotel Metropole, W.C., the President, Mr. R. Hammen, jun., presiding. There were also present, amongst others, Col. G. Haward Trollope, V.D., Major J. A. Thornhill, and Messrs. J. Aldwinkle, H. H. Bartlett, J. T. Bolding, E. J. Brown, E. J. Burr, C. Russell, J. Howard Colls, J. Carmichael, Stephen Collins, L.C.C., W. Downs, J. E. Dromer, R. Ensor, Basil P. Ellis, Benjamin I. Greenwood (President of the Institute of Builders), E. A. Gruning, Hy. Holloway, J.P., W. H. Howard, E. C. Hammen, F. Higgs, H. F. Higgs (President, London Master Builders' Association), W. Higgs, F. Hooper, H. T. Hare, J. Keith, Walter Lawrance (President, Quantity Surveyors' Association), J. W. Lorden, E. L. Lutyns, L. J. Maton, F. May, D. W. McLimes, G. M. Nicholson, Hy. Northcroft, Rowland Plumbo, E. A. Parker, J. F. Parker, A. N. Prentice, A. Rashleigh Phipps, T. F. Rider, A. Ritchie, J.P., T. Stirling, G. Sherrin, Howard W. Trollope, Howell J. Williams, L.C.C., and T. Costigan, secretary.

The loyal toasts having been honoured, Mr. H. H. Bartlett proposed "The Imperial Forces," and in the course of his remarks he referred to the great works which contractors were continually carrying out for the Army and Navy—barracks, hospitals, barracks, docks, etc.—without which they could not do; and it was obvious, therefore, that, apart from all else, the building trades benefited from the existence of the Army and Navy.

Col. Haward Trollope, whose name was coupled with the toast, suitably replied.

The Chairman then proposed the toast of "The Builders' Benevolent Institution." He said that the number of men pensioners at the present time was thirty-three, and the women, thirty, and their average age was twenty-three years. Since the last report was issued three of the men pensioners had died, and, in the ordinary course of events, the widows will come on the funds of the charity. The elections were held in May and December, and it was the object of the Committee to try and avoid contested elections, for they entailed a great amount of trouble and expense to the charity as well as to the pensioners. Each male pensioner receives 42s. per annum, and each woman 30s. a year, and in the case of death 5s. was given towards the funeral expenses. The total amount received last year in subscriptions, donations, and interest was 2,159s., and the total amount paid out in donations, 2,316s., or 157s. to the bad. It was obvious that the charity could not always do that, and they were making a special appeal this year for funds because of

this deficit. An interesting fact in connexion with the affairs of the charity was that the total expense of management was only 12 per cent., and that would compare very favourably with the expenses connected with the management of any charity in London. In the balance-sheet was included the Walter Watson legacy of 50s., and the money had been invested in Consols at 24 per cent. The amount of work entailed in the management and carrying on of the Institution was considerable; every case had to be investigated, the money promised had to be collected, and, in addition to other duties, there was the work of finding a President year after year. The whole of this work fell upon the Committee and the secretary, and in that connexion he wished to mention three names—names of men who had devoted time, etc., to keeping the Institution going, i.e., Messrs. Bolding & Russell, and Mr. Thomas Stirling, who aptly devoted his life to doing good to others who were in trouble. There were others who gave ungrudging help, including the stewards. The Institution was also indebted to those architects and surveyors who readily came forward and helped, not only in the way of money, but by attending that dinner. Then there were the merchants who nobly assisted by subscribing to the funds of the Institution. But charity began at home, and he hoped that the master builders would continue to help the Institution, for the funds must come in the main from builders, and the interest and welfare of the charity should principally be looked after by the master builders. That evening he was making a special appeal for help, and especially to the builders, and, in conclusion, he would ask them to remember the words of General Gordon, i.e., "Any good thing that you can do, or any kindness that you can show to a human being, do it now; do not wait or defer it, and remember that you will pass through this world but once."

The toast, having been well received, Mr. Howard Colls proposed "The President," and, in doing so, he said that the Committee had a keen desire that Mr. Hammen should be their President this year, and it was a great pleasure to them when he consented to do so. In 1866 Mr. Benjamin Hammen, sen., occupied that chair, and they were all delighted that his son now occupied that position. As treasurer, he (the speaker) would quote one part of the report, i.e., that the acute depression in all branches of the building trade had affected the Institution, and the Committee had appointed a canvasser in order to get the support of a large number of metropolitan builders who had not hitherto assisted the charity. There was considerable difficulty in getting help for a charity like this, and the Institution owed a great debt of gratitude to past-presidents and to the present President for their assistance; but the backbone of the Institution should be the annual subscriptions. Mr. Hammen had succeeded in getting a large amount of money for the Institution, and their best thanks were due to him.

The Chairman, who was received with musical honours, replied and said that he noticed that whenever the Government wanted money they enlarged the area of taxation, and his idea in collecting money on behalf of the Institution had been to enlarge the area of help. The proper people to tax to support the Institution were the people they built for.

Mr. Benjamin I. Greenwood then proposed the toast of "The Architects and Surveyors," and, in doing so, he said that they wished architects and surveyors good health—work always proceeded more smoothly when men were in good health—long life (for they preferred to do business with this generation rather than the next: the old school had learnt so much), and prosperity, for when architects and surveyors had plenty to do builders had plenty to do. The building trade was indissolubly connected with the professions of the architect and the surveyor, and there always should be good relations between them all. He was glad to say that the Institute of Builders was in cordial relations with the Royal Institute of British Architects; perhaps more so now than ever, as for almost a generation there had been a bone of contention between the two as to the conditions of contracts, but now that that difference no longer existed, the relationship was much more cordial, and he hoped it would

become more so still. Sir Aston Webb suggested the other day that it would be desirable if there were more opportunities for architects and builders uniting to consider matters of construction, and so forth. That view was entirely reciprocated, he believed, by the Builders' Institute, and he thought it would be for the benefit of architects and builders if there were more frequent opportunities for discussing these matters. A conference was to be summoned between the architects and builders to discuss construction in regard to reinforced concrete, and perhaps that would form a precedent which would be of mutual advantage not only to them but to the clients also.

Mr. E. A. Gruning, whose name was coupled with the toast, in reply said that as to the conditions of contract, with the arrangement of which and the amicable settlement that was come to, he had had a large share; he cordially congratulated them on having arrived at this happy settlement.

Mr. Walter Lawrance responded for the surveyors, and spoke of the excellent work the Builders' Benevolent Institution was doing, and the necessity for such work.

Mr. F. Higgs then suitably proposed the toast of "The Vice-Presidents, Committee, and Stewards," coupled with the name of Mr. T. F. Rider.

Mr. Rider, in the course of his reply, asked why the scope of this valuable charity could not be enlarged? There was not only the London Master Builders' Association, but the National Association of Builders, and why could they not have a Builders' Benevolent Institution of Great Britain? He hoped the Committee would consider the possibility of extending the benefits of the charity.

During the evening subscriptions and donations to the amount of 1,292s. were announced, the Chairman's list amounting to 1,000s., which included 102s. from himself; 50s. from the Institute of Builders; Lee & Eastwood, Ltd., 26s. 5s.; Trollope & Colls, Ltd., 30s.; and the Proprietors of the Builder, 11s. 11s.

#### ELEMENTARY SCHOOLS.

THE Education Committee of the Staffordshire County Council have recently obtained the Board of Education's sanction for the erection of a group of elementary schools, which are planned on somewhat novel lines. The innovation appears to have been made to meet the views of Dr. Reid, the Medical Officer of Health for the County, who thinks that in the designing of schools more attention has hitherto been given to "educational administrative requirements than to health conditions, especially as regards ventilation"; the central-hall type of school cannot, in his opinion, be adequately ventilated by natural methods, and, as mechanical ventilation was not approved by the Education Committee, Dr. Reid and the Committee's architect, Mr. J. Hutchings, were instructed to prepare plans on different lines. We have received a print of the approved design, which has received the name of "The Staffordshire Type of Elementary School." The plan is really a reversion to the old type of school building, but with some modifications. The two departments for girls and boys are exactly alike, each accommodating 312 children in six classrooms (four for forty-eight children and two for sixty). On the principal front there is a classroom for sixty at each end, and two for forty-eight (separated by a folding partition) in the centre, and between the large and small classrooms are two cloakrooms. In the rear of the cloakrooms are two projecting wings, each containing a lobby and a classroom for forty-eight. Two entrances are provided, one to each lobby, and are connected by a low, open verandah along the back of the two central classrooms. Each department consists, therefore, of two groups of three classrooms, each group having a central lobby and a cloakroom; communication between the two groups is effected by means of the open corridor and by a door in the folding partition between the two central classrooms. Each classroom has windows of equal size on both sides of the scholars, and the windows have hopper-lights at the bottom and sashes above, thus reversing the arrangement adopted in hospitals.

Schools of this type will be costly on account of the large amount of external wall, and the cloakrooms are too near the doors



Mr. C. W. Callcott, sanctioning the formation of a new street, laying-out of new streets for foot traffic only and in connexion therewith the erection of buildings and an iron and glass shelter upon a site of



the southern side of Highgate-hill and western side of Junction-road, Islington (Mr. J. W. Galton).—Consent.

#### Space at Rear.

**Bristol.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a house on the north-western side of Atherfold-street, Clapham (Mr. V. Vagnoliri for Mr. W. P. Gossey).—Consent.

**Bristol.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of three blocks of artisans' dwellings on a site on the east side of Stockwell-road and south side of East-place, Brixton, with irregular open spaces at the rear (Mr. P. Tres for Foster's Trustees).—Consent.

**Bermundsey.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on Lot 2, Tower Bridge-road, Bermundsey (Messrs. Barlow, Roberts, & Thompson).—Consent.

**Depford.**—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of eleven houses on the northern side of Lamerton-street, Depford (Mr. G. A. Lansdown for Mr. T. E. Lamerton).—Refused.

#### Means of Escape from Top of High Buildings.

**Strand.**—Means of escape in case of fire, proposed to be provided in pursuance of section 13 of the Act, on the topmost story of Nos. 226 and 227, Piccadilly (Mr. H. A. Woodington).—Consent.

The recommendation marked † is contrary to the views of the local authority.

### THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The third meeting of the session was held at 18, Tufton-street, Westminster, S.W., Mr. F. Lishman being in the chair, when Mr. H. Passmore read a paper on "Village Schools," of which the following is an abstract:—

In introducing the question of modern planning requirements, Mr. Passmore dealt with the gradual rise and extension of education, advocating a fuller study of country occupations for the children in village schools. The regulations for public elementary schools issued by the Board of Education were commended for their practical instructions on planning and construction. The first points to be considered were:—(1) Total number of scholars to be provided for; (2) the respective numbers of boys, girls, and infants—the latter class needing a margin to meet the varying attendance at different seasons. The next care is to arrange the needful accommodation as simply as possible, and most suitably for the site. Small schools may well be planned as a single room, but must not, in that case, exceed 600 ft. in area. There should be separate entrances and cloakrooms for all three departments in larger schools, though, if required by special circumstances, the infants and girls may enter by the same door. These cloakrooms should not be passages, and need separate entrance and exit doors. Good ventilation and lighting are essential here, and the dimensions given in the regulations must be observed. Basins, in proper proportion for girls than boys, need to be provided, fitted with self-closing taps. A drinking tap in each department and a sink and cupboard for caretaker's use are also wanted. In planning classrooms the light should fall from the left hand, and the spot chosen should always be a sunny one. Cross-ventilation must be provided by windows preferably high up in wall opposite to that containing the windows for lighting purposes. This can often be secured over cloakrooms by keeping the latter lower than the main buildings. Classrooms should have a floor area equal to at least 10 sq. ft. per child, and accommodate not less than twenty-four, or more than fifty or sixty. The infants' room needs a clear space for physical drill, not less than 12 ft. wide. Open fires are the best and most practical means of warming. Latrines must be placed well away from the school buildings, providing for all three departments separately. In small schools closets common to girls and infants may be allowed. Trough closets with automatic flushing tanks are satisfactory. Earth closets should be used where no main sewer is available. In a school of 100 children allow at least five closets for girls, three for boys, and four for infants. A glazed channel, automatically flushed, forms a good urinal. The playground should have a lean-to against one

boundary wall for exercise in wet weather. Desks are arranged on stepped platforms, either continuously or in "pairs." Space has to be allowed for the teacher to pass between the rows and behind the back row. The desks are slightly inclined and the seats provided with backs, and capable of being turned up. The teacher's desk stands on a platform, and is provided with cupboard and drawers; and a shelf on each side is useful. A cupboard for books is also needed. Folding partitions are useful to divide the classrooms; those separating the infants' room should be made as soundproof as possible. A blackboard on the middle of the wall facing the scholars is needed. The materials used in construction should be local where possible, and used in the way traditional to the district. Plaster walls, finished with distemper, give a pleasant finish internally, glazed brick forming a good dado; so also does linoleum finished with wood capping and fillet at foot. A picture-rail is useful. Sash windows are probably preferable to casements, but lights high up may be hung as hoppers, or on centres. Doors should open outwards. Internal woodwork is best if stained and varnished as a finish. It is better not to leave roofs open to the apex. Ventilation may be by trunks above the ceiling, but special care has to be taken to prevent down-draught, and a ventilating flue beside the smoke flue is probably better. Floors should be solid; those in the classrooms of wood-block in mastic on cement-concrete, and those to cloakrooms, etc., of tiles or granolithic. Mr. Passmore concluded by urging the teaching of local history and literature in the village school, believing that therein lay the future of true country life.

Mr. P. Turner, in opening the discussion, referred to the difficulties often found in providing a good water supply, and thought that the collection and filtration of rain water would often meet all needs. The waste from urinals could be disposed of by running it into a length of 6-in. pipe filled with sawdust. Artificial lighting had not been referred to; acetylene could now be used in many cases.

Other speakers referred to the fuller use of windows as ventilators, in preference to more elaborate arrangements. Mr. Peters advocated the adoption of open-air classes. Mr. Mellor pointed out that expensive building often paid in saving of up-keep. Girls' cloakrooms need more than the official allowance per peg, and all cloakrooms wanted the utmost ventilation possible. Another point raised during the discussion was the trouble caused by staging for desks when a room was needed for parish use.

Professor Simpson, in summing up, advised that all buildings should be combined under one roof. Waxing was an excellent finish to a linoleum dado, as also to plastered walls. Grooved boards, laid on bitumen, on concrete bed, were preferable to wood blocks. Wide doors might be made in two unequal parts, one being kept bolted, except when extra door opening was needed for emergencies.

### ARCHITECTURAL SOCIETIES.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—At a meeting of the Edinburgh Architectural Association on the 22nd ult., Mr. H. O. Tarbolton, President, in the chair. Mr. James A. Morris, architect, Ayr, read a paper, entitled "An Old Scottish Town." After outlining the history of Ayr, he gave particulars regarding some of the prominent architectural features of the old town, including the Old Bridge, Adam's Bridge, the Tolbooth, the Old Church, the Wallace Tower, the Church of St. John, and the Citadel. In the course of his remarks regarding the Old Bridge, Mr. Morris referred to the question of its preservation. He joined issue with the opinion of Sir William Arrol and Mr. Hall Blyth, who advocated the destruction of the Old Bridge and its rebuilding as far as possible with the old material. Mr. Hall Blyth seemed to think that the identity of the bridge would thereby be preserved, forgetting that if once destroyed the Old Bridge and the bridge of Robert Burns was gone absolutely and irretrievably. Mr. Morris indicated that he approved of the schemes submitted by engineers advocating the preservation of the existing structure, and stating its

practicability. The lecture was illustrated by lantern slides.

**MANCHESTER SOCIETY OF ARCHITECTS.**—The fourth general meeting of the students of the Manchester Society of Architects was held last Tuesday evening, presided over by Mr. P. S. Worthington. Mr. R. W. Orme read a paper on "Italian Renaissance," illustrated by a large number of photographs. The lecturer began by showing that this "rebirth" of classical forms was due, firstly, to the close study of classical literature; secondly, to the unsuitability of the classical style to the Italian climate. The lecturer then passed on to show how the style first developed itself in Florence, and then traced its course to the great cities of Venice, Milan, and Rome, and finished with a few brief remarks on the decline. In the debate that followed Mr. Worthington said that he thought the lecturer had not made enough of the importance attached to planning in the later period, many of the plans being excellently thought out. A question was raised as to the suitability of Renaissance as opposed to Gothic for church interiors, and this point brought about a very lively discussion, the result of which was that, whilst both might be used with advantage, yet the Gothic style perhaps produced the more impressive effect in this country.

**SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.**—At a meeting of the Sheffield Society of Architects and Surveyors, held in the Society's rooms, Leopold-street, on Thursday last week, Mr. E. Holmes, the President, occupied the chair, and the second of a series of lectures on "English Renaissance Architecture" was delivered by Mr. J. R. Wigfull. He dealt with the period from 1600 to 1650, and, quoting Lord Bacon's introduction to his essay on building that "Houses are built to live in, and not to look on," went on to explain the arrangement of the houses of the period, and showed by a series of plans the changes which were gradually introduced, until in the time of Inigo Jones the Italian villa supplanted to a great extent the English house, which in many respects was more suitable to our northern climate. A few typical buildings of the early part of the period, such as Hatfield House and Bolsover Castle, were described. The lecturer then dealt with Inigo Jones, the first, and perhaps the greatest, architect produced by England during the Renaissance period. After a reference to the early life of this architect, the lecturer showed a series of views of buildings by Palladio of Vicenza, an architect whose work exercised a great influence upon that of Jones. The purity of detail in the work of the Italian master was contrasted with the eccentricity of much of that done at the present time. Mr. Wigfull urged the study of the principles laid down by Palladio, not for the purpose of slavishly copying him, but to see on what lines he worked to produce the effects he obtained in his buildings. Returning to the work of Inigo Jones, his design for the great palace at Whitehall was described, a design which, with the exception of the Banqueting House, erected in the years 1619-22, was fated to remain unrealised in actual fact, the Civil War putting an end to this and many other architectural projects of the time. The work of Inigo Jones at St. Paul's Cathedral, Wilton House, and many other places was described, and illustrations of earlier work were used to show what changes he had effected in the internal treatment of buildings. The lecture was illustrated by lantern slides, most of which had been prepared by the lecturer, and at its conclusion a vote of thanks was accorded on the proposition of Mr. E. Holmes, seconded by Mr. W. J. Hale, and supported by Messrs. H. L. Paterson and J. M. Jenkinson.

**VICTORIA STATUE, LEEDS.**—At Leeds on the 27th ult., the Lord Mayor unveiled in Victoria-square, opposite the town hall, a memorial statue of her late Majesty Queen Victoria. The statue, for which about 8,000l. was subscribed by the citizens, is in bronze, and is the work of Mr. G. J. Fraughton, R.A. Queen Victoria is represented at the age of about fifty years, holding in the right hand the sceptre and in the left the orb. There are side figures in recesses representing Peace and industry, and at the foot of the monument on a broad band of bronze the names and emblems of India, Canada, Africa, and Australia are set forth. The base is of Portland stone.



## Fifty Years Ago.


FROM THE BUILDER OF DECEMBER 1, 1855.

## A DIPLOMA SOCIETY.

WHILST reading your recent leading article as to "The Architectural Association," the idea occurred to me of instituting "a general society" of the kind throughout the country, the members agreeing to submit themselves to an examination at the Royal Institute of British Architects. This, with the aid of "the Institute," and backed, of course, by the *Builder*, would at once put down all opposition to architectural diplomas. I am a young man myself, and feel how great a benefit such a protection would be to those who had honestly earned it; against, as it were, architectural quacks, who not only deprive the competent practitioner of business, but injure the profession generally, by the wretched buildings which are erected under their directions. Of course, it would require some hard study to pass such an examination, but that would fill the mind with many good and noble ideas, and which would at some future period be the means also of filling the pockets.—Letter signed "A Student."

## Illustrations.

## ILLUSTRATIONS OF THE SCALA THEATRE.

 WE have much pleasure in giving two illustrations, from photographs, of the interior of the Scala Theatre, which affords an example of a reform in the architectural treatment and decoration of theatre interiors that we have long advocated but never expected to see. As a general rule, a theatre interior seems to be considered only an opportunity for a kind of pie-crust decoration in a riot of plaster and gilding; and it is a positive refreshment to see a play in a house which is designed on dignified and severe architectural lines. Possibly, with one or two more theatres carried out in this manner, audiences may get educated up to it. At present (and no wonder, after all the bad habits they have got into) they evidently are not, and it was amusing to overhear the complaints of the occupants of the stalls, when we visited the theatre, as to its coldness of appearance, and so on. People are so used to gawgaw in theatres that an architectural treatment seems at present beyond their comprehension. Yet in fact this quietness of treatment in the architecture of the house is really a scenic advantage, as it gives more emphasis to the scenery and the figures on the stage, which should be the principal point of the *coup d'œil*. It is almost needless to add that the drop-curtain is a simple unadorned crimson curtain, not bedizened either with a landscape or with sham loops and festoons.

The staircases on each side, which give or suggest the name to the house, were we believe an idea of the management, accepted and turned to account by the architect. They are of no particular practical use, unless an occupant of the stalls wishes to look for a friend in the balcony between the acts, but they certainly make a very pleasing architectural feature, and give an individuality to the interior.

It is quite a relief to find real marble in a theatre, instead of "compo." We must admit (and we regret it) that the joining of the arch over the proscenium is a sham jointing; the material is an artificial stone which appears in this case to have been put up *en bloc*. It might, we should think, have been made in voussoir blocks, and built as a genuine arch, which would have been more satisfactory to one's architectural conscience. But this is the only criticism we have to make.

The architect of the theatre is Mr. Frank T. Verity, who sends us the following notes on the work:—

"The theatre is situated midway between Oxford-street and Fitzroy-square, and built on the site of the old Prince of Wales's Royal Theatre, and adjoining property on what is practically an island site. The old house came into existence 145 years ago, when, in 1760, Signor Pasquali erected the playhouse which attained the height of its popularity in the days of the Bancrofts.

The plan of the auditorium is strictly academical, from which the architectural treatment of the interior has grown, its main features being the marble staircases on each side of the house connecting the stalls and dress-circle, and passing under the two boxes. The house is a two-tier one, the gallery being practically a continuation of the upper-circle tier. The dress-circle and stalls are approached from Charlotte-street through a spacious vestibule, on either side of which ticket offices and cloakrooms are placed; the seating accommodation of the house is for 1,400 persons.

The plan determined the elevation treatment of the walls, the chief *motif* consisting of a superimposition of the Doric and Ionic orders, after the manner of Palladio; this has been divided into bays in which the exit doors and boxes are composed as features in scale with the orders; great care has been taken to carry the main architectural lines completely round the auditorium, and to preserve all centres. The proscenium wall is designed in a similar manner; the cornice of the lower order is carried over the arched opening, and the space above filled with a sculptured architectural panel in low relief. The fronts to the circles are formed of gilt-iron railings, presenting a contrast with the stone and marble of the wall surfaces. The construction throughout has been rendered thoroughly fireproof.

The chief materials used for the decoration are as follows:—Pavonazza marble for surbase, columns, pilasters, and doorways, bronze for caps, bases, and other decorative work, and stone composition resembling wood doors are of teak, maple bolection mouldings, and maple veneer being used for exposed surfaces.

The general contractors for the work were Messrs. Allen & Sons, of Kilburn; the steel construction being carried out by Messrs. Richard Moreland & Sons; the marble work and stone composition by Messrs. Farmer & Brindley, Westminster Bridge-road."

## DENMAN HOUSE, PICCADILLY.

This building is situated at the corner of Piccadilly and Air-street and close to Piccadilly-circus. It is built entirely of Portland stone, is of fire-resisting construction, and is occupied as shops and offices. The architect is Mr. Harold A. Woodington.

## S. WINEFRIDE'S CHURCH, SOUTH WIMBLEDON.

The church is of simple but substantial construction, and the design is of early Romanesque character suited to a plain brick building. The plan comprises a large and wide nave, with narrow processional aisles on either side, a sanctuary raised several steps above the nave level, flanked on one side by a side chapel and on the other by priests' and boys' sacristies, a transept on the north side, with a porch adjoining giving access to that portion of the church, and a baptistry at the north-west corner. The main entrance is by a deeply-recessed arched doorway at the west end, and there is also another entrance porch at the south-west corner.

The total length is 112 ft., and the width of nave 33 ft.

Accommodation is provided for between six and seven hundred persons, and the contract is for 6,375*l*.

Mr. Frederick A. Walters, of Westminster is the architect, and Messrs. James Smith & Sons, of South Norwood, are the builders.

## CHURCH AT EGREMONT, CUMBERLAND.

This drawing, which was exhibited at the last Royal Academy, shows a perspective view of a Catholic church which is to be erected on an elevated site at Egremont, in Cumberland.

The church consists of a nave and one aisle, and has seating accommodation for about 350. There is a lady chapel and organ place on the north of the sanctuary, the sacristies being on the south side connecting the church with an existing house, which will be used as a residence for the priest.

A baptistry is on the north side opposite the porch.

The walling will be of local sandstone, and the roofs covered with Butternere green slates. The heating will be by means of warm air, and the lighting by gas.

The architect is Mr. Frederick A. Walters, F.S.A., of Westminster.

## Correspondence.

## S. MICHELE, LUCCA.

SIR,—In M. Lucien Bégule's new work, "Les Incrustations Décoratives," there is a fine illustration of the front of S. Michele, at Lucca, which is apparently taken from a photograph, and which shows the friezes over the four stories of arcades as having their backgrounds filled in with a dark composition. In Ruskin's "Seven Lamps," plate 6 shows the north angle of the frieze over the second gallery, with the background quite clear of any filling-in. The extreme accuracy of Ruskin's drawing may be tested by comparison with the photograph (except that in the engraving his drawing has been reversed—an accident which "the master," perhaps, regarded as of no moment), and it is not likely that he made any mistake in drawing the figures of the frieze in relief instead of outlined by a background of some foreign material.

Do any of your readers know if, and when, the front of S. Michele was restored? J. TAVENNER-PERRY.

## ENTASIS OF COLUMNS.

SIR,—Regarding the statement in last week's *Builder* as to the entasis of Greek columns: although it is to be supposed that the Greeks merely gave an entasis to their columns to prevent them looking hollow, yet in many cases they appear to have overdone it. This is especially in evidence in one of the most refined examples, namely, the so-called "Theseion" at Athens.

In Vol. III. of Stuart and Revett's "Athens," a footnote with reference to these Theseion columns states that "They are executed with a very perceptible entasis," but in Vol. IV. it is clearly stated that the entasis "is not perceptible to the eye, and scarcely to the rule."

I am bound to say that my own observations from visits to this temple at three different periods coincide with the statement that there is a very perceptible entasis, which is apparent without looking for it. BANISTER F. PENROSE.

\* We should suggest that Mr. Penrose's eye has been deceived into seeing what he expected to see. We suppose he does not dispute that the Parthenon represents the highest perfection of Greek architecture, and that the entasis in that building is not "overdone," and in fact is difficult to perceive with the eye. Would it surprise him to hear that the entasis in the Theseion columns is less than that of the Parthenon? Not only positively less owing to smaller scale, but relatively less in proportion to the scale of the column. The relative proportions of entasis in the Parthenon and the Theseion are as 9 to 7—on the authority of Penrose, which in regard to less of measurement of this kind may be taken as absolutely trustworthy.—Ed.

## THE CHEAP COTTAGES EXHIBITION.

SIR,—I find that in my paper on this subject at the Sanitary Institute there was a clerical error as to the size of the living room in Lord Carrington's cottages. It should be 12 ft. by 11 ft.; not 12 ft. by 8 ft.

THOS. W. ALDABERT.

## COMPETITION.

NEW CITY HALL, PERK.—The Report by Mr. John J. Burnett, A.R.S.A., Glasgow, the assessor appointed to adjudicate on the plans for the new City Hall, has now been received. There were altogether thirty competitors. Three plans were selected for the new City Hall in order of merit for premiums of 50, 30, and 20 guineas. There were also three plans selected for the reconstruction, the premiums for which were 30, 20, and 10 guineas. The authors of the premiated plans are as follows, viz.:—Erection of New Hall: (1) Mr. J. Wallace Archer (Edinburgh); (2) Messrs. Thomson & Robertson (Brighton); (3) Messrs. Henry & McLennan (Edinburgh). For the Reconstruction of Existing Hall: (1) Mr. James Sibbald (Dundee); (2) Messrs. Menart & Jarvie (Perth); (3) Messrs. H.M. Jones & Cummings (London). The plans will be exhibited in the Picture Gallery of the Sandeman Library from 23rd inst. to the 2nd proximo, and will then be returned to the authors.

## Books.

*Old and New Architecture in Khiva, Bokhara, and Turkestan.* By O. OLUFSEN. (Copenhagen: Gyldendalske Boghandel. 1904.)

This book, which, in spite of the date on the title-page, has only just reached us, is headed (above the title we have quoted) "The Second Danish Pamir Expedition"; and the author, Lieut. Olufsen, of the Danish Army, was chief of both Expeditions. The Expeditions were made with scientific objects, and we gather that this account and illustration of the architecture of the country visited is a side-issue of the Expedition. It is unusual to find a military undertaking so much note of architectural monuments and describing them so well. The text is in English; it is perhaps the preparation of an English version which has retarded the arrival of the book, as we presume it would have appeared in Danish in the first instance.

During the second Expedition in 1898-99 the author had time to make a good many excursions into Transcaspiia, Khiva, Bokhara, and Turkestan. It is not much that we hear of the architecture of what the author calls "this somewhat closed-in portion of Central Asia"; as to its geographical characteristics some amount of investigation has been made during the XIXth century, but there has been little or no study of its ancient history and culture. Fergusson dismisses Turkestan in a page and a half, from sheer lack of information and illustration, not from want of interest in the subject, as he remarks that the buildings there may form a connecting link between the architecture of Persia and that of the great Mogul dynasty in India, and that these buildings may supply many missing links in history, though he observes

that we can hardly expect to find there any buildings of very great antiquity.

Lieut. Olufsen's essay confirms this latter view, though he suggests that information about the architecture of the pre-Islamitic Period might be obtained by excavations in the isolated mounds of the steppes between Samarkand and Tashkend, and that much more may remain to be discovered as to the architecture of the early Islam Period:—

"Even if we do not care to go so far back as the Avesta age in Central Asia, in which Buddhism and Christianity also tried to gain ground, but confine ourselves to the Islamic age, our knowledge of it is very incomplete. From the early Islamic age, from the time when Arabs in the VIIIth century under Rebi-Ibn-ul-Harith made their way into Transcaspiia, and on their arrival at Bokhara are supposed to have found rich Buddhist temples with idols of gold and silver, and with carved temples adorned with mythical figures, there are now no visible remains; and those which are still existing from the Islamic middle age, run the risk of disappearing before any proper account of them has been recorded."

The old buildings illustrated in the plates do not, however, supply anything which can be called a missing link in the architectural history of this part of the world. They show the same forms of pointed arches under square heads, with elaborate spandrel decoration in geometric patterns, and the same type of conventionalised floral forms in the smaller decorations, which we are familiar with in the Mahomedan buildings of the Indian Peninsula. The illustration (plate 5) of detail from one of the mosques at Shah-Zindeh, traditionally attributed to Timur, in the XIVth century, might at first glance, except for the shape of the carved column on the right, be taken for a piece of detail from the Taj Mahal. The illustrations showing unfamiliar details are, as far as we can gather (for the descriptive text is not very clearly expressed on this

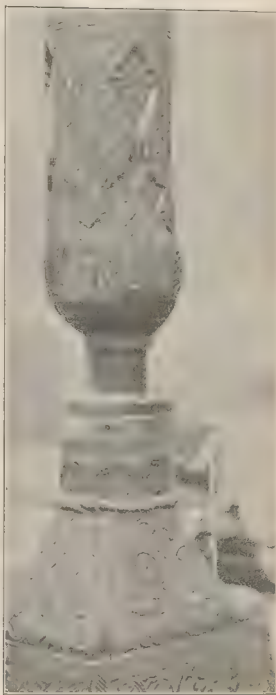


Fig. 2. Base of a Pillar.

point), from buildings of the modern period. This is certainly the case with the interior of the Assembly Hall in the Shirbeden Palace (plate 22), where the two arcades are carried by short wooden columns with a pinched-in base, and painted with a zebra-like decoration of broad black and white stripes arranged chevron-wise. The most interesting piece of unfamiliar detail, however, is that of the slender wood columns of the verandah in one of the Khan's palaces at Khiva, shown in plate 12. We should like to know the date of this, which is not mentioned, but we gather that it is a building of the modern period, and that it is given as an illustration of the woodwork of the country. Large forests do not exist in the country; the wood chiefly used is apricot and walnut. The slender columns used in this instance to support the verandah, of which we reproduce the illustration (Fig. 1), are of apricot wood, bound round at the narrow neck at the base by an iron ring, which rests upon a sandstone base. Fig. 2 shows the base of a column of the same type, from another palace. Modern or ancient, it is an interesting example of a form of column devised for lightness of appearance, and may form a suggestion which might be worked out further.

Lieut. Olufsen's book, besides being an interesting addition to an architectural library, may perhaps have the result of promoting more architectural investigation in a part of the world rather difficult of access, and which has not been much explored.

*Cement and Concrete.* By LOUIS CARLTON SAIN, B.S., C.E., Assistant Engineer, Engineer Department, U.S. Army, M. Am. Soc. C.E. (London: Archibald Constable & Co., Ltd. 1905.)

SEVERAL books have been published during the present year on the general subject of concrete, the literature of which has barely kept pace with the rapidly growing use of cement in constructional work of all kinds. It is true that much valuable information is continually published in the technical press, by far the greater portion being found in American and Continental journals. To keep an eye upon all the papers and articles made



Fig. 1. Verandah in One of the Khan's Palaces at Khiva.





is a musician by profession, and some of his attacks dealing with points in musical criticism, especially in opposition to the current opinions of the day) seem to us very sensible. On the other hand, in one set of letters he displays a most extraordinary ignorance—for a musician—of one of the commonplaces of musical terminology. It is not our business to write about music, but we happen to know the difference between "Sonata-Form" and "Sonata," and Mr. Ashton does not, and got the worst of it in the newspaper controversy (hereupon; though, to do him justice, he does not seem the least aware of the fact.

## BOOKS RECEIVED.

GOTHIC ARCHITECTURE IN ENGLAND. By Francis Bond, Hon. Associate R.I.B.A. (R. T. Batsford, 31s. 6d.)

MECHANICS OF AIR MACHINERY. By J. Weisbach and Professor G. Hermann. Translated by A. Trowbridge. (Crosby Lockwood & Son.)

## The Student's Column.

STEAM BOILERS AND PIPES.—XXII.  
THE FLOW OF STEAM (continued).

LAST week we explained the different methods of ascertaining the velocity and weight of steam discharged from outlets on boilers or other reservoirs containing steam at a pressure higher than that of the outer space. We now give rules for calculating the area of outlet required for the discharge of any given weight of steam into a space where the pressure is not more than 58 per cent. of the initial pressure maintained in the boiler or other reservoir. These rules are simply inversions of formula (48) to (53).

Area for weight of steam per second—

$$A = \frac{W}{6.16 D} \dots \dots (48a)$$

Area for weight of steam per minute—

$$A = \frac{W}{370 D} \dots \dots (49a)$$

Area for weight of steam per second—

$$A = \frac{W}{6 D} \dots \dots (50a)$$

Area for weight of steam per minute—

$$A = \frac{W}{360 D} \dots \dots (51a)$$

Area for weight of steam per 70 seconds—

$$A = \frac{W}{7} \dots \dots (52a)$$

Area for weight of steam per minute—

$$A = \frac{7 W}{6 P} \dots \dots (53a)$$

As the weights given by formulae (48) to (53) require qualification by values for the coefficient of contraction, so do the areas obtained by the use of formulae (48a) to (53a). Thus, if the required area be calculated at 58 sq. in., the corrected area for a short cylindrical mouthpiece would be  $(3 + 0.93) \times 58$  sq. in. But, computed by formula (48) or (51), the area for the same discharge comes out at 3.14 sq. in., and the value of 0.58 may be taken for the coefficient of contraction.

The same rules are equally applicable to the computation of the discharge from an outlet at the end of a steam pipe or from an outlet at any point in the length of a steam

pipe. In other words, any steam pipe connected with a boiler constitutes an essential part of the boiler, regarded as a reservoir of steam.

But at the end, or at any point in the length of a steam pipe so connected, the pressure is less than that maintained within the boiler, owing to losses caused by friction in the branch pipe or outlet on the boiler; and in valves, bends, and fittings; and (3) in the pipe or system of pipes.

In calculating the required area of the outlet from a boiler, the object is to provide for the delivery of a predetermined weight of steam through the pipe system whether the steam ultimately escapes into the open air, or is removed in the form of water. The predetermined quantity is ascertained

by computing the total weight of steam required for the operation of engines and pumps, and in various kinds of apparatus employed for warming buildings, for heating water supplies, for cooking and laundry work, and for sundry other purposes.

When the sum total has been obtained, the required area of the boiler outlet could be correctly calculated by any one of formulae (48a) to (51a) if it were not for the losses by friction occurring in the pipes and fittings intervening between the boiler and the points of ultimate discharge or consumption.

The various hindrances to flow thus encountered are equivalent to reduction of the outlet area, and must be counterbalanced by increasing either the initial pressure of the steam or the area of the outlet.

Hence we see the importance of inquiring into the extent of the losses taking place in pipes constituting the steam distribution system.

*The Flow of Steam Through Pipes.*—Formulae for the flow of steam in pipes can be used for ascertaining the maximum possible flow of steam from a given pressure to a vacuum, or from a given pressure to any other pressure. It is very seldom the case, however, that any practical object is attained by calculating the carrying capacity of a pipe without regard to the pressure maintained at the boiler side of the terminal outlet.

In steam distribution systems the limitation of pressure losses at points of delivery is a primary consideration, and rules such as those with which we are now concerned are almost invariably employed for determining either the loss of pressure for a given discharge or the discharge possible for a given loss of pressure.

Apart from frictional or other losses the velocity of flow of steam through a pipe is governed by the fundamental equation.

$$v = \sqrt{2gh}$$

Formula (3), p. 301, is a modification of this equation, and will give approximately correct results for the discharge of steam through a straight pipe communicating at one end with a boiler and open at the other end to atmospheric pressure.

Similarly, with an appropriate value for  $h$ , it will show the discharge of steam corresponding with any given drop of pressure.

In either case the losses due to the inlet nozzle and to valves, bends, and other fittings must be taken into account. For the moment we omit consideration of these.

The value for  $h$  is readily found by the aid of the expression

$$h = \frac{(p_1 - p_2) 144}{D}$$

where the factor 144 is introduced to convert pressure in pounds per square inch to pounds per square foot.

Substituting the second term of this equation in formula (3) we have for the velocity in feet per second

$$v = 48 \sqrt{(p_1 - p_2) \frac{144 d}{l D}} \dots (51)$$

and, by reduction

$$v = 576 \sqrt{(p_1 - p_2) \frac{d}{l D}} \dots (55)$$

where  $p_1$  and  $p_2$  = absolute pressures in pounds per square inch,  $d$  = diameter in feet,  $l$  = length in feet, and  $D$  weight per cubic foot of steam at the pressure  $p_1$ .

Dividing 576 by the square root of 12 to permit the statement of the pipe diameter in inches instead of in feet, we can make a further reduction.

$$v = 166.3 \sqrt{(p_1 - p_2) \frac{d}{l D}} \dots (56)$$

Example (28).—Required the velocity of flow with a loss of 5-lb. pressure per square inch from an initial absolute pressure of 100 lb. per square inch through a straight pipe having the length of 1,000 ft., and the internal diameter of 5 in.

By reference to Table XXV, we find the value of  $D$  for steam at 100-lb. pressure is 0.2307 lb.

The result is worked below by the three forms of the equation above:—

$$\text{By formula (54)} \\ v = 48 \sqrt{\frac{(100 - 95) \times 144 \times 0.25}{1,000 \times 0.2307}} \\ = 48 \sqrt{0.8832} = 42.39 \text{ ft. per second.}$$

By formula (55)

$$v = 576 \sqrt{\frac{(100 - 95) \times 0.25}{1,000 \times 0.2307}} \\ = 576 \sqrt{0.07361} = 42.39 \text{ ft. per second.}$$

By formula (56)

$$v = 166.3 \sqrt{\frac{(100 - 95) \times 3}{1,000 \times 0.2307}} \\ = 166.3 \sqrt{0.065} = 42.39 \text{ ft. per second.}$$

To ascertain the weight ( $W$ ) of steam discharged it is only necessary to multiply the calculated velocity by the internal area of the pipe in square feet and by the weight per cubic foot of the steam at the initial absolute pressure.

$$W = v \times A \times D$$

By combining the second term of this equation with formula (54) we have

$$W = 48 \sqrt{(p_1 - p_2) \frac{144 d}{l D}} (A \times D)$$

This may be written

$$W = 48 \sqrt{(p_1 - p_2) \frac{144 d (A \times D)^2}{l D}} \dots (57)$$

where the diameter and length are in feet and the area is in square feet.

Splitting up the expression  $(A \times D)^2$  into its component parts we get

$$(A \times D)^2 = (d^2 \times 0.7854 D^2)$$

or to permit the statement of  $d$  in inches

$$(A \times D)^2 = \left( \frac{d^2 \times 0.7854 D^2}{144} \right) = \left( \frac{d^4 \times 0.7854^2 D^2}{(144)^2} \right)$$

In this form the equivalent of  $(A \times D)^2$  can be combined with formula (56) as follows:—

$$W = 166.3 \sqrt{(p_1 - p_2) \frac{d (d^4 \times 0.7854^2 D^2)}{l D (144)^2}}$$

Whence by reduction

$$W = 0.9 \sqrt{(p_1 - p_2) \frac{d^5}{l D}} \dots (58)$$

where  $W$  = the weight of steam, of density  $D$  in pounds per cubic foot, discharged per second through a pipe of the diameter  $d$  in inches, and the length  $l$  in feet.

The corresponding formula for the weight discharged per minute is

$$W = 54 \sqrt{(p_1 - p_2) \frac{d^5}{l D}} \dots (59)$$

If, as recommended by some authorities, we take the factor 50 instead of 48 as a multiplier in formula (3) we have, under the conditions stated in connexion with formulae (54), (55), and (56):

$$v = 50 \sqrt{(p_1 - p_2) \frac{144 d}{l D}} \dots (54a)$$

$$v = 600 \sqrt{(p_1 - p_2) \frac{d}{l D}} \dots (55a)$$

$$v = 173.2 \sqrt{(p_1 - p_2) \frac{d}{l D}} \dots (56a)$$

Whence the discharge per second is

$$W = 0.945 \sqrt{(p_1 - p_2) \frac{d^5}{l D}} \dots (60)$$

and the discharge per minute is

$$W = 56.7 \sqrt{(p_1 - p_2) \frac{d^5}{l D}} \dots (61)$$

Consequently, we may adopt as approximate rules the following:—

(a) Weight of steam discharged per second

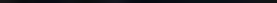
$$W = \sqrt{(p_1 - p_2) \frac{d^5}{l D}} \dots (62)$$

(b) Weight of steam discharged per minute

$$W = 60 \sqrt{(p_1 - p_2) \frac{d^5}{l D}} \dots (63)$$

In undertaking the foregoing demonstration we have not been actuated by an ambition to add further to the innumerable rules that have sprouted from the root  $v = \sqrt{2gh}$ , but by the desire to show the manner in which formulae of the kind are evolved. The explanation is the more necessary for the reason that in most books of reference rules are quoted without the name of any authority, and, what is a far more undesirable omission, without making clear the origin or *raison d'être* of the formulae. Apart from the risk of error due to the misprints that creep into many text-books, it is important that professional men should know exactly what is the meaning of the formulae they employ.



$$W = 60 \sqrt{0.2803} = 31.76 \text{ lb. per min.}$$




**PREMISES, HOVE.**—Messrs. Albery & Co. have prepared two sets of plans for a club-house to be built in the New Church building, Arlington. One of these provides for a dining with reading-room and club-rooms, billiard-room, and the usual offices on the first floor, and a billiard-room with two bedrooms, a library and card-room on the first floor. It is proposed to provide bedrooms on the second floor, and provision has been made for four bedrooms, a quiet green, and a putting green on the second floor. An alternative plan provides for two rinks and a club-house with a billiard room, but with similar accommodation. The cost is estimated at about 3,500.

problem of assuring the want of truth in the gun 45 ft. long is a difficult one. It is solved by using a tapered steel tube carrying a knife-edged contact wheel. The moment this wheel touches the side of the bore it completes an electric circuit, and a galvanometer deflects. Another interesting application is the use of an electro-magnet, 10 in. in length, for lifting cast-iron projectiles, some of which are very nearly a ton in weight. The measurement of the temperature of the furnaces in which the steel is heated is made by means of a thermo couple, and this seems to

AN "OPEN SPACE," OXFORD UNIVERSITY.  
BUILDINGS.—At a recent meeting of the members.



of Convocation a decree was rejected by 136 votes to 55 which, if it had been passed, would have made over the Proscholium, commonly known as the "Pig Market," as a stand for bicycles. The "open space" is the vaulted ambulatory near the Divinity School and under a part of the Bodleian Library in the old school's quadrangle. The Curators of the Bodleian were strongly opposed to the appropriation of the area for the purposes contemplated, whilst the Curators of the University Chest advanced certain claims to authority over the floor of the Proscholium in virtue of a statute of 1898, which confers upon them the oversight and care of open spaces in that portion of the University buildings.

**SITES FOR NEW PROVINCE SCHOOLS, LONDON.**—There has just been issued the schedule of sites which it is proposed to take for purposes of the Education Acts, 1870-1903, and the erection of new school buildings in the administrative county of London. The sixteen sites cover an aggregate of 373,010 sq. ft., or nearly 8½ acres. The largest site scheduled is a parcel of land of about 87,120 sq. ft. at the junction of Standen and Wimbledon Park roads, having a frontage of 484 ft. to the latter road. In Islington Borough five sites are specified, one comprising thirteen houses in Packer-street, with five in Linton-street, and another including Nos. 140-2, Cloud-street, with portions of the gardens of esley-road. In the City of London, the site in Paddington embraces the Clifton nursery-ground and the approach thereto, and Nos. 39-43, Blomfield-road, Maids-vale. The remaining sites are in the boroughs of Deptford—Alverton-street; Hackney—Nos. 18-30 (even) Lansdowne-road, and eight houses in Derby and Rutland roads; Poplar—seven houses and the court thereof in Bright-street and Bromley-cottages; St. Marylebone—Nos. 9-21, Aberdeen-place and No. 21, Carlisle-place; St. Pancras—Camden-street; and Stepney—three sites, being Nos. 47-67 (odd) Pigott-street, Limehouse, premises in Commercial-road East, with lands abutting on Beck Court-lane and Gowers-walk (near Leman-street), and property in Ropery and Carter streets. Six of the properties to be acquired adjoin existing school premises.

## Legal.

### INJUNCTION GRANTED AGAINST TRADE UNION.

**THE case of Thomas Wallis & Co., Ltd., v. United Society of London French Polishers** came before the Court of Appeal, composed of the Master of the Rolls and Lord Justice Mathew, on the 27th ult., on the appeal of the defendants from an interlocutory injunction granted by Mr. Justice Bray.

Mr. Mulligan, K.C., Mr. P. T. Blackwell, and Mr. Martin O'Connor appeared in support of the appeal; and Mr. Horace Avery, K.C., Mr. A. F. Wootton, and Mr. E. C. Bliss for the respondent company.

Mr. Mulligan said the order appealed from was an interlocutory injunction granted by Mr. Justice Bray, restraining the defendants, a trade union, from watching or besetting the premises of the plaintiffs in Holborn so as to cause a nuisance. The circumstances giving rise to the litigation were as follows:—The plaintiffs were the well-known furnishing firm in Holborn—a corporation with a capital of 350,000, and upwards of 1,700 shareholders. The plaintiffs had a contract with the London County Council, the contract containing a clause that the plaintiffs were to pay the trade union wages. For many years prior to this contract the French polishers working for the company were paid at the rate of 9d. an hour. On July 8 last the company gave the polishers who were in their employment notice that after a certain date the company would only pay 8d. an hour. On July 20 the company's manager had an interview with the polishers on the premises, and as a result of that interview the polishers that night struck work because of the reduction. On July 29 the defendant union employed some of the polishers to walk up and down opposite the plaintiffs' premises, and these men had in their hats a card with the following words on it—"Pickets. Wallis & Co.'s French polishers on strike against reduction of 1d. an hour in wages." On July 29 the defendants, having ascertained that the contract between the company and the London County Council was in existence, wrote a letter to the Council to the effect that the company had reduced the wages and were not paying the proper rate of wages. The writ in the present action was issued on October 4 for an injunction to restrain the defendants, their servants, agents, etc., from watching or besetting the premises of the plaintiffs or the approaches thereto, or causing or procuring the same to be watched or beset in such a manner as to cause a nuisance to the plaintiffs, or for any purpose except to obtain or communicate information. Those were the exact terms of the *interim* injunction which had been granted by the learned judge on October 13. The defendants admitted the men walked up and down the footway with the card in their hats, but

there was no evidence that any of the men spoke to any customers of the plaintiffs or interfered with or caused any obstruction or damage to anyone.

Mr. Avery stated that the plaintiffs' case was that the French polishers were paid 9d. an hour, and they asked for an extra 1d. an hour for travelling money when they were employed at Westminster Bridge-road, and the plaintiffs dismissed them.

Mr. Mulligan said the men were entitled to walk up and down opposite the plaintiffs' premises for the purpose of getting and communicating information. He submitted that there was no evidence that the men had "watched or beset" the plaintiffs' premises within sect. 7, sub-sect. 4, of the Conspiracy and Protection of Property Act, 1875. He further submitted that the injunction was too formal, and that it ought only to restrain the defendants from doing particular acts.

Mr. Blackwell followed on the same side. Without calling upon counsel for the plaintiffs, the Master of the Rolls, in giving judgment, said that Mr. Justice Bray came to the conclusion from what was stated in the affidavits that there had been a wrongful watching and besetting without legal authority, and that it did not come within the proviso to sect. 7. He (the Master of the Rolls) thought there was abundant evidence to justify that conclusion, and that the injunction granted was the proper remedy.

Lord Justice Mathew concurred, and the appeal was accordingly dismissed.

### DISPUTE AS TO DEVELOPMENT OF BUILDING ESTATE.

**IN the Chancery Division, on the 27th ult., the case of Hurrell and others v. Beauchamp and others**, came before Mr. Justice Swinfen Eady.

Mr. Eve, K.C., and Mr. Sheldon appeared for the plaintiffs; and Mr. Upjohn, K.C., and Mr. Dunham for the defendants.

Mr. Eve said that the plaintiffs were Mr. Hurrell, Mr. Schellebeer, Captain Buchanan, and Admiral Wilson, and the action was brought by them for an injunction to restrain the defendants from proceeding to develop an estate abutting on the main road from Devonport to Tavistock, in the immediate proximity of the plaintiffs' houses. The plaintiffs claimed under conveyances executed in or about the year 1858 to their predecessors in title. The defendants had acquired the residue of the estate, and what they proposed to do was, according to plaintiffs' case, inconsistent with the original scheme under which the estate was laid out.

The defence was that the original scheme—if there was one—had been abandoned, or, in the alternative, if it had not been abandoned that the plaintiffs had acquired in breaches which had operated to free the rest of the land. The defendants also pleaded the alteration of the neighbourhood by reason of the increase and spreading of the borough of Devonport, and they were now proposing to do was to erect a large number of small four-roomed artisan dwellings in the immediate vicinity of the plaintiffs' houses.

As counsel was proceeding to read the terms of the deed upon which the plaintiffs relied it was announced that a settlement had been arrived at between the parties on the terms as to the division of the estate which would include the removal of all restrictions except that no public-house should be erected.

### BEKENHAM BUILDING DISPUTE.

**THE hearing of the case of Whitehouse v. Hugh** concluded before Mr. Justice Kekewich, in the Chancery Division, on the 24th ult., an action brought by the plaintiff, a market gardener, carrying on business at No. 10, Mackenzie-road, Beckenham, to restrain the defendant from building on a roadway joining the plaintiff's premises, in alleged contravention of a building scheme adopted by the Birkbeck Freehold Land Society in 1878, and from interfering with plaintiff's user of the roadway. The plaintiff also sought to restrain the defendant from building so as to obstruct his ancient rights.

It appeared that the plaintiff purchased the freehold of his premises from Mr. Chamberlayne in 1885. At this time the north-western boundary of plaintiff's premises was laid out as a road which led from Mackenzie-road to a level crossing on the London Chatham and Dover Railway. The plaintiff's house was built on plots 351 and 352, two out of three plots purchased from the society by Mr. Chamberlayne in 1879. On the plan in the conveyance by the society to Mr. Chamberlayne the roadway was designated as a vacant space between lots 352 and 355. By the conveyance the society reserved to itself the right of allowing a variation in the plans and conditions. The roadway had only been roughly made up and, by reason of its not being much used, had been allowed to fall out of repair. This road, after it crossed the railway, led to a meadow, to which there was no other means of access for vehicles. In 1894 the society purchased and laid out the meadow as a building estate, and by an

arrangement the railway company were released from maintaining the level crossing, and the company subsequently removed the gates of the crossing and erected an iron fence which was in 1880 the property erected, a fence at the Mackenzie-road end of the roadway, and conveyed the plots occupied by the roadway to the defendant's predecessor in title, and since that date there had been no means of communication between Mackenzie-road and the roadway, except by a gate in the fence, which was kept locked. The defendant, in 1904, purchased from plaintiff's predecessor in title No. 21, Mackenzie-road, which was built on plot 355. He also purchased plots 353 and 354, over which the roadway passed, and in November last he commenced laying out the roadway for the purpose of laying the foundations of two houses he proposed to erect. The plaintiff alleged that defendant by so building was depriving him of the user of the roadway and the light, and air coming over it to his premises. He also said that when the defendant's buildings were completed they would so interfere with the light coming to his premises as to constitute an actionable nuisance. Plaintiff further said that the society had dedicated the roadway in question to the public.

After hearing the evidence and the arguments of counsel, his lordship held that the representation had been made that there was a road that the vacant space between lots 352 and 354 should remain vacant. It could not be said that the society could not allow defendant to build houses on plots 353 and 354, and, therefore, plaintiff was not entitled to restrain the defendant from so building. He held further that the question of dedication to the public of the road in plaintiff's case completely broke down, and that there would be no such obstruction as would substantially lessen the plaintiff's comfortable enjoyment of his house. He accordingly *dismissed* the action for the defendant with costs.

Mr. Stewart Smith, K.C., and Mr. Todd, appeared for the plaintiff; and Mr. E. O. Lawrence, K.C., and Mr. Cozens-Hardy, for the defendant.

### LIBEL ACTION BY A BUILDER AND CONTRACTOR.

**THE hearing of the case of McCarthy v. McCarthy and others**, concluded in the King's Bench Division before Mr. Justice Wille and a special jury on the 28th ult.—as stated by the plaintiff, Mr. Patrick McCarthy, a builder and contractor, carrying on business in the Fulham-road, S.W., to recover from Mr. J. A. Rochford, a War Office clerk, and Mr. Michael McCarthy, a builder and contractor, carrying on business in the Kings-road, Clapham Park, damages for libel, one alleged libel being raised and published in the *Chelsea Mail* and the *Westminster Express*, and the other sent to the Editor of the newspapers. The plaintiff also said that the defendants had entered into a conspiracy to libel him, and that he had also been damaged. Both the defendants pleaded a denial of the conspiracy, and the defendant McCarthy also denied the publication of the letters complained of. The defendant Rochford denied that he wrote the letter printed in the newspapers, but as to the second letter pleaded justification.

Mr. Dwyer, K.C., and Mr. Haydon, appeared for the plaintiff; Mr. Shee, K.C., and Mr. E. Symons for the defendant Rochford; and Mr. Montague Shearman, K.C., and Mr. Macpherson, for the defendant McCarthy.

Mr. Haydon, in the course of opening the plaintiff's case, said that his client was the nephew of the defendant McCarthy, both being builders and contractors. Both the McCarthy had been in partnership together, but in 1900 disputes having arisen, the plaintiff bought an action against his uncle, and this resulted in the uncle having to make a payment of money to his nephew. After the partnership was dissolved the plaintiff started business in the same locality in which his uncle carried on business. The rivalry between them came to a head in August, 1903, when the London County Council invited tenders for the painting of Chelsea Bridge. Both the plaintiff and his uncle sent in tenders, but the plaintiff obtained the contract. The work proceeded satisfactorily until a series of articles in the local newspapers were directed against the plaintiff as to the way in which the work was being carried out. From that time the relations between the plaintiff and the London County Council underwent a change. The defendant Rochford was a friend of his co-defendant, and he had not the slightest practical experience in the painting of bridges. The first libel of which complaint was made was contained in a letter published in the newspapers in question, signed September 18, 1904. The letter was signed "Ratepayer," and, amongst other things, contained the following passage:—"Work such as this should be entrusted to well-known and substantial tradesmen, who are able to cope with the elementary engineering difficulties of so big a work, either with the requisite plant or financially. If, however, the London County Council, in their wisdom, do not so deal out work, then they should protect the ratepayers by seeing that good value in labour and material is given by ensuring the



and most adequate supervision over the contractors employed." In the second letter, written by Rochford, but not published in the newspapers, the writer criticised the way the work of cleaning and painting had been carried out by the contractor, and he referred to the many character of the scaffolding which had been erected.

The plaintiff, called and examined, said that the work was begun in August, 1903, and it was carried out under the supervision of a Mr. Simmons, the clerk employed by the London County Council. No trouble was experienced in carrying out the work until the libel appeared. When the clerk insisted on his doing everything was unreasonable. He had to reconstruct the scaffolding and to put up scaffolding over the bridge at the same time, which he could not do. The work cost a good deal more than ought to have been owing to the letter of September 18.

Witness-examined by Mr. Shee.

He did not think it was the Council which was criticised in the letter so much as the architect.

Robert Standridge, a scaffolder, examined, said that the scaffolding on Chelsea Bridge was done in the ordinary way.

Several other witnesses were called, who gave evidence that the scaffolding used was of a satisfactory character.

At the close of the plaintiff's case the first witness called for the defendant Rochford was Mr. W. C. McCarthy, Bridge Engineer to the London County Council. He said that at first the scaffolding was not of sufficient strength, and during the progress of the work it was altered and made stronger. Before the letter of September 18 he had received complaints from Simmons, and he had explained to the plaintiff about the quality of the paint in August.

Mr. H. Tyers, Editor of the *Chelsea Mail* and *Illustrated Express*, examined, said he put a notice about the work upon the bridge in the *Express*, issued on September 11, but Rochford was not going to do with that notice. Between September 11 and 18 he met Rochford, and, as he had complaints with regard to the work on the bridge, he asked Rochford to let him know his views about it. Rochford told him his views, and witness made a note of them. Witness then compiled the letter from the various sources he had received. The defendant McCarthy had made no complaints to him about the bridge. The second letter was handed to witness by Rochford, but was not signed. He did not publish that letter as he thought the defendant had become stale. The defendant McCarthy had no part in the second letter so far as witness was concerned.

Mr. James Rochford, the defendant, examined, said that after seeing the notice about the bridge in the *Chelsea Mail* he met Mr. Tyers, and told him he thought it was a fair summary of what was going on. The notes he gave to Mr. Tyers were his honest opinion of the work. The letter was common talk. There was no conspiracy between himself and the defendant McCarthy to libel the plaintiff.

At the close of defendant Rochford's case McCarthy, the other defendant, was called. He said that he took no part in the letter of September 18, nor did he supply any information which it could be written. He had no connection with the letter written by Rochford. He did not instigate Rochford to write any letter, and he conspired with him for the purpose of libelling the plaintiff.

Witness-examined by Mr. Duke.

For some years he and the plaintiff had not met on good terms. The plaintiff being his enemy, he was not anxious to do him any harm. He would not say whether the work on the bridge was being done properly, nor could he say whether the scaffolding was properly done. He never connected with Rochford the fact that the plaintiff obtained the contract. Rochford told him that he had been communications to the newspapers about the plaintiff's work. He did not know that Rochford was interesting himself in the matter. He never saw Rochford's letter. When being the case for the defendant McCarthy, Mr. Tyers was recalled to be further cross-examined by Mr. Duke. He said that to the best of his belief he wrote the letter on September 18, and he was heard of the scaffolding being erected. He consulted three experts, and, as far as he could remember, compiled the first notice in the *Express* from information he received from McCarthy. The letter of September 18 was partly the result of Rochford's communication to him. Two compositors of the *Chelsea Mail* gave evidence to the effect that the letter of September 18 was not in the handwriting of the Editor, and that the conclusion of the addresses of counsel, and the signing-up of the learned judge, the jury, and the verdict for the defendant McCarthy, were all written by the defendant McCarthy.

The question of libel and a verdict for the plaintiff against the defendant Rochford with one hundred damages.

Some findings his lordship entered judgment against the defendant McCarthy with costs, and for the plaintiff against the defendant Rochford with costs.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.\*

26,162 of 1904.—D. RUSSELL: *Fireplaces*. This relates to a fireplace, and consists in the employment of a fuel-holder comprising a base member formed of an iron grating and a fire-alloy slab, and upstanding side portions and back portion.

28,483 of 1904.—P. R. J. WILLIS (J. E. ERICSON): *Flushing Apparatus for Water-closets and Urinals*. This relates to a flushing apparatus for water-closets and urinals, and comprises a hollow casing attachable to a closed tank and source of water supply respectively, a valve on a valve seat within the casing, a system of levers arranged beneath the valve and having a bowl or the like suspended therefrom, the position of said bowl or the like being such that it will be depressed by a forcible flow of water through the casing, and retain the valve open after it has been initially opened, and means such as a rock shaft carrying a cam for initially opening said valve.

29,963 of 1904.—H. HIRST and F. T. CASE: *Heat Radiating Apparatus for Warming Rooms, Offices, and the like*. This relates to a heat radiating apparatus having the frame work in the main body constructed of fireproof wood, and the provision of tubes or equivalent means for the diffusion of heated air.

771 of 1905.—A. J. BOULT (P. A. GASSE): *Fuses of Fireplaces, and the like*. This relates to the combination with a stoneware or terra-cotta frame, for building into the flues of fireplaces and the like, of a tile or cover of stoneware, terra-cotta, or the like, for closing the aperture in the frame after the purging of the flues is finished and the debris removed therefrom.

2,748 of 1905.—T. F. ASH: *Chimney and Ventilating Shaft Tops*. This relates to the combination in a ventilator composed of a series of curved shields radiating from a common centre and bent over and wider at their outer sides than at their fixed or pivoted ends, of the type applicable to a ventilating shaft or chimney-top, of horizontal, vertical, or oblique flanges extending from the lower edges of the said shields downwards, vertical or oblique flanges extending from the upper edges of said shields upwards, and vertical or oblique flanges extending from the side of the final covering shield downwards.

3,634 of 1905.—E. J. KIS: *Moulding Machine for Cement Blocks, and other articles*. This relates to a machine for the production of shaped articles from cement, concrete, or the like, by stamping in a mould, the arrangement consisting of revolving stops in the outlet openings of feeding hoppers placed above the mould, which stops are brought into the open position by the raising of the stamp, so that a definite volume of material, carried round by the stops, can be fed to the mould for each stamping operation.

3,648 of 1905.—E. G. WATKINS: *Chimney-Top*. This relates to a system of treating a stack of smoky chimneys with one or more flues as one, and consists of a chamber or casing tapering upwards, and fitted on the top of the stack, which can be swept from the top without danger to the sweep, and also obviate the unsightly look of different kinds and heights of cowl.

5,621 of 1905.—J. SHANKS: *Cisterns made of Earthenware, Stoneware, Fire-clay, or like materials*. This invention consists in forming a cistern of earthenware, stoneware, fire-clay, or the like material, with an internal flange around the open top, all of the corners being preferably also rounded. The flanged formation of the open top provides such rigidity of the structure that in the operation of firing the ware it is not liable to such warping as is usual.

8,144 of 1905.—P. KEMP: *Window-Sashes*. This relates to window-sashes, and consists of devices for securing the batten rod and sash when closed, and comprises a striking plate on the hinged batten rod in combination with a pin, peg, or screw fitted to project inwards from a vertical rail of the sash.

8,635 of 1905.—R. ROUGHTON and F. W. CROSS: *Sliding and Reversible Window Sashes and Frames*. A reversible sliding sash for windows and the like, consisting in the combination with each sash, of suspended sliding bars pivoted to the sides thereof in such a manner as to approach or recede from the sash when the latter is being swung, and separate movable draught bars lodged in the window frame between the sashes, which normally hold the sashes vertical and cover the joints between the sashes and their pivoted bars, the latter being capable of being moved out of the path of the sashes and of automatically resuming their normal position, together with means which allow the top sash to swing freely round at the bottom of the window frame and below the other sash.

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

14,919 of 1905.—W. LEAR and W. F. LEAR: *Method and Means for Securing Lines to Sliding Window Sashes*. A method of securing cords, lines, or the like to sliding window sashes, characterised by front and back plates arranged at right angles to one another, a box connecting said plates together, and integral therewith, an opening at top and bottom of said box for the reception of the cord or line.

21,046 of 1904.—J. F. KLEINE: *Fireproof Floors and Ceilings*. The construction of floors and ceilings, consisting of a concrete filling material in combination with an arrangement of the stones or bricks relative to the iron insertions, such that the same effect is produced as if the floor were constructed with small flat vaultings between the iron insertions.

27,943 of 1904.—E. HAMPTON: *Heating Churches, Chapels, and other Buildings*. This consists in centrally heating churches, chapels, and other buildings, by means of steam-heated or hot-water heated pipes, having lateral extensions arranged under the seats.

29,101 of 1904.—H. V. SMITH & FREEMAN HINES, LTD.: *Apparatus for Trueing and Perfecting the Spigot and Socket Ends of Pipes*. An apparatus for trueing and perfecting the spigot and socket ends of pipes, consisting of moulds having members adapted to be retracted to facilitate the withdrawal of the pipe from the mould.

2,899 of 1905.—A. AUSTIN: *Chain for Supporting Drain Pipes, and the like*. A chain for supporting drain pipes and the like, being moulded in stoneware, cement, etc., the shape of said chain being oblong and solid, in the form of brick, but with two upright supports, one at either end, leaving an open space in the centre at top, this open space being provided for the socket or flange of the pipe to drop in, and stand free of the slightest pressure.

10,533 of 1905.—H. H. LAKE (G. F. HALL): *Emergency Screens for Protection against Fire*. A folding fire shutter having a box or case wherein it is normally enclosed by means of a plate or cover, which is secured to the underside of said box or case by a fusible fastening in such a manner that when exposed to sufficient heat said plate or cover is caused to release said shutter, and permit it to become extended under the influence of gravity over the part it is intended to protect.

11,192 of 1905.—A. C. CHENOWETH: *Construction of Concrete Columns, and the like*. A column composed of concrete or cement, convoluted metal netting embedded therein, and plastic material moulded about said column.

11,208 of 1905.—H. STUTTLE and J. H. BEACHE: *Pipe Couplings or Joints*. A pipe coupling consisting of two counter part coupling members, each of which comprises a semi-circular extension formed integrally with and on the ends of a pipe section, inwardly extending flanges on said extension, and lugs whereby said coupling members are removably connected together, forming a semi-circular recess in the end of each section, which will permit any of said sections to be removed without disturbing the rest of the pipe.

14,108 of 1905.—P. NANGOUTH: *Laying Jointless Stone-wood Flooring*. A method of laying a jointless flooring of stone-wood or similar material, distinguished by having an intermediate network of elastic composition, which forms open spaces between its ridges or walls, combined with isolating padding composed of sheets of roofing cardboard, which is placed in the open spaces surrounded by the network, and which thus form together a course or layer between the lower beton foundation and the stone-wood floor in order to prevent the upper floor from having contact with or becoming joined to the said foundation, said intermediate layer preventing cracks in the foundation from being transmitted to the said floor surface, said network thus forming a solid but elastic connexion between the stone-wood floor surface and the said foundation.

SOME RECENT SALES OF PROPERTY:  
ESTATE EXCHANGE REPORT.

November 16.—By HEPPEL & SONS (at Leeds).

Leeds.—York-rd., a corner building site, area 335 yds., f.	2563
Pontefract-la., a building site, area 145 yds., f.	127
50, Pontefract-st., area 130 yds., f., y.r. 131.	170
Richmond-road, The Bank, Top Mills, area 1,650 yds., f.	1,000
Cross Stamford-st., The Providence Leather Works, area 630 yds., f.	325
Cyber-yd., a building site, area 168 yds., f.	290
Beeston-rd., corner house and shop, area 92 yds., f.	355
Folly-rd., a building site, area 233 yds., f.	303
Canal-rd., a building site, area 1,338 yds., f.	350
Waterloo-rd., four sites and five cottages, area 391 yds., f.	901
4 and 6, Wals-st., and 14, 16, and 18, Bow-st., area 161 yds., f.	580
4, Hertford-st., and 9, Chapel-walk, area 134 yds., f.	335
Meadow-la., a freehold shop site, area 48 yds.	153



By WALTON & LEE (at Frome). Chantry, Somerset.—The Chantry Estate, 97 a. 1 r. 28 p. l. ....	55,550
November 16.—By E. HOLWORTH (at Bromley). Bromley, Kent.—3 and 7, Bloomfield-rd., l., cr. 84. ....	1,230
November 17.—By MONTAGU & ROBINSON. St. Luke's.—Nicol's-buildings, l.g. rents 480l. reversion in 51½ yrs. ....	9,550
By F. ROUGHEN & DAVISON. Walthamstow.—21, Avon-rd., l., p. 281. 12s. ....	600
November 20.—By T. W. CAMPBELL. Pimlico.—Sutherland-pl., l.g. 27s. u.t. 32½ yrs. g.t. 3l. with reversion ....	305
Holloway.—Hilton-rd., l.g. 30l. u.t. 46½ yrs. g.t. 10s. ....	500
By DRIVER. Holloway.—17 and 19, Cromwell-rd., u.t. 60 yrs. g.t. 20l. w.r. 97. 10s. ....	675
By HOLCOMBE, BETTS, & WEST. South Kensington.—Fiborough-rd., l.g. rents 110l. u.t. 57½ yrs. g.t. 40l. with reversion ....	335
Kensington.—33, Victoria-rd., u.t. 19½ yrs. g.t. 15l. 15s. p. ....	1,690
Fulham.—61, Crab Tree-la., u.t. 91 yrs. g.t. 6l. 10s. w.r. 44. 4s. ....	1,425
November 21.—By DAVID BURNETT & CO. Tottenham.—320 and 322, High-rd., area 16,000 ft., l., y.r. 90l. ....	345
Minorities.—40, Royal Mint-st., c., y.r. 25l. ....	1,700
By C. W. DAYNES & SON. Islington.—31, Theobald-st., u.t. 22 yrs., g.t. 7l., y.r. 44l. ....	435
92, Liverpool-rd., u.t. 12½ yrs., g.t. 9l. cr. 50l. 53, Norfolk-rd., u.t. 64 yrs., g.t. 5l. 4s. ....	235
Holloway.—60, 62, 73, and 75, Gooding-rd., u.t. 53 yrs., g.t. 28l. cr. 16½. ....	130
By DEBENHAM, TEWSON, & CO. Hackney.—35, Well-st., l., y.r. 35l. ....	130
Leystonstone.—181, Hainsell-rd., l., y.r. 40l. ....	1,100
Holloway.—St. John's-ch., "Park Lodge," u.t. 45½ yrs., g.t. 10l. p. ....	600
By PEMBERTON & PAIBA. Hampstead.—25, Kilburn Priory, u.t. 35 yrs., g.t. 4s. 8d., cr. 60l. ....	850
By THURGOOD & LAMBERT. Kentish Town.—55, Malden-rd. (s.), u.t. 44 yrs., g.t. 8l., y.r. 50l. ....	400
Abbey Wood, Kent.—Woolwich-rd., "The Cot," and half an acre, l., y.r. 40l. ....	530
By MURLET BAKER & CO. Hyde Park.—23, Norfolk-rd., u.t. 52½ yrs., g.t. 35l. p. ....	600
21, Slaxee-rg., and 57, Bathurst-mews, u.t. 31½ yrs., g.t. 48l. p. ....	1,000
Devonport-st., l.g. 20l. u.t. 29½ yrs., g.t. 10l. 1, Radnor-pl., u.t. 26½ yrs., g.t. 9l., y.r. 110l. ....	2,380
Southwick-cres., l.g. 30l. u.t. 30 yrs., g.t. 10l. Radnor-pl., l.g. 22l. 10s. u.t. 30 yrs., g.t. 2l. ....	295
17s. Radnor-pl., u.t. 30 yrs., g.t. 2l., y.r. 104l. 17s. Radnor-pl., u.t. 30 yrs., g.t. 2l., y.r. 65l. ....	1,000
Sussex-gdns., l.g. 15l. u.t. 31½ yrs., g.t. 10l. 5, Sussex-gdns., u.t. 30 yrs., g.t. 15l., y.r. 100l. ....	455
Regent's Park.—74, Osnaburgh-st. (business premises), y.r. 100l.; also l.g. 10l. u.t. 17½ yrs., g.t. 16l. ....	900
82, William-st. (s.), y.r. 18l. u.t. 10l. 10s. ....	960
u.t. 17½ yrs., g.t. 11l. ....	710
By J. C. PLATT (at Hammersmith). Chiswick.—23 to 33 (odd), Devonshire-rd., u.t. 62½ yrs., g.t. 25l. 4s., y.r. 215l. 16s. ....	400
Kensington.—65, Mastro-rd., l., w.r. 74l. 2s. ....	1,700
By LOVED & DONER (at Masons' Hall Tavern). Hampton, Middlesex.—High-st., "Red Lion Hotel," l., p. (with goodwill), ....	8,000
High-st., a freehold shop, y.r. ....	280
Twickenham, Middx.—The "Albany Hotel," u.t. 71 yrs., y.r. 125l. (with goodwill), ....	6,830
Klugst., The "George" p-h., u.t. 5½ yrs., y.r. 65l. (with goodwill), ....	8,050
Willaden.—Acton-la., The "Fountain Junction" Arms" p-h., u.t. 7½ yrs., y.r. 500l. ....	3,000
By ORGILL, MARKS & CO. (at Masons' Hall Tavern). Enfield.—Theobald's Park-rd., The "Plough" b-h., l., p. (with goodwill), ....	1,900
By E. C. STRECHER (at Rufford). Rufford, Lancs.—Two houses and 6 a. 1 r. 38 p., "Boundary House Farm," 43 a. 3 r. 31 p. l., Holmes Wood-la., two farms, 47 a. 1 r. 22 p. l., Six moss fields, 45 a. 0 r. 29 p. l., ....	780
Two houses and 5 a. 1 r. 30 p. l., ....	2,657
Wheelwright's shop, smithy, etc., 2 a. 0 r. 6 p., l., ....	4,480
Six freehold fields, 31 a. 1 r. 26 p. l., ....	2,700
Fifteen freehold cottages and 9 a. 2 r. 10 p. l., House, shop and 1 a. 0 r. 23 p. l., ....	700
November 22.—ARTHUR BAXTON. Camberwell.—17, New Church-rd. (s.), l., w.r. 33l. 18s. ....	750
19, New Church-rd. (s.), l., w.r. 34l. 4s. 8d., Plumstead, Kent.—55, Robert-st. (s.), u.t. 46 yrs., g.t. 4l. 6s. w.r. 28l. 12s. ....	2,144
By S. B. CLARK & SON. Eltham, Kent.—"Darentdale" and 10 a. 3 r. 84 p., l., p. ....	2,821
By HUMBERT & FLINT. Holborn.—33, 34, and 35, Kirkby-st. (manu- facturing premises), area 4,840 ft., l., p. ....	300
By F. JOLLY & JAMES. Forest Gate.—132, Field-rd., l., cr. 32l. 10s. ....	355
By ALFRED RICHARDS. Bloombury.—21A, Devonshire-st. (s.), l., w.r. 110l. 12s. ....	235
Holborn.—19, Emsland-st. (warehouse), area 750 ft., u.t. 20 yrs., g.t. 25l., y.r. 125l. ....	125
5, Orde Hall-st., u.t. 70½ yrs., g.t. 33l., w.r. 192l. 18s. ....	3,050
10A, Featherstone-buildings (s.), area 1,225 ft., g.t. 70l., y.r. 312l. 4s. ....	5,800
Clerkenwell.—180, Farringdon-rd. (s.), u.t. 45½ yrs., g.t. 9l., y.r. 107l. 18s. ....	320

By RUSHWORTH & STEVENS. Kensington.—33, Russell-st., l., p. ....	5800
Plumstead, Kent.—41, Reids-haven-rd., u.t. 61½ yrs., g.t. 3l., w.r. 28l. 8s. ....	180
By SCOBELL & LAKE. Kentish Town.—Wellesley-rd., l.g. rents 72l., reversion in 40 and 51 yrs. ....	1,855
By WHEELER BROS. Pimlico.—8 to 11, Wilton-rd. (s.), u.t. 18½ yrs., g.t. 35l., y.r. 135l. ....	1,075
November 23.—By CANE & CO. Dulwich.—32, Gower-st., u.t. 63 yrs., g.t. 7l., cr. 34l. ....	805
Brookley.—305, Brookley-rd. (s.), u.t. 86 yrs., g.t. 7l. 7s., y.r. 60l. ....	700
By MAY & PHILIPOT. Brixton.—21 to 31 (odd), Elm-pl., u.t. 45½ yrs., g.t. 33l., y.r. 241l. 18s. ....	1,350
By FARRBROTHER, ELLIS, & CO. Tackley, Oxon.—"Court Farm," 227 a. 2 r. 20 p., The "Gardens Arms" p-h., 8 a. 0 r. 6 d., and 2 a. 1 r. 2 p., ....	4,750
Thirteen freehold cottages and 1 a. 1 r. 8 p. l., By FRITH, GARLAND, & LANE. Harrington.—103, 105, and 107, Seymour-rd., u.t. 90 yrs., g.t. 21l., cr. 108l. ....	1,100
97 to 103 (odd), Hewitt-rd., u.t. 92 yrs., g.t. 28l., y.r. 144l. ....	880
18, Chesterfield-gdns., u.t. 84 yrs., g.t. 6l. 6s., cr. 32l. ....	290
By HARRIS STACEY. Redhill, Surrey.—Lingfield-la., l.g. rents 84l., u.t. 23½ yrs., g.t. 24l. 10s. 6d. ....	840
By STIMSON & SONS. Stoke Newington.—Springfield-rd., l.g. r. 22l. 10s., reversion in 65 yrs. ....	380
Claydon.—19 and 19 (odd), Lipson-rd., u.t. 61 yrs., g.t. 55l., y.r. 312l. ....	3,015
Camberwell.—20, 21, 23, 25, 26, and 32, North- way-rd., u.t. 67½ yrs., g.t. 40l., y.r. 24l. 14s. ....	1,855
Peckham.—2, Brayards-rd., u.t. 65 yrs., g.t. 6l., w.r. 50l. 4s. ....	355
133 and 135, Peckham Park-rd., u.t. 153 yrs., g.t. 8l., w.r. 70l. 4s. ....	610
Battersea.—Stewart's-la., West, l.g. 54½ u.t. 14 yrs., g.t. 12l. ....	2,470
11 to 19 (odd), York-rd. (s.), u.t. 31 yrs., g.t. 25l. 18s. 6d., y.r. 132l. ....	1,745
30, York-rd. (s.), u.t. 64½ yrs., g.t. 3l., y.r. 31l. 18s. 11d. ....	365
8 to 16 (even), Triton-st., u.t. 60½ yrs., g.t. 21l., w.r. 111l. 18s. ....	445
80, Ingrave-st., u.t. 60 yrs., g.t. 5l., w.r. 27l. 6s. ....	165
Bethnal Green.—155, 171, and 173, Cambridge- rd. (s.), y.r. 108l. ....	1,450
Highbury.—185, Backstock-rd., u.t. 65 yrs., g.t. 10l., y.r. 50l. ....	380
Battersea.—27, York-rd., "The Old Rectory," denises 2 h., an improved rental of 49l. 9s. 11d. for 31 yrs. ....	615
Walworth.—62 and 64, East-st. (s.), l., y.r. 74l. Tottenham.—218 and 220, Northumberland-rd., 4s. y.r. 54l. ....	905
By NEWTON, EDWARDS, & SHEPHERD. Battersea.—Queen's-rd., l.g. rents 84l. 10s., reversion in 67 yrs. ....	870
Stanley-st., l.g. 20l., reversion in 50½ yrs. ....	725
Barnesford-rd., l.g. rents 55l. 6s., reversion in 64½ to 76½ yrs. ....	1,430
Old Kent-road.—Hemp-row, l.g. 20l., reversion in 60½ yrs. ....	470
Cambersal.—Brisbane-rd., l.g. 35l., reversion in 91½ yrs. ....	525
Catford.—Woolstone-rd., l.g. rents 26l., reversion in 90½ yrs. ....	665
Rotherhithe.—Corabury-rd., l.g. 86l. 10s., reversion in 77 yrs. ....	730
Leyton.—Manby-rd., l.g. rents 32l. 15s., reversion in 73 yrs. ....	750
Leytonstone.—Cobbold-rd., l.g. 21l., reversion in 75½ yrs. ....	475
Plaistow.—Terrace-rd., l.g. 30l., reversion in 80½ yrs. ....	690
Tottenham.—Seaford-rd., l.g. 51l. 4s., reversion in 76½ yrs. ....	1,175
Poplar.—Bath-st., l.g. 2l., reversion in 50½ yrs. Camberwell.—121, Denmark-hill (s.), u.t. 60 yrs., g.t. 10l. 10s., y.r. 55l. ....	405
Barnesbury.—133, Henningford-rd., u.t. 37 yrs., g.t. 7l., cr. 45l. ....	515
Dalston.—4 to 14 (even), Shrubland-rd., u.t. 14 yrs., g.t. 24l., y.r. 194l. ....	380
8 and 9, West Side, l., y.r. 64l. ....	910
November 24.—By MARK HUBBARD. Gunnersbury.—19 to 25 (odd), Cambridge-rd., u.t. 55 yrs., g.t. 2l., y.r. 160l. ....	1,010
Islington.—40, 42, and 44, Dorinda-st., l., w.r. 78l. 9s. ....	1,205
By PROTHOROE & MORRIS. Woodford.—1, Myrtle-villas, l., y.r. 26l. ....	580
Barnet.—Hanks.—Railway Nursery (Oberthur Jude Farm), 21½ acres, l., p. ....	345
Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; r. for improved ground-rent; g.t. for ground-rent; t. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; a.r. for estimated rental; w.r. for weekly rent; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; y.s. for year; l.s. for land; s.d. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; g.t. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.	

## MEETINGS.

FRIDAY, DECEMBER 1.

Architectural Association.—Mr. E. F. Reynolds on  
"Turkish Architecture," illustrated with lantern views.  
7.30 p.m.  
Institution of Civil Engineers (Students' Meeting).—Mr.  
W. L. Jenkins on "An Illustration for the Bacterial  
Treatment of Sewage at Neath." 8 p.m.

SATURDAY, DECEMBER 2.

The Incorporated British Institute of Certified Carpenters  
—Annual general meeting. Carpenters' Hall, London  
Wall, E.C. 6. 6.15 p.m.

MONDAY, DECEMBER 4.

Royal Institution of British Architects.—Business and  
ordinary meeting (1) to announce the result of the  
November examinations; (2) to elect candidates for the  
Presidency for the coming year; (3) to elect members to  
approach the promoters of any competition with  
object of their nominating competition; (4) to elect  
President or Council appoint any professional Association  
any competition, unless recommended by the  
promoters of such competition; (5) to elect members to  
open an informal discussion on "The New Woodwork  
of the London Building Act." 8 p.m.  
Society of Arts (Lecture Series).—Dr. J. A. Fleming,  
F.R.S., on "The Measurement of High Frequency  
Currents and Electric Waves."—11. 8 p.m.  
Institution of Electrical Engineers.—Mr. E. A. Richards on  
"Intention in Ornament." Illustrated by lantern slides.  
6 p.m.  
Society of Engineers.—Mr. Benjamin I. Biddle on  
"The Grindstone Stone Quarry and its Products."  
7.30 p.m.

TUESDAY, DECEMBER 5.

Institution of Civil Engineers.—Hon. Charles Alcock  
Parsons, C.B., J.D., F.R.S., and Mr. O. D. Stonor,  
M.M.Inst.C.E., on "The Steam Turbine." 8 p.m.  
Wednesday, December 7.

Edinburgh Architectural Association.—Mr. E. A. Richards on  
"A Tour in Belgium." Illustrated by lantern slides.  
8 p.m.  
Builders' Foremen and Clerks of Work Institution.—  
Ordinary meeting of the members. 8 p.m.  
The Quantity Surveyors' Association.—An ordinary  
meeting to be held at 7.30 p.m. in "The Commodore's  
Room," Holborn Restaurant. Presided by Mr. F. B.  
Hollis, entitled "Some Thoughts on the Quantity  
Surveyor, and his Relation to the Building Trade, the  
Architect, and the Builder." 7.30 p.m.  
Institution of Civil Engineers.—Building Committee to  
the British Shipway of Messrs. William Cory & Son, Ltd.  
Royal Archaeological Institute.—Mr. William Churchill  
on "The Nurseries of the Sardinia, and some other Neolithic  
Monuments of the Mediterranean Region." 4 p.m.

THURSDAY, DECEMBER 7.

Civil and Mechanical Engineers' Society (Lecture Series).—  
Dr. J. A. Fleming, F.R.S., on "Conduction of Heat." 8 p.m.  
Institution of Electrical Engineers.—Mr. J. H. Girdell on  
"The Charing Cross Company's City of London  
Works." 8 p.m.

FRIDAY, DECEMBER 8.

Junior Institution of Engineers.—Professor J. T.  
Morris on "Electric Mains for Power Transmission Work."  
8 p.m.

## TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is sent DIRECT  
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## PRICES CURRENT OF MATERIALS.

*.* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect price—a fact which should be remembered by those who make use of this information.	BRICKS, &c.	&c.
Hard Stocks.....	12 0	" per 1000, all sorts, in river.
Rough Stocks.....	12 0	" " " " " "
Grilles.....	1 40	" " " " " "
Facing Stocks.....	2 00	" " " " " "
Shippers.....	2 00	" " " " " "
Flettons.....	5 6	" at 1000, all sorts, in river.
Red Wire Cuts.....	1 10	" " " " " "
Best Fareham Red.....	3 12	" " " " " "
Best Red Pressed.....	5 00	" " " " " "
Best Blue Pressed.....	4 10	" " " " " "
Do. Bullnose.....	4 6	" " " " " "
Best Skourbridge.....	3 15	" " " " " "
Fire Bricks.....	3 15	" " " " " "
GLAZED BRICKS.		
Best White and.....	12 00	" " " " " "
Ivory Glazed.....	11 00	" " " " " "
Stretchers.....	12 00	" " " " " "
Quoins, Bullnose.....	16 00	" " " " " "
Double Stretchers.....	16 00	" " " " " "
Double Headers.....	16 00	" " " " " "
One Side and two.....	19 00	" " " " " "
Two Sides and one.....	20 00	" " " " " "
End.....	20 00	" " " " " "
Spays.....	20 00	" " " " " "
Chamfered Squints.....	20 00	" " " " " "
Best Dipped Salt.....	12 00	" " " " " "
Glazed Stretchers.....	12 00	" " " " " "
Quoins, Bullnose.....	12 00	" " " " " "
Double Stretchers.....	12 00	" " " " " "
Double Headers.....	12 00	" " " " " "
One Side and two.....	15 00	" " " " " "
Two Sides and one.....	15 00	" " " " " "
End.....	15 00	" " " " " "
Spays, Chamfered, Squints.....	14 00	" " " " " "
Second Quality.....	14 00	" " " " " "
White.....	2 00	" less than best.
Dipped Salt.....	2 00	" less than best.
Glazed.....	2 00	" less than best.

LEAD, &c. Per ton, in London.

LEAD, &c. Per ton, in London.			
		£ s. d.	£ s. d.
LEAD—Sheet, English, 5lb. and up.	18	5 0	...
Pipe in coils .....	18	5 0	...
Soft pipe .....	21	5 0	...
Comp. pipe .....	21	5 0	...
ZINC—Sheet .....	10	3 0	0
Vieille Montagne .....	10	3 0	0
Silesian .....	32	15 0	...
COPPER—			
Strong Sheet .....	per lb.	0	1 0
Thin .....		0	1 0
Copper nails .....		0	11 ..
BRASS—			
Strong Sheet .....		0	0 11 ..
Thin .....		0	1 0 ..
Tin—English Ingots .....		0	5 ..
SOLDER—Plumbers' .....		0	0 3 ..
Tinmen's .....		0	0 3 ..
Blowpipe .....		0	0 10 ..

12 oz. thirds	22d.	per ft. delivered.
fourths	20d.	
21 oz. thirds	33d.	??
fourths	31d.	??
26 oz. thirds	46d.	??
fourths	37d.	??
32 oz. thirds	52d.	??
fourths	51d.	??
Fluted Sheet, 15 oz.	37d.	??
21 oz.	44d.	??
1/2 Hartley's Rolled Plate	24d.	??
1 1/2     "     "     "	24d.	??
1 1/2     "     "     "	24d.	??

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes .....	per gallon	0 1 7
" " " in barrels .....	"	0 1 8
" " " in drums .....	"	0 1 10
Boiled " " in pipes .....	"	0 1 9
" " " in barrels .....	"	0 1 10
" " " in drums .....	"	0 2 0
Turpentine in barrels .....	"	0 3 9
" " " in drums .....	"	0 3 11
Genuine Ground English White Lead .....	per ton	21 10 0
Red Lead, Dry .....	"	50 10 0
Best Linseed Oil Putty .....	per cwt.	5 6 6
Stockholm Tar .....	per barrel	1 12 0

VARNISHES, &c.	Per gallon.
	£ s. d.
Fine Pale Oak Varnish .....	0 8 0
Fine Copal Oak .....	0 10 0
Superfine Pale Elastic Oak .....	0 10 0
Fine Extra Hard Church Oak .....	0 10 0
Superfine Hard-drying Oak, for seats of Chairs .....	0 14 0
Fine Elastic C rriage .....	0 12 6
Superfine Pale Elastic Carriage .....	0 16 0
Fine Pale Maple .....	0 16 0
Finest Pale Durable Copal .....	0 18 0
Extra Pale French Oil .....	0 10 0
Eggshell Flattening Varnish .....	0 18 0
White Copal Enamel .....	1 4 0
Extra Pale Paper .....	0 12 0
Best Japan Gold Size .....	0 10 6
Best Black Japan .....	0 16 0
Oak and Mahogany Stain .....	0 9 0
Brunswick Black .....	0 8 6
Black and Blue .....	0 12 0
Knottin' .....	0 10 0
French and Brush Polish .....	0 10 0

SLATES.			
		£ s. d.	
10	best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
10	1st quality "	13 17 6	" "
12	" "	13 0 0	" "
12	" "	13 15 0	" "
18	" "	7 5 0	" "
10	best blue thin	12 13 6	" "
18	modco	6 12 6	" "
10	best Eureka un-		" "
12	fading green	15 17 6	" "
10	" "	15 7 6	" "
18	" "	13 0 0	" "
10	" "	10 5 0	" "
10	permanent green	11 12 6	" "
18	" "	9 2 6	" "
18	" "	6 12 6	" "

TILES.		
	s.	d.
English red roofing tiles	43	0 per 1000 atry. depôt.
Hip and Valley tiles	50	0 per doz.
Broseley tiles	50	0 per 1000
Broseley tiles	52	6 per doz.
Hip and Valley tiles	52	6 per doz.
Red Raton red, brown, or " " " " " "		
Red Raton red, brown, or " " " " " "	57	6 per 1000
Red Raton red, brown, or " " " " " "	00	0 per doz.
Hip tiles	3	0 " " "
Red Raton Mottled Stafford " " " " " "	51	9 per 1000
Red Raton Mottled Stafford " " " " " "	54	6 " " "
Hip tiles	4	1 per doz.
Valley tiles	8	8 " " "
Broseley " brand		
Broseley " brand	48	0 per 1000
Broseley " brand	50	0 " " "
Hip tiles	4	0 per doz.
Valley tiles	8	8 " " "
Broseley " brand		
Broseley " brand	50	0 per 1000
Broseley " brand	47	6 " " "
Broseley " brand	50	0 " " "
Hip tiles	4	0 per doz.
Valley tiles	8	6 " " "

JOISTS, GIRDERS, &c.		
	In London, or delivered Railway Vans, per ton.	
Rolled Steel Joists, ordinary sections .....	£ s. d.	£ s. d.
Compound Girders, ordinary sections .....	6 5 0	7 0 0
Steel Compound Girders, ordinary sections .....	7 15 0	8 15 0
Angles, Tees, and Channels, ordinary sections .....	9 7 6	10 17 6
Fitch Plates .....	7 15 0	8 15 0
Cast Iron Columns and Stanchions including ordinary patterns .....	8 0 0	8 10 0
	6 17 6	8 0 0

METALS.		Per ton, in London.	
		£ s. d.	£ s. d.
In—		8 0 0	8 10 0
Common Bars .....			
Cold-churned " Good quality .....		8 10 0	9 6 0
merchandise quality .....		8 10 0	9 6 0
Starfording " Marked Bars .....		10 0 0	0 0 0
Steel Bars .....		9 5 0	9 0 0
Hoop Iron, best price .....		9 5 0	9 10 0
" Galvanised .....		17 0 0	—
(And upwards, according to size and gauge.)			
Sheet —			
Ordinary sizes to 20 g.		9 10 0	—
" " 24 g.		10 10 0	—
" " 26 g.		10 10 0	—
Sheet Iron, Galvanised, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to			
3 ft. to 20 g.		14 0 0	—
Ordinary sizes to 22 g.		14 0 0	—
" " 24 g.		15 0 0	—
" " 26 g.		15 0 0	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.		17 0 0	—
" " 22 g.		17 0 0	—
" " 24 g.		17 10 0	—
" " 26 g.		19 0 0	—
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 20 g.		13 10 0	—
" " 22 g. and 24 g.		14 0 0	—
" " 26 g.		15 0 0	—
Best Soft Steel Sheets, 2 ft. by 2 ft.		11 10 0	—
" do by 20 g. and thicker .....		12 10 0	—
Best Soft Steel Sheets, 24 g.		13 10 0	—
" " 26 g.		14 15 0	—
Cut Nails " S." to 3 in., small trade extras,		9 15 0	—

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\* Denotes *accepted*. † Denotes *provisionally accepted*.

TENDERS.—Continued on page 631.



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(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Pipe Sewer (1,068 yds. of 12 in. and 507 yds. of 9 in.)	Milton-next-Sittingbourne U.D.C.	Town Hall, High-street, Milton	Dec. 5
Pipes (470 tons of cast-iron)	Edinburgh and District Water Trust	Superintendent of Works' Office, 12, St. Giles-street, Edinburgh	do.
Road Works, Broughton and Pendleton	Salford Corporation	Borough Engineer's Office, Town Hall, Salford	do.
Walls (raising boundary), etc., Blaydon School	Durham County Education Authority	W. Rushworth, F.R.I.B.A., Education Offices, Durham	do.
Tenny, Chvrtin, (Single to Dble. Line), Lon.-rd. Route	Derby Corporation	G. Trevelyan Lee, Town Clerk, 15, Tenant-street, Derby	do.
House, etc., Alterations, West Gate, Mansfield	Willenden District Council	G. P. Griffin, Architect, Watson-avenue, Mansfield	do.
*SLUICE GATES (78)	Uxbridge R.D.C.	Council's Engineer, Public Offices, Dyne-road, Kilburn, N.W.	Dec. 8
Road and Drains, Cleveland-road, Cowley	Wortley R.D.C.	E. Birks, Engineer & Surveyor, Town Hall, Uxbridge	do.
Road Works, Greenhead-lane	Warrington Electricity Committee	G. E. Beaumont, Surveyor, Grosvenor, Yorkshire	do.
Plant (high Tension)	Bucklow Guardians	F. V. J. Mathias, Boro' Electrical Engineer, Howley, Warrington	do.
Paint, etc., Two Blocks of White Bldgs., Knutsford	Manchester Corporation	R. J. McBeath, Architect, Birnam House, Sale	do.
Urinals (five)	Manchester Guardians	City Surveyor's Office, Town Hall, Manchester	do.
Machine (washing) for Crumpsall Workhouse	Glamorgan County Council	Master of the Workhouse	do.
Road Improvement (Headland), Whitechurch	do.	T. M. Franklin, Clerk, Westgate-street, Cardiff	do.
Llandaff and Whitechurch Main Road, Llandaff Yard	do.	do.	do.
Diverting Road near Niah Cross	do.	do.	do.
Widening Road at Ystradomen	do.	do.	do.
Stores and Materials	Wrexham R.D.C.	J. Price Evans, C.E., Argyle-chambers, Wrexham	Dec. 7
Street Works	Nottingham Works & Ways Com.	A. Brown, City Engineer, Nottingham	do.
Plumbers' and Glaziers' Work	Southend-on-Sea Corporation	E. J. Elford, Borough Surveyor, Town Hall, Southend-on-Sea	do.
Enlarging, etc., Consecrational Manse, Sedburgh	Leeds Corporation	City Engineer's Office, Municipal Buildings, Leeds	do.
Four Blocks of Buildings, Hawhead Asylum	Sheffield Education Committee	J. F. Moss, Secretary, Leopold-street, Sheffield	do.
Refuse Removal	Rhonda U.D.C.	W. J. Jones, Public Offices, Pentre, Rhonda	do.
*NEW SORTING OFFICE, PECKHAM	Govan District Lunacy Board	S. Shaw, Architect, Kendal	Dec. 8
Church Renovation, Broad-lane, Hlogan, Cornwall	St. Marylebone Borough Council	H. & D. Barclay Architects, 245, St. Vincent-street, Glasgow	do.
Street Works, Eskdale-road	H.M. Office of Works	J. Wilson, Town Clerk, Town Hall, Marylebone-lane, Oxford, W.	do.
Deepening the River Thames, Gravesend	Primitive Methodists	H.M. Office of Works, Storey's Gate, Westminster, S.W.	do.
Stone for Roads	Chesham U.D.C.	Sampson Hill, Architect, Green-lane, Redruth	Dec. 9
Sewer Extension (250 yds. of 9-in. Stoneware Pipe)	Thames Conservancy	R. Phillips, Sec., Thames Conserv. Offices, Victoria Embankment	do.
Two Villas at Watling	Northumberland County Council	County Surveyor, Moot Hall, Newcastle-on-Tyne	do.
*Alters, to Premises in High-street, Weston-super-Mare	Dorking U.D.C.	G. Somers Matthews, Surveyor, 46, Lough-street, Dorking	do.
Formation of a Bowling Green	Messrs. George	A. R. Bennetts, Surveyor, St. Austell, Cornwall	Dec. 11
Culverting Baycroft Stream (275 yds.)	Grimsby Corporation	Hans Price & W. Jane, Architects, Weston-super-Mare	do.
Pipes (415 tons of Cast-Iron)	Halifax Corporation	W. Tweedie, Secretary, Mos-mart, New Cumnock, N.B.	do.
1,000 Steel Tyres for Carriages, etc.	Southern Mahratta Ry. Co.	G. Gilbert Whyatt, Borough Engineer, Town Hall-square, Slough	do.
Street Lighting	Crewe Town Council	G. H. Hill & Sons, Engineers, 3, Victoria-street, Westminster, S.W.	do.
Stores	Leicester Corporation	E. Z. Thornton, 44, Queen Anne's-gate, S.W.	do.
Granite	Hertford Corporation	G. Eaton-Shore, Borough Surveyor, Municipal Office, Crewe	do.
Cast-Iron Water Main (540 yds. of 4-in.)	Great Northern Railway Co., Ireland	E. G. Mawbey, Borough Engineer, Town Hall, Leicester	do.
House, Queen's Bridge, Belfast	do.	Borough Surveyor's Office, Hertford	do.
Residence (Detached), Dundalk	Walsall Education Committee	W. H. Mills, Engineer, Amlena-street, Terminus, Dublin	do.
School, Bilsley-street, Walsall	Powell Duffryn Steam Coal Co.	Bailey & McConall, Architects, Bridge-street, Walsall	do.
Stores	Dublin Waterworks Committee	Stores Manager, Aberaman Offices, near Aberdarn	do.
Elec. Lighting, Fire Brigade Station, Gt. Brunswick-st.	Southampton Corporation	City Architect, Municipal Buildings, Cork Hill, Dublin	do.
Reservoir, Tanks, etc., near Cardington	Dundalk R.D.C.	C. W. Stubbs, Borough Engineer, Municipal Office, Southampton	do.
*IRON ROOFING	St. Pancras Borough Council	P. R. Fitzgibbon, Clerk, Council Office, Dundalk	do.
Fire Hydrants, etc. (50)	Southall-Norwood U.D.C.	Borough Engineer, Town Hall, St. Pancras, N.W.	Dec. 12
Stores (General)	South Indian Railway Co., Ltd.	R. Brown, Engineer and Surveyor, Public Offices, Southall	do.
Locomotive Stores	do.	H. W. Notman, 55, Gracechurch-street, London, E.C.	do.
Ironwork Fencing (40 tons)	do.	do.	do.
Roofing (5 roofs, 100 ft. by 25 ft.)	Sub-Com. for Norwich District	H. Beswick, County Architect, Newgate-street, Chester	do.
School for 300 Children, Barton	Corporation of London	Office of Engineer, Corporation, Guildhall, London	do.
Paving Carriageways of Tulon-roy, Maudslayi	The U.D.C.	T. J. Trowsdale, Surveyor, Council Offices, Amfield Park	do.
Street Works, Annfield Plain, Durham	Willenden District Council	Council's Engineer, Public Offices, Dyne-road, Kilburn, N.W.	Dec. 13
*SLOP VANS AND WATER VANS	Marlesfield Corporation	C. W. Stubbs, Borough Engineer, Marlesfield	do.
Drain Pipes, Cement, Bricks, etc.	Essex Education Committee	F. Whitmore, County Architect, 73, Duke-street, Chelmsford	do.
*HARDWOOD OR IRON FENCING	Sunbury-on-Thames U.D.C.	H. F. Coates, Surveyor, Council Offices, Sunbury-on-Thames	Dec. 15
Sewage and Air Mains	Clyde Navigation Trustees	G. H. Baxter, Mechanical Engineer, 16, Robertson-street, Glasgow	do.
Cranes (20-ton Hand or Electric Overhead Travelling)	do.	do.	do.
Quay Capstans (Six Electrically-driven)	do.	do.	do.
Capstans (Two Double-geared Pierhead)	Hendon U.D.C.	Council's Engineer, Council Offices, Hendon, N.W.	Dec. 20
*ROAD WIDENING, PIPE SEWERS, ETC.	Blakton U.D.C.	C. J. Lomax, Engineer, 37, Cross-street, Manchester	do.
Sewage Disposal Works	Kent Education Committee	Ruck & Smith, Architects, 85, Week-street, Maidstone	Dec. 23
*ENLARGING TO SCH., DOUGHTON MONCHELSSEA	Alderley Edge U.D.C.	J. Newton, Son, & Bayley, Engineers, 19, Cooper-st., Manchester	do.
Gullies (twenty detritus catch-pits), etc.	Castleria R.D.C.	C. Mulvany, Engineer's Office, Athlone, Ireland	do.
Houses, Weir Sluices, and Watercourse	do.	do.	do.
Turbine, Hydraulic, and Suction Gas Engine Plant	do.	do.	do.
Electrical Work	Docking Guardians	J. Morris, Surveyor, Dorset House, Heneham	Dec. 27
Workhouse Repairs, Docking	Alverstoke Guardians	H. A. F. Smith, Architect and Surveyor, Star-chambers, Gosport	Jan. 1
Drainage Works at Workhouse, Park-road, Gosport	Fishston U.D.C.	C. J. Lomax, Engineer, 37, Cross-street, Manchester	Jan. 4
Sewage Disposal Works, Fishston	Southsea Clarence Pier Co.	A. H. Bone, Engineer, 148, High-street, Portsmouth	Jan. 10
*EXTENSION OF PIER	Mr. John Robson	G. Balnes & Son, Architects, 15, Cheapside, Bradford	Jan. 10
Baptist Church and Schools, Consett, Co. Durham	Warrington Markets & Parks Com.	Houston & Houston, Surveyor, 148, High-street, Guildford	Jan. 10
Engineering Works Extension, Shipley	Staffs Education Committee	J. M. Gill, M.E., Craigowan, Castlebury, N.B.	Jan. 10
Road (1,100 ft., Woodbridge Estate, Cudworth)	do.	T. Longlin, Borough Engineer, Warrington	Jan. 10
Hutch-road (1 mile 55 chains), Abington to Craighead	do.	J. A. Lucas, Architect, Guildhall-chambers, Exeter	Jan. 10
Painting Markets and Fountain	do.	do.	Jan. 10
House at Benchams, Harford, Newton-Poppleford	do.	do.	Jan. 10
*NEW SCHOOL AT BURNWOOD	do.	do.	Jan. 10

## PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be made
*CLERK OF WORKS	Hammersmith Borough Council	5l. per week	Dec. 5

Those marked with an asterisk (\*) are advertised in this number.

Competitions.

Contracts, iv. vi. viii. x.

Public Appointments, xvi.

TENDERS.—Continued from page 599.

ASHFORD (Kent).—For 270 tons of cast-iron water pipes, etc., for the Urban District Council. Mr. W. Terrill, surveyor, 5, North-street, Ashford.—

	Rising Main.	Distributing Main.	Valves.
£ s. d.	£ s. d.	£ s. d.	£ s. d.
G. Cooke	580 13 2	178 17 0	1,613 11 5
J. Cochrane & Co.	580 8 1	208 15 6	1,650 0 7
London Iron Works	574 0 0	249 0 0	1,654 4 7
Quey Coal and Iron Co.	585 8 5	273 5 0	1,606 4 11
Gray Iron Co.	582 4 5	223 17 6	1,697 16 8
Hewell Iron Co.	581 5 3	297 5 0	1,698 14 3
St. Cross Co.	553 10 11	270 1 0	1,711 4 11
J. Gorman & Co.	846 11 2	307 13 0	1,733 6 8
Green & Co.	910 18 3	212 19 0	1,767 5 1
W. Weeks & Sons	929 10 0	217 14 6	1,776 16 9
Wain, Gow, & Co.	906 18 9	272 6 3	1,782 4 10
Tarver & Co.	921 8 9	261 15 6	1,831 2 5
J. & S. Sons	1,141 7 0	816 12 8	1,973 3 9
J. Jordan & Co.	1,110 15 9	707 2 0	2,177 15 3
Wain Engineering	1,193 6 0	661 11 11	2,270 2 11
John Mannesmann	816 4 8	543 9 6	1,359 14 2
J. Cooke & Co.	801 4 9	560 16 3	1,362 1 0
Hepbridge Coal and Iron Co.	816 6 3	573 18 11	1,390 5 2
W. & A. Saunders	—	202 14 6	—
Quinlan & Kennedy	—	203 15 0	—
Barren Appliance	—	255 0 0	—
J. & H. Ritchie	—	632 3 1	298 4 6

ABERDEEN.—For the construction of an 18-in. diameter day-pipe drain, etc., across the old town, for the Town Council. Mr. W. Dyack, Burgh Surveyor, 41, Union-street, Aberdeen.—  
J. Leith, 321, Clifton-road..... £318 1 10

ACTON.—For the erection of the first portion of St. John's Church, West Acton, W. Messrs. Edward Monahan & Son, architects, of Grosvenor House, Acton-vale, E. and 22, Buckingham-street, Adelphi, W.C.—  
J. & S. Sons..... £10,353  
Willcock & Co..... £9,640  
J. & S. Sons..... £9,999  
Dorey & Co., Ltd..... £9,332

ADDIN.—For the erection of married attendants' quarters, Cornwall County Asylum.—  
Ham Bros..... £160

ADDLEFIELD.—For erecting a new school at Bradford, for the Tending Advisory Committee of Essex Education Committee. Mr. F. Whitmore, Surveyor, Addlefield, Chelmsford.—  
J. Saunders, Dovercourt..... £3,121

ADDLESLAM.—For the erection of new school of art at Addlestone, for the Corporation of Addlestone. Messrs. A. R. Rod & Son, architects, Addlestone and Tunstall.—  
J. & S. Sons..... £7,090  
J. Grant..... £6,650  
J. & S. Sons..... £6,650  
J. & S. Sons..... £6,650  
J. & S. Sons..... £6,650

ADDLESLAM.—For the erection of new Congregational Church at Addlestone, for the Trustees, Messrs. J. Wood & Son, architects, Addlestone and Tunstall.—  
J. & S. Sons..... £3,840  
W. Grant & Sons..... £3,791  
J. & S. Sons..... £3,791  
J. & S. Sons..... £3,791  
J. & S. Sons..... £3,791

ADDLESLAM.—For erecting a fire-station, with hose-wagon, etc., Station-road, for the Urban District Council. Mr. C. J. Haller, Engineer and Surveyor, Carlton.—  
J. & S. Sons..... £630  
J. Cooper, Ltd..... £275  
J. & S. Sons..... £275  
J. & S. Sons..... £275  
J. & S. Sons..... £275

ADDLESLAM.—For erecting a warehouse at Millhush, for Messrs. W. L. Ingle, Ltd., Messrs. T. A. Bailey & Co., B. Bards, architects, Gun-sheaf, Morley.—  
J. & S. Sons..... £465  
J. & S. Sons..... £465  
J. & S. Sons..... £465  
J. & S. Sons..... £465  
J. & S. Sons..... £465

ADDLESLAM.—For making-up Beaconsfield-road, Enfield, for the Urban District Council. Mr. H. Collins, Surveyor, Public Offices, Enfield.—  
J. & S. Sons..... £1,151  
J. & S. Sons..... £1,151  
J. & S. Sons..... £1,151  
J. & S. Sons..... £1,151  
J. & S. Sons..... £1,151

ADDLESLAM.—For alterations and additions to Palmer's Endowed School, for Messrs. the Governors of Palmer's Endowed School, Mr. M. S. Shiner, architect and surveyor, 6, 7, and 8, Crutched-friars, E.C., and at Messrs. Quantities by Mr. G. Silvester, 46, Strand, W.C.—  
J. & S. Sons..... £13,878  
T. Bruty..... £11,700  
J. & S. Sons..... £11,700  
J. & S. Sons..... £11,700  
J. & S. Sons..... £11,700

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T. Bruty..... £11,700  
J. & S. Sons..... £11,700  
J. & S. Sons..... £11,700  
J. & S. Sons..... £11,700

ALFORD.—For main sewer works, from Oakland's Park-avenue to the top of The Drive, for the Urban District Council. Mr. H. Shaw, Surveyor, Town Hall, Alford.—  
C. W. Taylor, Essex-road, Chadwell\*... £2,389 10 8

ALSWORTH.—For sewers and roads, Spring Grove House Estate, Alsworth. Mr. W. Burrough Hill, surveyor, Southamton and Alsworth.—

	Estimate No. 1.	Estimate No. 2.	Estimate No. 3.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
H. E. Morris	2,090 12 4	2,307 6 3	2,315 7	4,680 13 4
W. Ward	2,128 13 10	2,58 16 0	4,535 18 0	
J. Mowlem & Co.	2,041 0 0	2,076 0 0	2,55 0 0	4,372 0 0
W. H. Coston	1,087 0 0	2,108 0 0	274 0 0	4,367 0 0
F. Oulton	1,840 15 6	2,038 11 5	347 11 6	4,235 18 5
E. Strickland & Co.	1,960 16 8	2,011 17 1	242 6 3	4,223 10 11
T. Watson, jun.	1,934 0 7	1,994 5 3	255 3 1	4,183 0 0
F. Hoffman	1,925 8 10	2,002 12 5	218 19 2	4,150 17 7
H. E. Rutherford	1,918 0 0	2,013 0 0	241 0 0	4,172 0 0
C. W. Kellingham	1,898 8 11	1,991 1 0	258 7 11	4,147 17 10
H. & W. Smith	1,907 0 0	1,908 0 0	259 0 0	4,084 0 0
W. Neave & Son	1,857 17 6	1,922 17 6	212 7 6	4,013 0 0
T. Price & Son	1,784 0 0	1,982 0 0	232 0 0	3,998 0 0
J. Macklin	1,874 8 0	1,880 0 0	231 0 0	3,994 0 0
S. Kavanagh & Co.	1,848 14 0	1,873 15 6	230 19 10	3,954 10 0
R. W. Baker	1,818 11 0	1,844 3 6	226 4 0	3,918 5 6
T. Chapman	1,853 1 11	1,852 0 10	214 7 2	3,917 6 6
S. Atkins	1,800 0 0	1,789 0 0	221 0 0	3,801 0 0
J. Jackson	1,791 0 0	1,781 3 11	227 2 0	3,800 0 0
J. Selbourne	1,781 9 10	1,760 0 0	210 0 0	3,751 9 10
J. Butt	1,753 0 0	1,774 18 8	207 17 10	3,759 12 11
E. Rogers & Co.	1,687 7 4	1,678 17 1	354 10 2	3,724 19 10
G. Hies	1,714 12 7	1,680 0 0	290 10 0	3,690 0 0
W. H. Williams	1,720 0 0	1,663 3 5	198 19 4	3,584 19 4
O. F. Gibbons	1,652 7 3	1,638 0 0	179 0 0	3,472 0 0
G. Bell	1,657 0 0	1,548 13 4	177 4 5	3,359 19 5
T. Adams	1,634 1 11			
Davies, Ball, & Co., Sheerness				

LEAVESDEN.—For sewage tank, sewage irrigation works at Leavesden Asylum, near Watford, for the Metropolitan Asylums Board. Mr. W. T. Esch, Engineer-in-Chief.—  
H. W. Wheeler £5,909 5 8  
J. Jackson £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0  
G. Bell £3,395 0 0

	Estimate No. 1.	Estimate No. 2.	Estimate No. 3.	Total.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
R. H. B. Neal, Ltd.	243,013	—	—	243,013
C. Ansell	41,000	—	—	41,000
J. F. M. Patrick	39,999	—	—	39,999
Foster & Dicksee	40,842	—	—	40,842
A. Penks	38,537	—	—	38,537
Perry & Co.	38,093	—	—	38,093
E. Lawrence & Sons	37,775	—	—	37,775
Higgs & Hill, Ltd.	37,484	—	—	37,484
W. H. Lynden & Son	37,273	—	—	37,273
Mowlem & Co., Ltd.	37,088	—	—	37,088
Martin, Wells, & Co., Ltd.	37,023	—	—	37,023
V. Parkinson & Co., Ltd.	36,811	—	—	36,811
Braid, Paton, & Co., Ltd.	36,467	—	—	36,467
Holliday & Greenwood, Ltd.	36,444	—	—	36,444
Cropley Bros., Ltd.	36,440	—	—	36,440
C. Wall, Ltd.	36,198	—	—	36,198
H. J. Williams, Ltd.	36,187	—	—	36,187
Holloway Bros. (London), Ltd.	36,000	—	—	36,000
W. King & Son	35,929	—	—	35,929
Whithead & Son, Ltd.	35,863	—	—	35,863
W. Johnson & Co., Ltd.	35,474	—	—	35,474
J. Shelbourne & Co.	35,345	—	—	35,345
Leslie & Co., Ltd.	34,997	—	—	34,997
W. H. Eyde	34,900	—	—	34,900
J. C. Johnson & Son	34,853	—	—	34,853
H. Lovatt, Ltd.	34,835	—	—	34,835
J. Smith & Sons, Ltd.	34,690	—	—	34,690
Walls & Sons, Ltd.	34,460	—	—	34,460
Galbraith Bros.	34,050	—	—	34,050
Waring-White Building Co., Ltd.	33,989	—	—	33,989
J. Garrett & Son	33,775	—	—	33,775
F. G. Minster	33,089	—	—	33,089
Wisdom Bros.	32,958	—	—	32,958
B. E. Nightingale	32,958	—	—	32,958

LONDON.—For providing and fixing a new 30-h.p. electric motor at the Old Montague-street school, White-chapel, for use in connexion with the heating and ventilating system, for the London County Council.—  
Electromotors, Siemens, Bros., Ltd., £122 14 0  
Electric Construction Co., 111 0 0  
Verity, Ltd., 105 10 0  
Lancashire Dynamo & Motor Co., Ltd., 102 0 0

LONDON.—For roadworks, part of Boveney-road, Forest Hill, for Lewisham Borough Council.—  
Footways.  
W. Pearce..... £150  
Roadways.  
W. Pearce..... 446

LONDON.—For roadworks, part of Brockley-grove, Ladywell, for Lewisham Borough Council.—  
B. Martin..... £1,050 8 3  
Atlas Stone Co..... 254 0 0

LONDON.—For hot-water apparatus for heating the appliance rooms, etc., at the Northcote-road and Westminster Fire Stations, at the London County Council.—  
Northcote-road Station.  
F. Deane..... £101 12  
Clark, Hunt, & Co., Ltd., £70 0  
C. & E. Bradley, 82 0 0  
J. & F. May..... 79 10  
Highbury\*..... 71 10

Westminster Station.  
F. Deane..... £138 13  
Clark, Hunt, & Co., Ltd., £136 0  
C. & E. Bradley, 138 0 0  
J. & F. May..... 138 5  
Highbury\*..... 121 10

ISLEWORTH.—For sewers and roads, Spring Grove House Estate, Isleworth. Mr. W. Burrough Hill, surveyor, Southamton and Isleworth.—

Estimate No. 2.			Estimate No. 3.			Total.		
£	s.	d.	£	s.	d.	£	s.	d.
2,307	6	3	2,315	7		4,680	13	4
2,128	13	10	257	0	0	4,632	0	0
2,076	0	0	258	16	7	4,555	18	0
2,087	0	0	255	0	0	4,372	0	0
2,108	0	0	274	0	0	4,367	0	0
2,038	11	5	347	11	6	4,235	18	5
2,011	17	1	242	6	3	4,223	10	11
1,994	5	3	255	3	1	4,183	0	0
2,002	12	5	218	19	2	4,177	5	7
2,013	0	0	241	0	0	4,172	0	0
1,991	1	0	258	7	11	4,145	17	10
1,908	0	0	259	0	0	4,084	0	0
1,922	17	6	212	5	5	4,013	0	0
1,982	0	0	232	0	0	3,998	0	0
1,880	0	0	231	0	0	3,994	0	0
1,850	0	1	217	7	3	3,950	15	1
1,873	15	5	230	19	10	3,954	10	0
1,844	3	6	226	4	0	3,918	5	6
1,852	0	11	214	7	2	3,917	6	6
1,800	0	0	221	0	0	3,807	6	6
1,789	0	0	221	0	0	3,801	0	0
1,781	3	11	227	2	0	3,800	0	0
1,760	0	0	210	0	0	3,751	9	10
1,774	18	8	227	4	9	3,689	9	10
1,740	18	8	207	17	10	3,659	11	11
1,678	17	1	354	10	2	3,647	19	10
1,680	0	0	290	10	0	3,690	0	0
1,663	3	5	198	19	4	3,524	0	0
1,638	0	0	179	0	0	3,472	0	0
1,548	13	4	177	4	5	3,359	19	5

LONDON.—For roadworks, in a new road from Ennersdale-road to Nightingale-grove, Lewisham, for Lewisham Borough Council.—  
Roadway.  
B. Martin, Brockley..... £74 14 3  
Footways.  
Atlas Stone Co., Cambridge..... 183 10 0

LONDON.—For enlargement of manual training centre, Sandley-street, Bristol.—  
Faring-White Building Co., Ltd., £788 0 0  
F. & H. F. Higgs..... 769 0 0  
Galbraith Bros..... 743 12 0  
W. Downes..... 740 0 0  
Rice & Son..... 730 0 0  
W. Smith & Son..... 647 0 0  
T. G. Sharpington..... 618 0 0  
W. Johnson & Co., Ltd., 611 2 6  
J. Garrett & Son..... 610 0 0  
T. D. Leng..... 603 0 0  
W. Whitehead & Co., Ltd., Portland-place, Clapham-road\*..... 586 0 0  
[The estimate, comparable with the tenders, is 753.]

LONDON.—For the adaptation of the dissolved infants' school, on the South-grove site, Mile End, for a school for the accommodation of forty mentally defective children and for laundry and housewifery centres, and of the provision of a manual training centre (on arches) for forty boys, for the London County Council.—  
A. A. Symes £4,805 0 0  
Staines & Son £5,702 0 0  
W. Harris £5,662 0 0  
Perry & Co. £5,323 0 0  
J. Grover & Co. £5,133 0 0  
J. Greenwood, Ltd., £4,662 0 0  
[The estimate, comparable with the tenders, is £5,250.]

LONDON.—For roadworks, Hillstone-street, Lea Bridge-road, for the Hackney Borough Council. Mr. N. Scorgie, Borough Engineer and Surveyor, Town Hall, Hackney.—  
Grounds & Waterhouse & Co., Ltd., £388 3 0  
Newton..... 381 10 8  
T. C. Stacey..... 460 15 9  
Suewin Bros. & Co., Ltd., £379 19 1  
W. Manders..... 434 8 6  
G. J. Anderson 396 3 6  
A. T. Cotes, 23, Lloyd-square, W.C.\*..... 373 16 0



LONDON.—For transferring a vacant iron building from the Blackthorn-street site, Bow and Bromley, to the Osborn-place site, Whitechapel, for the London County Council:—  
F. Smith & Co., Ltd. .... £863 0  
J. Harrison & Co. 783 10  
J. McManus ..... 781 0

LONDON.—For fittings, furniture, painting, decorations, etc., for the Hearts of Oak Benefit Society, New Offices, Euston-road, N.W.:—

Sage & Co. ....	£18,304 14 10	A. Leather ..... £758 0
Shannon, Ltd. ....	16,456 4 1	W. Harbrow, South
J. S. Henry, Ltd. ....	15,768 5 0	B e r m o n d s e y
Barker & Co., Ltd. ....	15,230 0 0	Station* ..... 744 0
Hampton & Sons, Ltd. ....	15,042 1 6	
Waring & Sons ..... 14,031 2 6		
Walker & Sons ..... 13,981 15 0		
Maple & Co., Ltd. .... 13,840 7 10		
North of England Furnishing Co. .... 13,723 15 11		
Trading and Manufacturing Co., Ltd. .... 13,377 0 0		
Cohen & Sons, Ltd. .... 13,372 15 6		
Goodhalls, Ltd., Manchester .. 13,168 2 6		
Garnett & Sons, Warrington .. 13,143 4 0		
Chamberlains, Ltd., Birmingham .. 12,848 4 0		

\* Selected to do parts of the work, &c.:—  
Garnett & Sons ..... £4,252 19 4  
Chamberlains, Ltd. .... 3,112 7 1  
Goodhalls, Ltd. .... 2,804 17 10

LONDON.—For alterations and repairs to ice wells, Great Cambridge-street, Hackney, W.C., for Messrs. Carlo Gatti, Stevenson, & Slaters, Ltd. Mr. H. P. Drew, architect, 38, King-street, Covent Garden, London, W.C.:—  
Thomas & Edge, Woolwich\* ..... £698

LONDON.—For new stabling and alterations to ice wells, Kings Cross, N., for Messrs. Carlo Gatti, Stevenson, & Slaters, Ltd. Mr. H. P. Drew, architect, 38, King-street, Covent Garden, London, W.C.:—  
L. H. & R. Roberts £2,381  
W. Morton ..... 2,350  
L. C. Richards & Co. 2,320  
Edwards & Medway £2,212  
Wilkinson Bros. .. 2,075  
Thomas & Edge, Woolwich\* ..... 2,035

LONDON.—For building boundary wall at Western Fever Hospital, Seagrave-road, Fulham, S.W., for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—  
E. Swan & Sons. £425 0  
Martin, Wells, & Co., Ltd. .... 490 0  
Haley & Haley .. 398 0  
T. Cole ..... 398 10  
F. Webster & Son 397 0  
H. C. Payne ..... 388 0  
G. Godson & Sons 386 0  
W. Hussey ..... 375 0  
R. Hes, Ltd. .... 372 0  
W. Taylor & Co. .... 357 0

MORLEY.—For erecting a warehouse, Glen Mills, for Mr. A. Glover, Messrs. T. A. Buttery and S. B. Birds, architects, Queens-street, Morley:—  
Masone: J. Brown & Son, Bingley £780 0 0  
Joiner: A. Furness, Morley ..... 612 0 0  
Slater: J. Atkinson & Son, Ltd., Leeds ..... 85 0 0  
Ironfounders: Morley Engineering and Pulley Co., Morley ..... 68 2 10  
Plumber: B. Gomersall, Morley .. 37 4 0  
Plasterers: Sykes, Idle, & Co., Gomersall ..... 29 10 0

NUNEATON.—For constructing a high-level service reservoir (50,000 gallons) in Hennebique's ferro-concrete, for the Nuneaton and Chivers Cotton Urban District Council, Mr. F. C. Cook, Waterworks Engineer, Council offices, Nuneaton:—  
Liverpool Hennebique Ferro-concrete Co., Ltd.\* ..... £303 14 6

QUEEN'S FERRY (Flintshire).—For erecting an elementary school to accommodate 300 children, for the Flintshire Education Committee, Mr. S. Evans, County Surveyor and Architect, Mold:—  
E. O. Probert, Hops, near Mold\* .. £2,324 2 2  
[Twenty-one Tenders were received.]

SHOTTON (Flintshire).—For the erection of a temporary school building, for the Flintshire Education Committee:—  
Mc S. Rogers, Flint\* ..... £396 4 0  
[Sixteen Tenders were received. Work to be completed in five weeks.]

SHILDON (Durham).—For road works, Cottage-row, back All Saints-road and Bouch-street, and back Kimberley-terrace, for Shildon and East Thirley Urban District Council. Mr. M. Turnbull, Surveyor, Shildon. Quantities by Surveyor.

Back All Saints-road and Bouch-street.  
W. Burdon, Shildon\* ..... £100 0 2  
Back Kimberley-terrace.  
J. Moore, New Shildon\* ..... 57 19 6  
Cottage-row.  
A. Metcalfe, Shildon\* ..... 53 19 9

SUNDERLAND.—For private street improvement works, Hyllon, for the Rural District Council. Mr. T. Young, Surveyor, 17, John-street, Sunderland:—  
G. E. Simpson, Newcastle-on-Tyne\* ..  
J. W. White .....  
Henderson & Armstrong .....  
J. Morice Wright ..... Scheduled prices.  
R. Hudson & Sons .....  
J. Meredith .....  
A. Walker & Sons ..

SUNDERLAND.—For private street improvement works, Fulwell, for the Urban District Council. Mr. T. Young, Surveyor, 17, John-street, Sunderland:—  
G. E. Simpson, Newcastle-on-Tyne\* ..  
J. W. White .....  
Henderson & Armstrong .....  
J. Morice Wright ..... Scheduled prices.  
J. Emmerson .....  
R. Hudson & Sons .....  
J. Meredith .....  
A. Walker & Sons ..

SWANLEY.—For surface-water drainage, and tarring at White Oak School, Swanley, Kent, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—  
Chittenden & Simmons .. £1,328 0 0  
J. Lonsdale .. 1,213 0 0  
J. Coles & Son 1,143 0 0  
C. W. Killing-  
back & Co. 1,090 0 0  
J. Wainwright & Co., Ltd. 1,084 6 7  
Fry Bros. .... 1,067 9 4

TWICKENHAM.—For the erection of nineteen shops, Twickenham, for Mr. A. Moss, Mr. Jasper J. Keil, architect, 15, Bishopgate-street Without, London, E.C.:—  
S. N. Scole ..... £19,500 0  
Son ..... 15,788 3  
Wickham Bros. 19,200 0  
S. E. Moss & Co. 19,000 0

YARDELEY.—For making-up, etc., of Alexander-road and Acock-green, for the Urban District Council. Mr. A. W. Smith, Engineer and Surveyor, Council House, Sparkhill, near Birmingham:—  
J. Young, Oxford-street, Rugby\* .... £380 10

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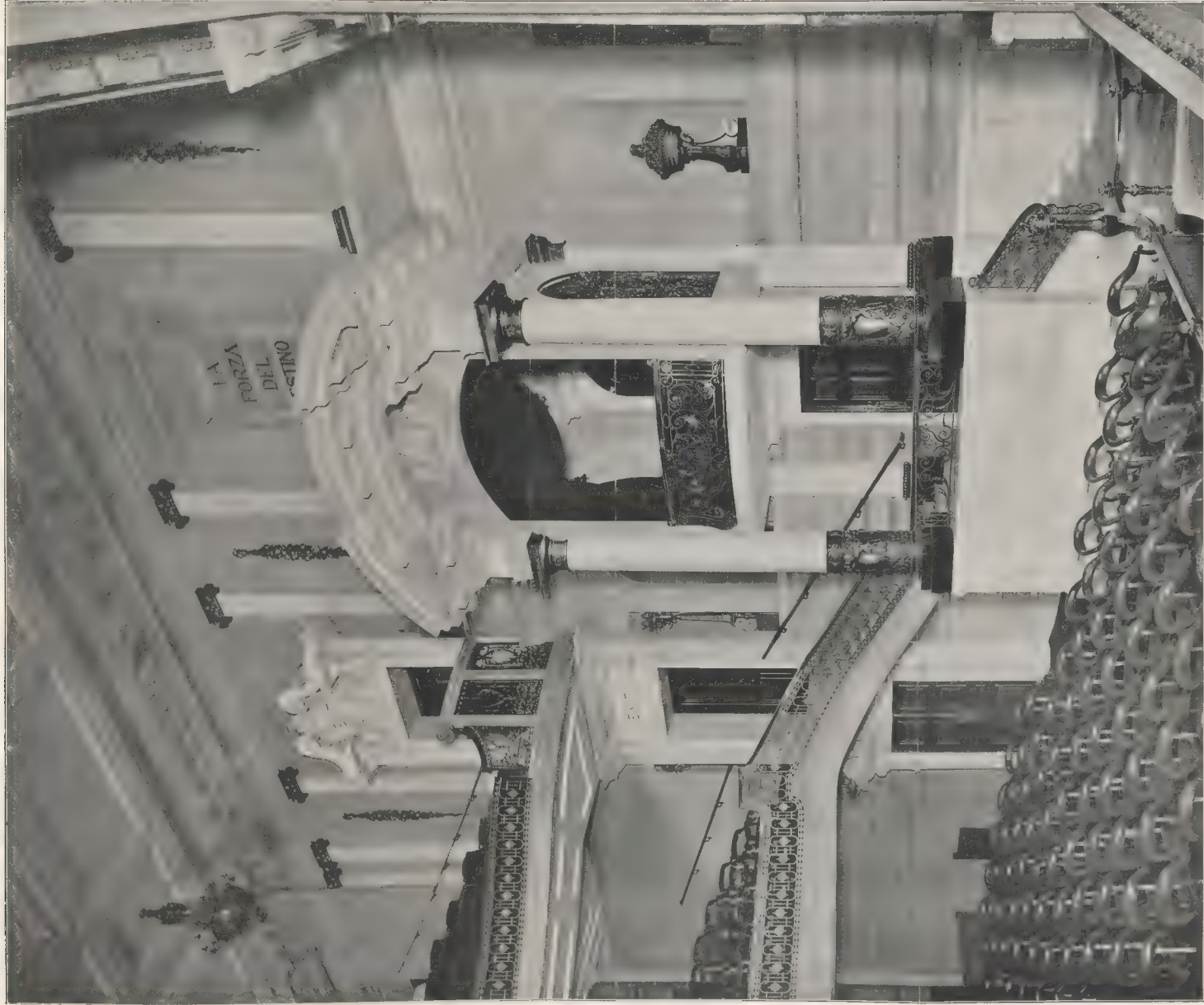
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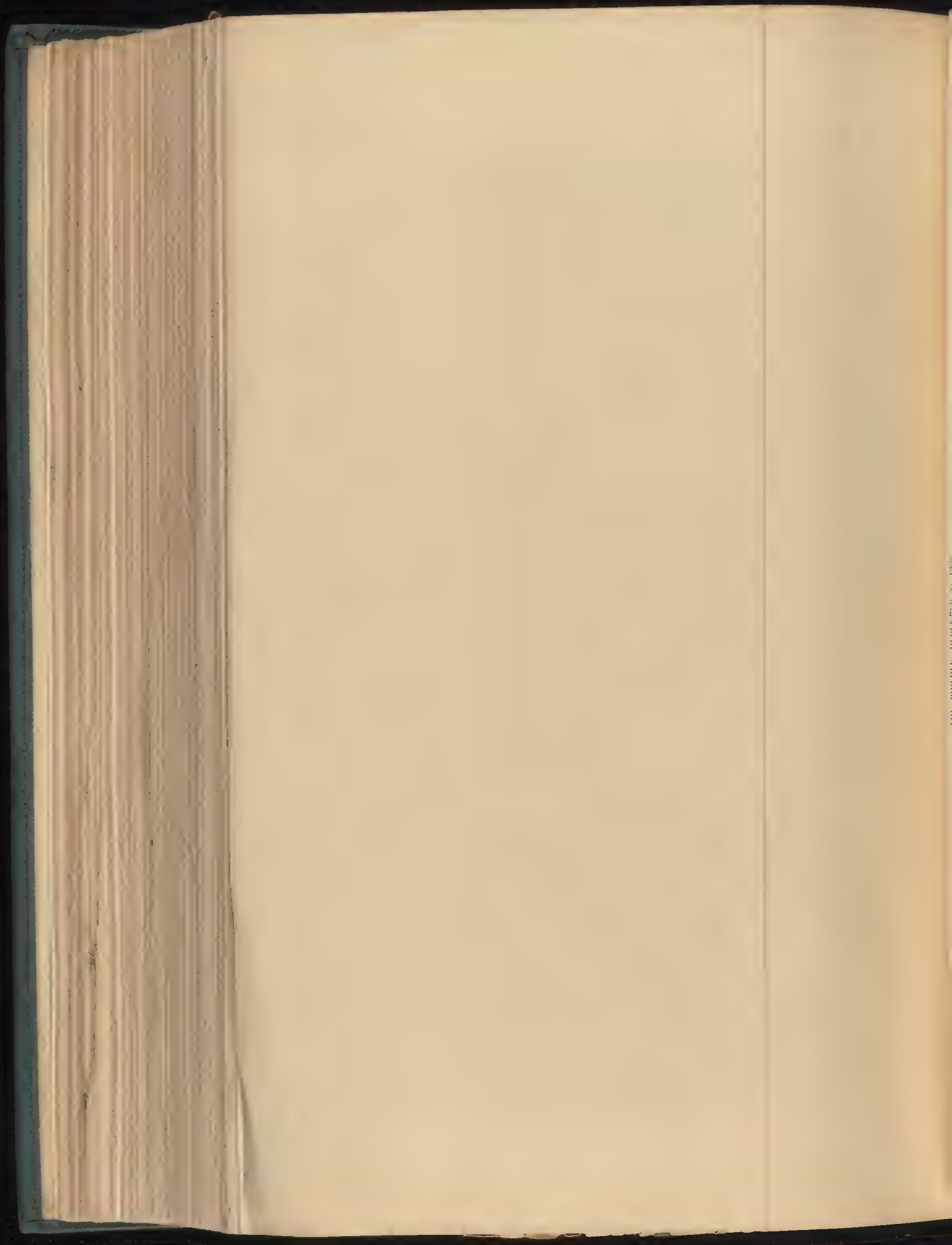


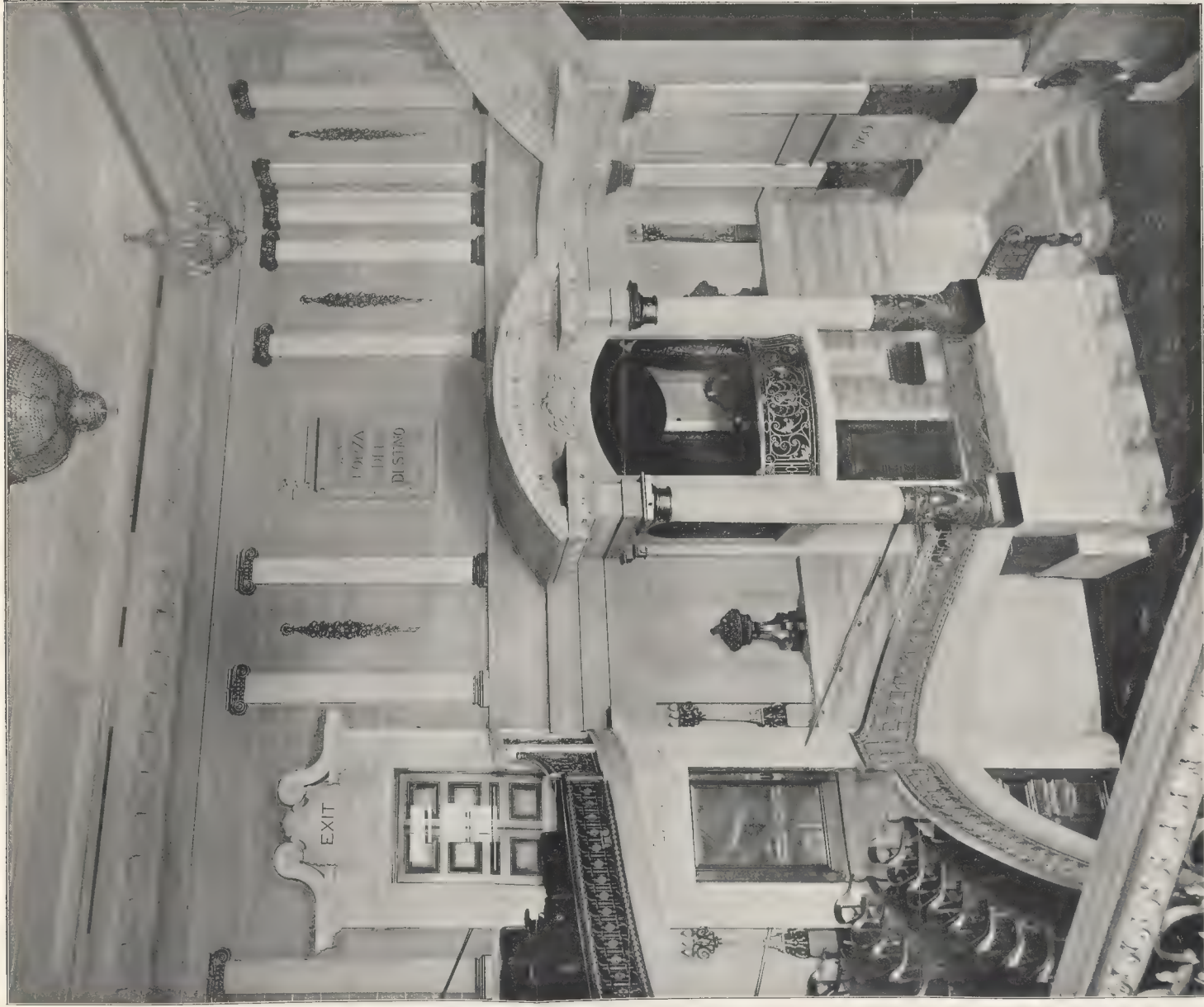
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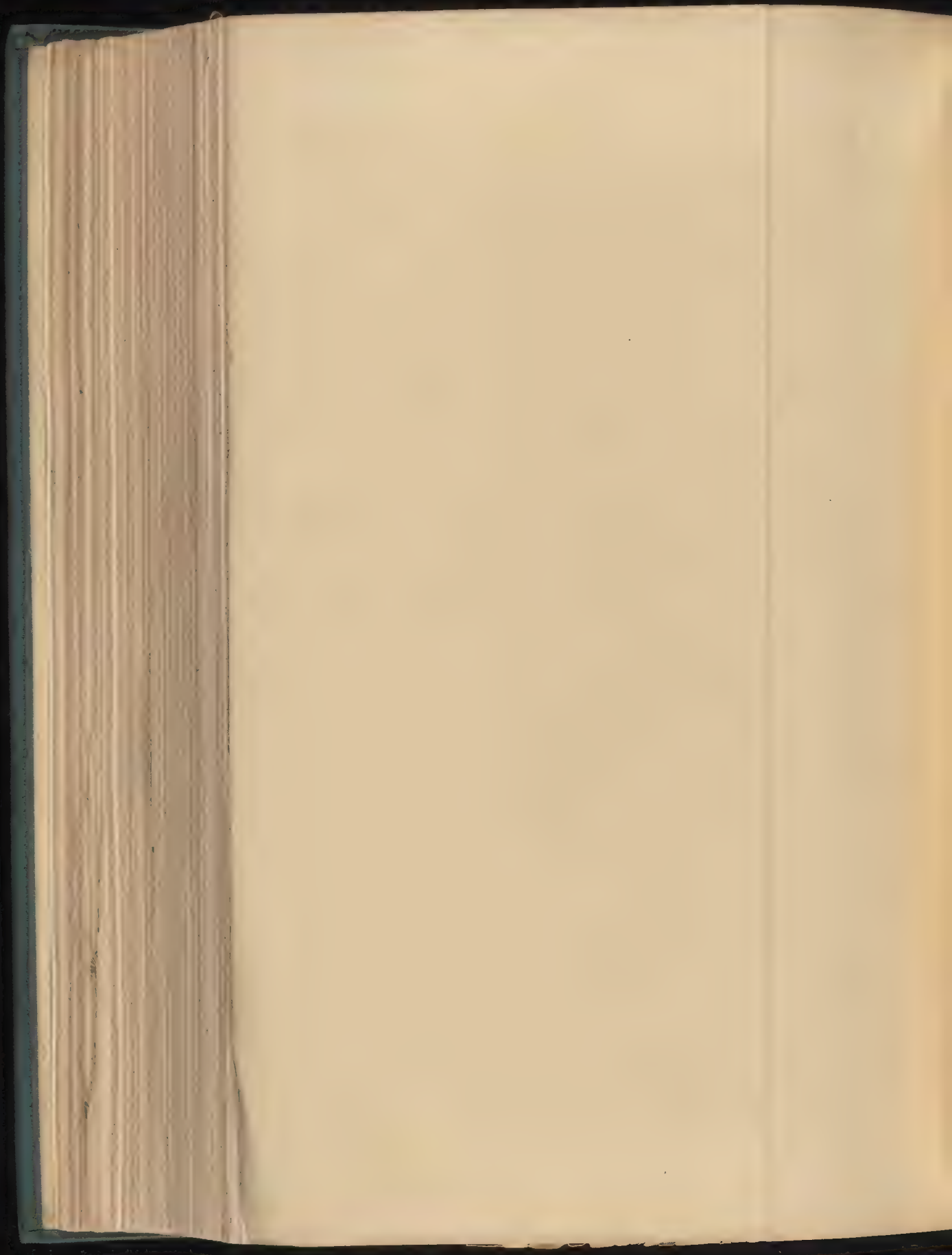


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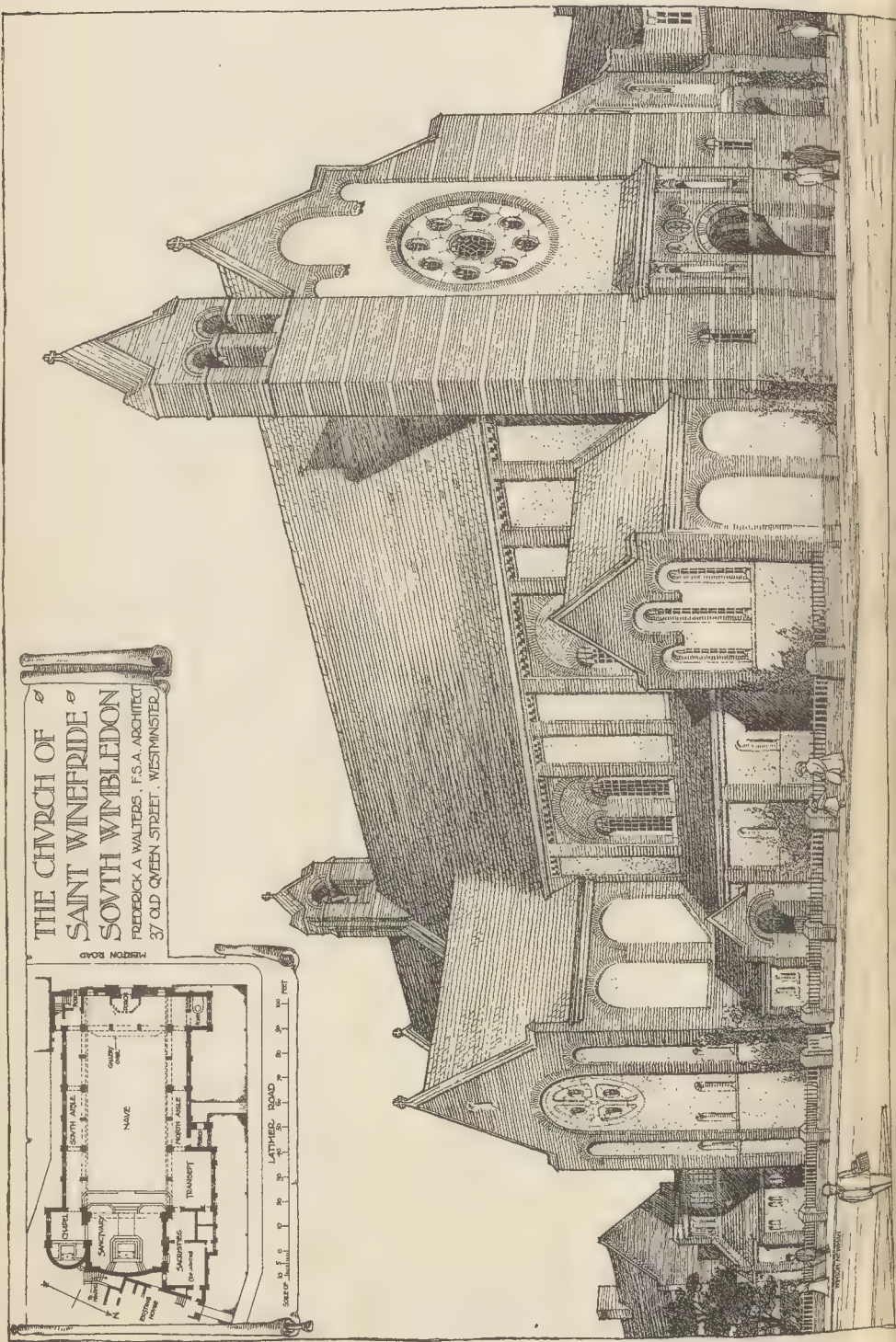




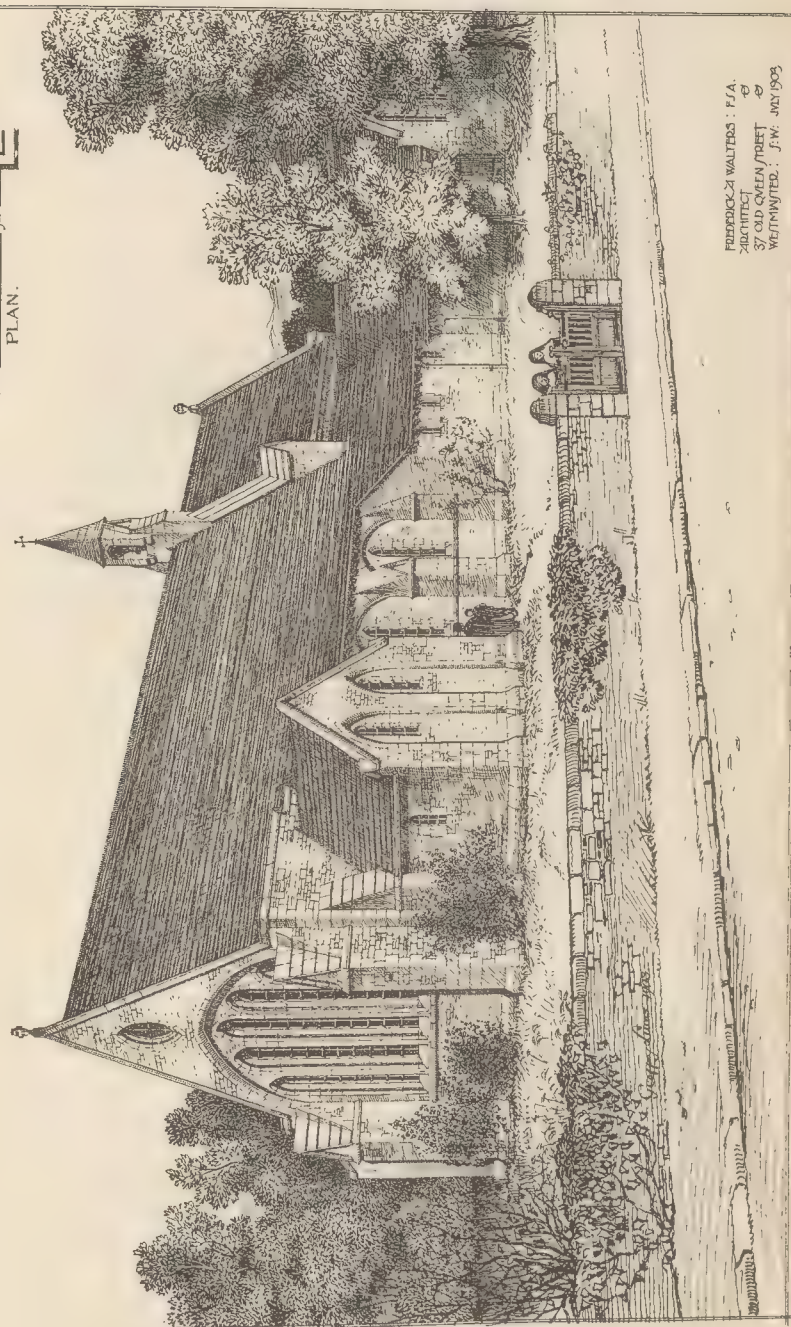
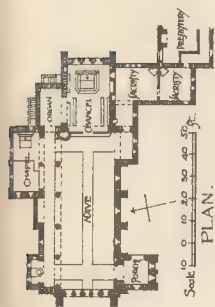




THE BUILDER. DECEMBER 2 1905

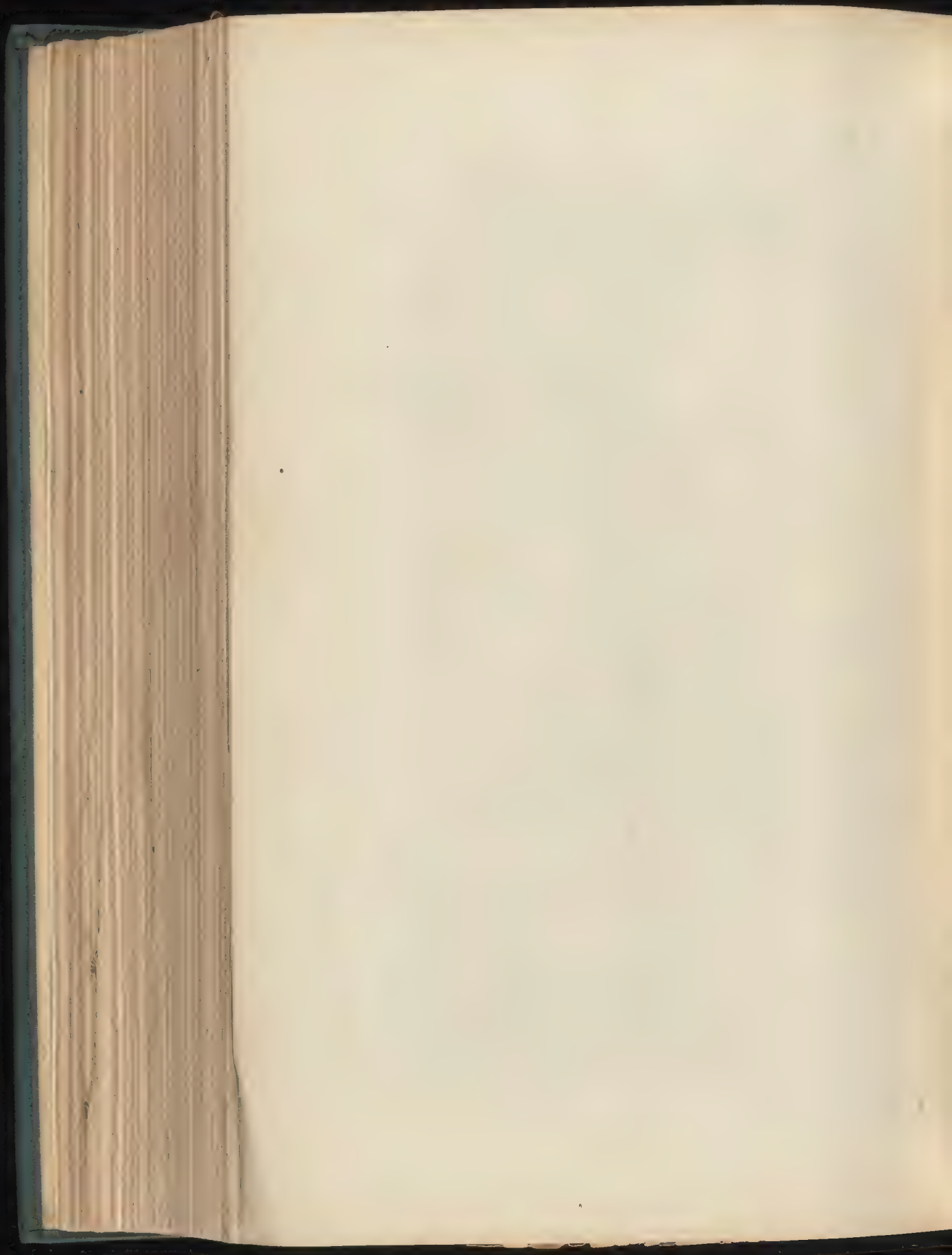


# NEW CATHOLIC CHURCH at EUREMONT, CYMBELZIND

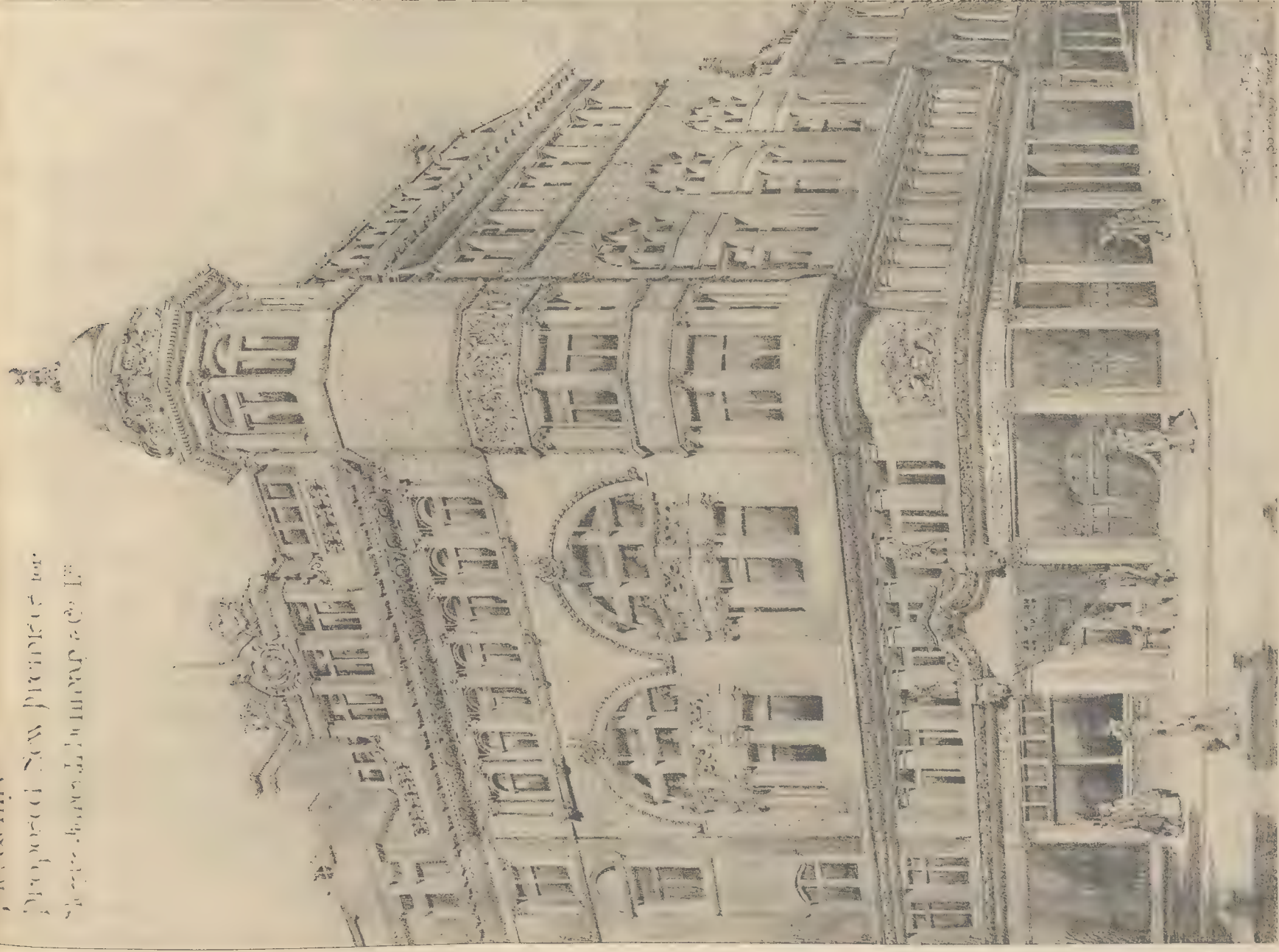


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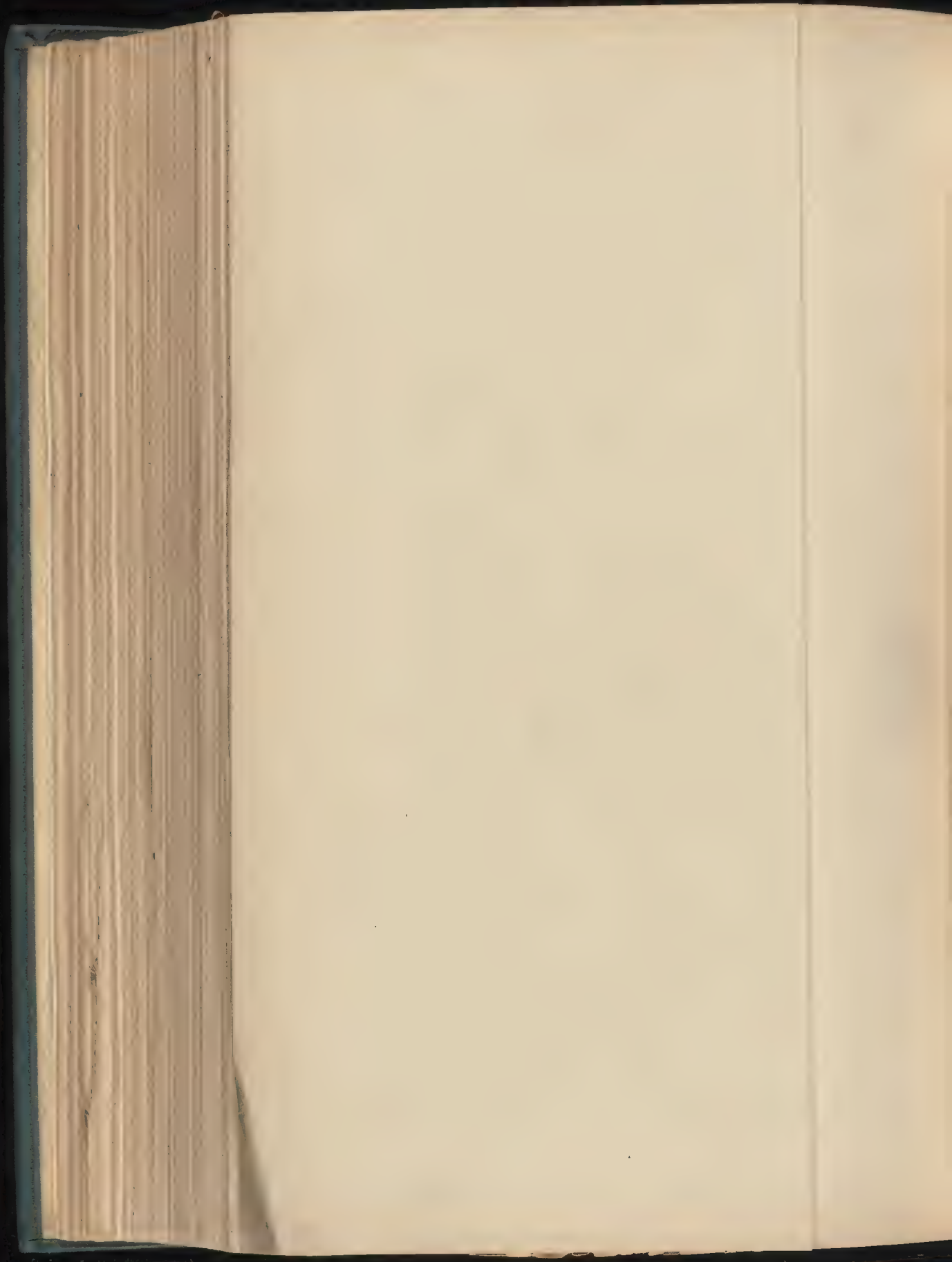




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UNIVERSITY BUILDING







# The Builder.

VOL. LXXXIX.—No. 3279.

DECEMBER 9, 1905.

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- Design for Municipal Buildings, Bournemouth.....By Mr. C. E. Mallows, F.R.I.B.A., and Mr. F. W. Lacey, M.Inst.C.E.  
New Almshouses, Wood Green.....Mr. A. W. S. Cross, F.R.I.B.A., Architect.  
1. Elevation and Section.  
2. Perspective View of Entrance.  
3. Detail Elevation.

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## The Cathedral Builders in England.



Original and interesting book on a subject that might well seem hackneyed," will be the verdict of everyone who has carefully read through Mr. Prior's volume.\* The title is reminiscent of a comparatively recent publication of a widely different aim and character, and if credible history is to be preferred to fiction, however ingenious and romantic, the superiority lies with Mr. Prior. In this connexion it is amusing to find Lord Macaulay pilloried in a new indictment. That vivid and irresponsible writer's Broddingnagian inaccuracy has often been discovered by specialists in the spheres of political, legal, naval, or military history. Mr. Prior now brings into the light of artistic history an almost grotesque example of his careless conscience. "I believe," said Lord Macaulay in a conversation reported by Mrs. Beecher Stowe, "that all the cathedrals of Europe came into existence nearly contemporaneously, and were built by travelling companies of masons under the direction of a systematic organisation." "This guild, if it existed," Mr. Prior very truly comments, "must also have had a supernatural power of hiding its tracks, for

in all our accounts and records are no references which can be twisted into a consciousness of a Freemason guild. Instead of indicating a central body of masoncraft to which ecclesiastics applied for the building of their churches, they mention artisans coming haphazardly together, and their organisation for the special work, as at Canterbury; or in the case of continuous building in one of our large cathedrals, we have the establishment of a cathedral bureau — 'opus,' or 'opera,' as it was called—such as at York, which has indeed practically continued to our own day."

With regard to another and more modern "discovery" of the "secrets" of mediæval building, Mr. Prior displays the same lucid sanity of mind. He entirely refuses to be carried away by the specious theory of "optical refinements," so confidently asserted by Professor Goodyear and his school of architectural microscopists. On this head he observes :—

"The irregularities and shapely contours of the mediæval fabric have been lately carefully measured and gauged by level and plumb-line, and the discovery published as that of the recondite principles of design which underlie the architectural beauty of the Middle Ages. In my opinion such a discovery is valueless. I have never found any system of æsthetic creation in the proportions of mediæval building beyond the simplest promptings of the square and the compass. The curvings of wall and the irregular spacings of supports can be seen to be one of two things, either the immediate habit of craftsmanship or the result of expediency—both varied by the difficulty of building piecemeal and to suit the existing buildings, difficulties that were the constant necessities of church-work in the Middle Ages."

To come now to the actual structure of the book: It is laid out on strictly

successive chronological lines as to its main division into chapters, but within each of the fairly well-defined periods to which each chapter is devoted full attention is directed to emphasising the important part played by local schools or trades in bringing about diversities of style contemporaneous as to their date. Mr. Prior has made this subject of the local varieties of style distinguishable in English mediæval art, and the causes which have produced them, particularly his own, and readers of the present work have presented to them in a compact form a generalisation of the widespread and painstaking researches more fully detailed in the author's "History of Gothic Art in England." The multiplicity of his architectural "periods"—seven between the Conquest and the Reformation alone—will surprise, and perhaps at first confuse, readers accustomed to the simplicity of the Rickman-Parker system of nomenclature; but the progress of research and the much more accurate historical information available at the present day have really shown that an adherence to the too broadly simple classification of those worthy pioneers may be historically inaccurate and misleading to modern students. Mr. Prior very rightly shows as strongly as possible the enormous mistake of treating the XIVth century as a homogeneous architectural period. In reality no greater and more catastrophic break in the continuity and resemblance of artistic work is known to history than that occasioned by the Black Death in 1349-50; and it is impossible to label the period

\* The Cathedral Builders in England." By Edward R. Prior. Portfolio Artistic Monographs Series. London: G. P. Putnam & Co., Great Russell-street; New York: E. P. Dutton & Co., 1905.



under the easily comprehensive term "XIVth century style."

On the social causes which brought about different manners of building much very valuable information may here be found, and the author's conclusions, which show both acute critical insight and trained intelligence in the handling of records, may generally be accepted as quite sound. While agreeing however, with Mr. Prior as to the necessity of strongly marking the totally distinct character of the art of—speaking in round numbers—the second half of the XIIIth century and the first half of the XIVth (it is in treating all the work of these two periods as being of one and the same style that Rickman's threefold classification is so especially contrary to facts), we venture to say that we do not think he has made quite clear his reasons for limiting the duration of his period called "The Summit of Gothic Art"—naturally the most important and fascinating of all the different epochs—to the dates (of course approximately) 1250-1290. The former date is certainly as convenient and significantly chosen as could be desired, but does the date of 1290—about the middle of the reign of Edward I.—as nearly define the change from what Mr. Prior so appropriately labels the *regal* style of the later half of the XIIIth century to the aristocratic or *chivalric* style of the earlier half of the XIVth century as would the year of the death of that great sovereign (1307), or, to keep to round numbers, the date 1310? In their general mental attitude, and therefore in the sentiment and expression of their arts, the people of mediæval England appear at any given time to show a common character, a special impress, in the formation of which the individuality of the reigning monarch had a very considerable share. Seldom was this more strikingly evident than during the reign of Edward I. That king unquestionably set the tone of strenuous work and unswerving, perhaps pedantic, legal strictness to the whole nation, all of which may be seen reflected in contemporary art. But his influence did not greatly wane, nor (as we read them) did the fashions of building greatly alter, so long before his death as 1290. Neither the Eleanor crosses and tomb, nor Bishop de Luda's chapel in Ely-place, show any marked difference in style from the work done just before; while, on the other hand, they differ entirely, throughout their whole conception, from anything carried out in the time of Edward II. or Edward III. There was certainly never one "Edwardian" style common to the reigns of the first three Edwards—Mr. Prior himself would never agree with that—but it seems almost treason to the memory of the great Edward I. and of his bishops, great statesmen and great lawyers like their chief, to throw back the advent of the decadence and the almost *rococo* luxuriance of the "Flowing" style into the days when they were still in full vigour. If confined to the period 1310-1350 (Sharpe made the division *circa* 1315, which accords very well both with dated buildings and with time for the spread of new habits of life after the austere ways of the first Edward had fallen out of fashion),

nothing could better describe the spirit of the builders of the age than Mr. Prior's "[they] seem to me to present themselves in the guise of splendid revellers making a day of carnival for which all the hard facts of life are put away out of sight. It is all brilliance and merriment in their luxurious spendthrift art, bred of the joy and pride of a class of nobles." One cannot help noting the striking parallel presented here with what took place in France four centuries later. "In their architecture," he continues, "the monk's enthusiasm, the bishop's piety, the king's artistic fashion are gone out of date: all have yielded to the rule of chivalry, which in one aristocratic equality makes pageant for king, noble, and ecclesiastic. As they appeared at the tourney, or in the chase, or in the glory of the battle array, so as one social class they entered the lists in the pride of their sumptuous building." A true and graphic account is this, only weakened by the too sweeping commencement:—"The XIVth-century architects seem to me, etc." Nobody knows better than Mr. Prior that his description really applies to a well-defined period of barely forty years, and it is simply because his opening phrase may be misunderstood that we have dwelt so long on it.

One more quotation must be allowed us in order to give an adequate idea of the scope and quality of the book. On a subject very little thought about, felt, or understood by nine persons out of every ten who take an interest in architecture, that of the colour of buildings, Mr. Prior makes some most pertinent remarks:—

"The sense of a living colour must be added to that of living form. Though the original painting of our cathedrals has perished from their walls or is left to us as the merest patches, and faded into dinginess—yet, wherever we find a piece that is real, what a life of colour does it give! It is this realisation of colour by the mediæval workman which, in the eye of the artist, raises him on a plane to which no modern architect reaches. . . . Sometimes, indeed, the old painted glass runs as a stamp of the brilliance, and we may catch in the hollow of a moulding or the recess of a roof-timber the suggestion of what an art of colour meant. Here and there by chance preservation a chapel or a tomb gives us the ancient treatment, but usually there are now only the crude grounding paints, which were brought into harmony by glazings and diapers."

This is a point especially worthy of attention, for these incomplete rudiments of the original scheme (to quote Mr. Prior further) "have deceived us, and indeed modern decorators, under the theory of revival, have seized on such under tints and sought to restore the ancient painting of buildings by their use. But the crude and unpleasant effects of this revival painting were not those of the original effect. . . . Nothing of crudity found place in the colour schemes of the Middle Ages—for have we not their illuminated manuscripts in evidence?"

True to his principle of the inalienable association of brilliant colour with mediæval architecture, Mr. Prior has adorned his book with four examples of XIVth and XVth century illuminator's work. These plates are copied in colours and gold with a tender accuracy which puts them on an altogether different plane from the raw and blatant "reproductions" which have passed current as true representations of mediæval painting until the last few

years, and they should enable anyone to realise in a considerable degree the original aspect of our Gothic structures. The other illustrations, which are numerous, are selected on grounds of interesting and characteristic of the author's attitude. He says in his introduction that "the majority of our mediæval buildings can no longer be regarded with enthusiasm, and it would be absurd to illustrate them as specimens. The genuine works that remain can scarcely be photographed without the inclusion of some piece of neo-Gothic church-furnishing. In fact the painter never dreams nowadays of turning to restored churches for his selections and impressions, whereas a hundred years ago it was different." Accordingly we are presented with facsimiles of drawings and water-colour sketches of cathedrals by "old masters" from Holbein down to Garland, Cotman, and Mackenzie, not omitting Turner's magnificent "Salisbury Cathedral from the Cloisters" nor specimens of the work of Constable and De Wint. The format and printing of the book are satisfactory, and we have noticed only two printer's errors: on p. 97, in "as at church, Hampshire," "Christchurch" is evidently intended, and on p. 99, where "this XIVth and XVth century work has claims against the dismissal, etc." is printed, the context seems to require "XIVth and XVth century." It only remains to be added that the book is provided with some useful chronological table and a sufficient index.

#### SOME MORE ABOUT CROOKED BUILDINGS.

**P**ROFESSOR GOODYEAR appears to be sending round among the architectural profession an elaborate pamphlet as a counterblast to our leading article of September 23, in the course of which he implies that our opinion on the subject is not worth consideration. In that case, it seems strange that he should have gone to so much trouble and expense in publishing a reply to it. We have no intention of entering into anything like a controversy on the subject, but we do not think this kind of document should be allowed to be sent round without a word or two from us in regard to its misrepresentations. The very first sentence conveys a completely wrong impression—that we declined to publish the first instalment of Professor Goodyear's reply to us in the course of his lectures at Edinburgh. A short report of the lecture was sent to us by the hon. secretary of the Edinburgh Association, but there was nothing about it to intimate that it was in any special sense a reply to us, and we declined to find space for it because we did not attach any value to Professor Goodyear's theories, and therefore did not think it necessary to occupy our space in reporting his lecture. As to the present "Reply," Professor Goodyear's method seems to be to ignore our actual argument and to find fault with us for not having said something else which had no bearing on it. As an example: Professor Goodyear asserts that the plan of the iron wall of St. Mark's has a curve inward

10 in., and that this is an intentional refinement. We reproduced his plan in order to show that the plan of St. Mark's is most carelessly set out, with hardly a right angle or two parallel walls; and we said that it was posterous to suppose that people who set out the whole building in so careless a manner should suddenly have been seized with a passion for minute refinements in setting out one wall; not to speak of the fact that to set it out hollow was, in respect of architectural effect, exactly the wrong thing to do. To this Professor Goodyear replies that it is not his plan, but Signor Saccardò's, and that he said so. What has that to do with our argument? He also asserts that we misrepresented him as attaching any intention to the irregularities of the ground plan. We did nothing of the kind. We said—

"No one who looks at that plan can pretend, we think, to discern any guiding motive for the irregularity of the direction of the walls; nor, as far as we understand him, does Mr. Goodyear venture on any such suggestion in regard to it."

Our sole point was that as all the plan was carelessly set out, it was to be presumed that the curve (if it is a curve) in the front wall was carelessness also. The sentence about "the vagaries in plan which are included . . . as having some architectural intention" had no reference to the St. Mark's plan, as any one who read the article might have seen; it referred to the various irregular and oblique-lined plans which are included in the illustrated catalogue, we presume because they are supposed to illustrate his theories, or else why are they there?"

We fear we must deprive Professor Goodyear of his jubilation over another little point, viz.: that he had called a certain diagram "Asymmetric scheme in arcades," while we called it "A symmetrical scheme." We wrote "A symmetrical" with a hyphen, which we consider a better orthography; either by accident, or because the printer's reader misunderstood it, the hyphen was dropped out, and the mistake escaped the editor's notice till too late. In any case the sentence was merely a quotation of the title of the diagram, and there being a clerical error in it had nothing to do with the argument. We went on to say—

"It is not a scheme at all, there is no rule or purpose in it; if the spacing was wider in the middle and narrower at the ends or the reverse, there would be something in it; but the difference is quite irregular, and without any system at all, and we are convinced that they are simply carelessness, or a conviction that it is not worth while to divide them equally."

Now, in our opinion, Professor Goodyear must have known, or ought to have known, that that mistake was a misprint of some kind; it was impossible that he could really have supposed that the editor of this journal did not know the meaning of "asymmetrical"; and to quote it in that way as a separate sentence, without the context, seems to us a piece of adroit misrepresentation.

In reference to this point, of irregular spacing, Professor Goodyear seems to think we are crushed by the fact that

"In regard to St. Mark's, it seems we are to believe that the bad nature of the ground, shown by the irregularity of the floor, only exists under the floor, where there is no weight on it; that where the walls rest it is an excellent foundation, and St. Mark's is in a perfectly good condition! Yet we read not many weeks back in the Times that St. Mark's was structurally in so precarious a condition that the gravest anxiety was felt about it."

Penrose found irregular spacings in the Parthenon, and irregular widths of abacus, and believed that they were intentional. Professor Goodyear does not seem quite to understand that we do not take opinions ready-made from other people, however illustrious. We accept Penrose's evidence absolutely for facts, but we do not therefore accept his reasoning; we do our own reasoning. We consider that Penrose was mistaken in his view, and we have always thought so. Penrose noted that the abaci of the north flank of the Parthenon "are of various sizes and decrease from east to west, but not according to any fixed law"; we find that we had underlined the latter words in pencil in our copy, many years ago. The principle is very simple. When you find variations in line or size made on a consistent system and which lead to a consistent result, it is reasonable to suppose that they were intentional. When they show no consistent system and lead to no consistent result, it is unreasonable to think so. That is the whole thing in a nutshell.

In regard to the west front of Peterborough, we question very much the suggestion, quoted by Professor Goodyear, that the front had gone over before the vault was put in. It is possible (if we may dare to make the suggestion!) that we know more about Peterborough than he does. A good many years ago, before the scare about the dangerous state of the front arose, we remember Mr. Irvine, the well-known clerk of works, who knew every stone of the building, taking us up on to the nave roof to see how the mass of the west front had separated bodily from the masonry behind it. Now, if that had happened when the front had just been finished, the mediæval builders would have made it good. As that was not the case, it is obvious that a great portion at least of the settlement must have taken place at a later time; so that we do not think there is very much in the assumption that the front had gone over from the first, at all events not to anything like its present condition.

Professor Goodyear recites in his pamphlet some of the complimentary honours which have been conferred upon him, we suppose as an indication that we ought to treat his views with more respect. We also used to regard Professor Goodyear as a very clever man; we remember some investigations of his on the origin and history of the Ionic volute which struck us as most interesting and valuable. Our complaint is that he has become too clever. He has apparently been carried away with the idea that he has caught sight of a kind of new Promised Land in architectural investigation, and has become *tête montée* on the subject. Everything seems to show itself to him in the light of an architectural refinement, and in this faith he has made a collection of examples, which he calls "architectural refinements," of which we believe the majority arose from accidental causes or from dilapidations, and of which, if they did not so arise—if it could be proved beyond doubt that they were intentional—ought rather to be called "architectural blunders." We are told, for instance, that the lower story of Notre Dame

leans outward 11 inches, the second story 4 inches, while the remainder is vertical; and we are asked to believe that this has been done deliberately. Will Mr. Goodyear, or will any one, tell us what possible advantage of architectural effect was to be served by such a lunatic method of building? And is not the probability merely that they found out that they had been careless in plumbing in the lower part, and were more careful afterwards? And on the evidence of Mr. Prior, whose work is reviewed in the previous article, and who understands the spirit of mediæval architecture better than most men, the idea of there being a constant search after "refinements" of this kind is quite contrary to the whole spirit and system of mediæval building.\* As to Professor Goodyear's rather sneering remark that the *Builder* is the only paper which has been entirely opposed to his views, we regard it as one of the best compliments that could have been paid us; and Mr. Goodyear will perhaps be surprised (even shocked) to learn that the week our article was printed we received two communications from architects both of whom are specially learned—one of them distinguished—in archaeological studies, expressing their great satisfaction at our having taken such a decided stand against these absurdities. And as to our title, "The Glamour of Crooked Building," which has given Professor Goodyear such offence, we think it exactly expresses the situation. He has been carried away by a vision of architectural refinements pervading every twist and distortion in ancient buildings; he has spent in the measurement of them an unremitting diligence, and in their attempted interpretation an almost pathetic ingenuity; but he has forgotten to take with him one sober companion whom neither architect nor architectural critic can afford to dispense with, viz.: Common Sense.

#### NOTES.

The Catastrophe at Charing Cross Station. So GREAT is the confidence placed in the strength and durability of iron structures that the partial collapse of Charing Cross station roof comes literally as a thunder-clap. The disaster is sufficiently serious to render unnecessary the sensational headlines such as "Collapse of the Station Roof," which even the most respectable of daily papers have printed. In point of fact less than one-tenth of the roof has fallen; the remainder stands firm, and probably is quite safe. Consequential damage has been done to part of the western wall of the station, and by fragments falling from that structure to the Avenue Theatre on the level below. Briefly, that is the extent of the failure and of its results from the structural standpoint. There has been also damage inside the station, and unhappily several lives have been sacrificed and nearly forty persons more or less seriously injured. Until careful investigation has been made it would be impossible to

\*We may remark that the concurrence of that testimony with the present article in this issue is entirely fortuitous. The review of Mr. Prior's book was written three or four weeks ago by an independent contributor, and should have appeared last week, but was held over for want of space.



form a decided opinion as to the originating cause of the accident. But having regard to the design of the roof trusses, and the secondary results of the first failure, it is practically certain that one of the tie-rods suddenly gave way, owing either to the growth of some hidden defect that had been developing during the past, or to a settlement causing undue strain to come upon a tie-rod, itself in perfect condition. Assuming the fracture of so important a member, from any cause, the bay or bays affected would naturally settle at the centre, thrust out the weaker of the two side walls at the line of support, and fall to the ground. This disaster is not a case of bad design, for the roof has stood for nearly half a century. Of course searching inquiry will be made into the cause not only by the coroner, but also by the engineers of the South-Eastern and Chatham Railway, who have already secured the co-operation of Sir Benjamin Baker. We do not wish to say one word that might add to any feeling of uneasiness with regard to the safety of similar roofs, new or old. Still, it is a point for serious consideration whether the safety of a great structure should be allowed to hang absolutely upon a single tie-rod, however strong it be or perfect it may appear to be. That was almost certainly the case at Charing Cross, and is the case elsewhere. Duplicate tension bars would not cost much, and if they were adopted one might break without any harm being done. A new tie-rod is far less expensive than a new roof.

#### Lodging-Houses and Fire Escapes.

It is satisfactory to find from the Report of the Public Health Committee of the London County Council that it has for some time past been examining common lodging-houses in London with a view to prevent danger from fire, and that it has obliged reasonable steps to be taken to minimise this danger. "Our general practice," says the Report, "is to insist upon all alternative means of escape being provided, and this has necessitated the construction of new staircases in a number of the larger houses, and of external balconies and step-ladders in others." There are now in London 251 common lodging-houses, and these are now, it would seem, reasonably safe in case of fire. It would be by no means undesirable if the London County Council were to inspect ordinary lodging-houses, or at any rate inspect such as the proprietors were willing should be inspected, and give certificates of safety where possible. There are a considerable number of lodging-houses in London in which there is no means of escape in case of fire.

#### Lessees of Mortgaged Property.

AN entirely new point has been settled in the case of *Robbins v. Whyte*, and one of importance to lessees of mortgaged property (and very commonly the smaller class of house property is mortgaged). Shorn of all legal technicalities, the decision amounts to this—that, although the mortgagor, whilst he remains in possession of the property, has power by virtue of the Conveyancing Act, 1881, to grant certain leases, he has no power to accept a surrender of the lease without

the concurrence of the mortgagee. In the above case, after a due surrender of the lease to the mortgagee, the lessees were held still liable to pay the rent to the mortgagee; and therefore it appears that the lessee in his own interest should see that the surrender of his lease is accepted by the mortgagee.

#### The Belfast City Tramways.

THE official opening of the extensive tramway system in Belfast took place last week. The work in connexion with the permanent way was only begun last February, so that apparently only about nine months were required to complete the work, although extensive alterations had to be made to sewers, gas and water mains, etc. There is nothing very novel either about the track or the plant, but this is probably due to the fact that traction engineers have to work within the narrow limits of the Board of Trade Rules, and manufacturers have found it to their advantage to standardise machinery and accessories. The greater part of the overhead equipment is supported by span wires, only four or five miles of side bracket and centre pole construction being used. We were never very favourably impressed by the specification of the British Standards Committee for lap-welded mild-steel poles. We think that a little more latitude should be allowed in the design of overhead systems. Granting their necessity, surely in an important town a more serious attempt might have been made to harmonise the poles, etc., with the surroundings. The centre poles are lighted by means of two glow lamps each fixed at a height of about 12 ft. from the ground. We are informed that these lamps are not intended for lighting the streets, but are merely—like the red lamps of the street-menders—for indicating the position of an obstruction in the thoroughfare. Provision, however, has been made for erecting arc lamps on the centre poles in case the authorities should change their minds. We are glad to notice that the sub-station is connected with the generating station by means of a three-core high tension underground main. As the pressure of transmission is 6,000 volts we expect that many electricians would have preferred to connect the stations with overhead wires in order to effect a somewhat microscopic saving in the total capital cost.

#### The Witham Railway Accident.

AFTER full consideration of the evidence, Colonel von Donop is not able to assign the precise cause of the disastrous mishap which took place in September near Witham station. He finds no ground for attributing the accident to defective rolling-stock, and although the permanent way construction is admittedly not of the highest standard, he considers there were no points of inherent weakness sufficient to cause the accident. It is said in the Board of Trade report that the platelayers who were working at the crossing close to the station may have removed some fastenings, which they were not able to replace before the train arrived. Of course, it is possible that the mishap was due to some ill-judged action of the kind, and the recommendation that greater supervision should be exercised

over the work of platelayers is one that should not be neglected. We particularly call attention to the conclusion of the inspector that the speed of the wrecked train between Blunts Hall signal-box and Witham station "was well over 65 miles an hour, and probably amounted to 70 miles an hour." In view of the speed, and statements by passengers that severe jerks and bumps had previously been felt at Witham and elsewhere, we cannot help repeating the doubt whether the permanent way of the Great Eastern Railway is up to the standard desirable for modern high-speed passenger traffic.

#### The Ramsgate Tramway Accident.

NOTHING of a particularly satisfying nature is contained in the report by Colonel von Donop to the Board of Trade relative to the tramway accident at Ramsgate in August last. We certainly agree with the inspector in blaming the tramway company for entrusting the conduct of cars up and down Madeira-hill to a driver having only nine days' experience, but cannot endorse the opinion that the gradients of this dangerous road are not excessive, although the risk of mishaps may not be very great if the brakes of a car are in perfect order, if the driver is thoroughly experienced, and if he takes care to reduce speed before commencing the descent and to keep the car well in hand. There are already altogether too many "ifs" as factors in this particular problem, and two more are suggested by the Board of Trade inspector, namely:—That if a car does get out of hand a derailment will probably result and possibly lead to further disaster. No doubt the Ramsgate Corporation would be pleased if Colonel von Donop had condemned the Madeira-hill route as dangerous. This could scarcely be expected, however undesirable that steep and curving road may be for tramway purposes. The inhabitants of the town will have to be satisfied with the execution of some minor improvements of the track suggested in the report, and which we understand will be carried out by the tramway company.

#### The Orientation of Buildings and Streets.

SOME very interesting material for the consideration of architects is provided in the admirable paper read by Mr. William Atkinson before the Society of Arts (Boston, U.S.A.). The author was led to investigate the subject in connexion with hospital design, but the results are equally applicable to all buildings and groups of buildings. The diagrams are most interesting. One of them, representing the shadows cast by two cubes in different positions, shows that a square building placed with one angle towards the meridian shades the surrounding area very much less than a similar building with one side of the square facing in the same direction. By joining the intersections of the hourly shadow lines, curves are obtained indicating the number of hours during which each area is in shadow daily, and making possible the calculation of sunlight received per square foot per unit by any portion of the exposed surface. Another diagram, representing the shadows corresponding with five different positions of a U-shaped court, presents

some striking contrasts of eye-opening character. Other diagrams showing the floor area of rooms illuminated by one window facing different points of the compass enables the architect, by superposition of the areas, to obtain the floor illumination for a room of any shape and with windows variously situated. In many cases the positions of buildings and windows are governed by the orientation of streets and roads, which in most American cities has not been considered in connexion with the question of light, and in Europe is generally left to chance, even when the surveyor has any choice in the matter. It may not always be possible to follow the rational methods of laying out streets advocated by Mr. Atkinson, but much benefit would be secured by adopting a regulation, similar to that in the proposed building law of Massachusetts, that no portions of a building, except chimneys and kindred constructions, shall project beyond either of two sloping lines drawn from each side of the street and forming an angle of 52° with the horizontal.

**MR. ALEXANDER RUSSELL** read an interesting paper to the Physical Society last week on the electric strength of air. He proved that the electric pressure required to produce a spark between metal balls or wires could be calculated with certainty by means of the old-fashioned theories of Cavendish and Coulomb without having recourse to the modern theory of "ions" which asserts that the air has no definite electric strength at all. The author analysed the results of the more important experiments made during the last fifty years and showed that all the results could have been predicted—in some cases with a maximum inaccuracy of less than 1 per cent.—from the results given in Lord Kelvin's Royal Society paper in 1860. The results of the very elaborate and expensive tests carried out by Professor Steinmetz in America in 1897 for the General Electric Company and by M. Thury at Geneva in 1903 for the Compagnie de l'Industrie Electrique are in exact accordance with theory. It is interesting to notice that in proving his results Mr. Russell uses Lord Kelvin's method of electric images. It seems to us that many important practical consequences follow from the determination of this physical constant. It is well known to those electricians who have to design overhead systems for the transmission of electric power at high pressures over considerable distances, that at night time the overhead wires are seen surrounded with a luminous glow, or "corona" as Mr. Russell calls it, which is brighter the higher the pressure. It is also known that when this glow makes its appearance the electric power lost in heating the air becomes appreciable, and that this fixes a definite economic limit to the pressure that can be used to transmit power. For instance, there is a sharp controversy at present being carried on in the technical press as to whether it is possible to utilise the power of the Victoria Falls at the mines on the Rand, a distance of at least 550 miles. A pressure of 140 kilovolts is proposed. We have made some rough

calculations, using the constant Mr. Russell has found—38 kilovolts per centimetre—and find that unless aluminium wires of what is apparently a prohibitive diameter are used the loss in heating the air would be enormous.

It has been decided by the National Housing Reform Council to hold in 1907 four exhibitions of cottages to be built for 200%, not including cost of land, and under urban by-laws. The reason for having four exhibitions is to give the opportunity of experimenting in differing methods of building suitable to the conditions and materials of different localities. Thus it is proposed that one exhibition should be held on the north-east coast; one in South Yorkshire; one in South Wales; and one in the London District. This is a good idea, and an exhibition of cottages for 200% will be more satisfactory than one for 150%, since we know that the former can be done, whereas the latter is doubtful except under specially advantageous circumstances.

By the death of Mr. H. H. Armistead we lose a sculptor who, though his work hardly rose to the highest ideal possibilities of the art, was a thoroughly trained and capable artist, and produced a great many works which were eminently successful both in conception and execution. We have always very much admired his series of figures of poets, musicians, and painters forming the reliefs on the south and east sides of the podium of the Albert Memorial, more especially the group of the French artists of the middle of the last century—Decamps, Vernet, Ingres, and others—on the north-east angle of the podium. It is only necessary to compare these two sides of the podium with the sculptures on the west and north sides, by another hand, to recognise how superior was his art to the mere commonplace of architectural sculpture. Some information as to his work and career will be found under the head of "Obituary" on another page.

At Messrs. Dickinson's Gallery in Bond-street is a miscellaneous collection including some interesting decorative work. Mrs. Roscoe Mullins exhibits a case of "Old Jewellery Re-made," in which various bits of ancient silver or other work are made up as portions of necklaces and other ornaments, with the addition of chains and other decorative details. It is rather a new idea, and some effective work is the result. Other cases contain modern jewellery work by Mr. and Mrs. Hadaway, enamels by Mrs. Engelbach, which are very good; silver work by Miss Wadsworth and Miss Remington, and embroidery by Mrs. Walter Crane. The exhibition of "Tinsel Pictures" by Miss Birkenruth is a form of art which does not interest us much. "Tinsel pictures" appear to mean figures (portraits mostly) with the faces painted in watercolour and the costumes made up out of real stuffs planted on. It is not a form of art worth encouraging.

## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The third general meeting (business and ordinary) of the session of this Institute was held on Monday, the 4th inst., at No. 9, Conduit-street, Mr. H. T. Hare, Vice-president, presiding.

### Examination Results.

The minutes of the last ordinary meeting were taken as read, and the following results of the November Examinations (Preliminary, Intermediate, Final, and Special) and the names of successful candidates were read:—  
**Preliminary.**—The Preliminary Examination, qualifying for registration as probationer R.I.B.A., was held in London and the undermentioned provincial centres on November 7 and 8. Of the 210 candidates admitted, claims for exemption from sitting for the examination were allowed to the number of forty-six. The remaining 164 candidates were examined, with the following results:—

District.	Number Examined.	Passed.	Relegated.
London .....	82	67	15
Birmingham .....	5	2	3
Bristol .....	8	6	2
Cardiff .....	14	12	2
Leeds .....	17	12	5
Manchester .....	24	18	6
Newcastle .....	14	11	3
	164	128	36

The following passed candidates, with those exempted—numbering altogether 174—have been registered as probationers:—

A. Adam, Paisley, N.B.	N. Fisher, Leeds.
C. A. Aish, Kingston-on-Thames.	A. Forbes, Reading.
E. M. Armstrong, Pretoria, S.A.	G. S. Ford, Nottingham.
C. F. Bailey, Walsall.	G. Forsyth, B.A. Cantab, London.
A. L. Ball, Birmingham.	W. S. Foster, Hull.
B. V. Bartholomew, Walthamstow.	W. T. Garbutt, Bradford.
P. C. Barrett, North Finchley, N.	R. R. Gaskell, Hull.
P. R. Barry, Richmond.	W. W. Gibbins, Reading.
A. Berrington, Birkenhead.	A. Gibbs, Moseley, Birmingham.
H. C. Berry, London.	S. Graham, Sunderland.
J. A. Bessant, London.	M. A. Hall, Newport, Lincoln.
W. S. Betts, Clapham.	F. M. Hammond, Bradford.
E. D. Blacker, Clifton.	H. Harper, Handsworth, Birmingham.
H. Blenkinsopp, Sheffield.	J. S. Harrison, Bolton.
H. Boddington, Wilm-slow.	J. C. Harvey, Northampton.
G. Bosher, Merthyr Tydfil.	W. H. Hattersley, Cambridge.
C. W. Box, Benfleet.	C. V. Hawker, Bourne-mouth.
W. W. Boyd, Belfast.	J. Hayhurst, Blackburn.
A. G. Brace, Knowle, Warwickshire.	G. E. Hedley, South Shields.
J. S. Bray, Exeter.	G. M. Hedley, Culler-coats.
W. J. Burton, New Cross, S.E.	J. H. Heaton, Newcastle-on-Tyne.
F. J. Butt, London.	G. W. Home, London.
R. W. Cable, Brixton.	H. R. Hooper, Ipswich.
S. C. Cameron, Aber-dare.	J. H. Horniman, St. Leonards-on-Sea.
F. E. Cannon, Lincoln.	L. W. Ingham, Leices-ter.
G. R. Carter, Leicester.	E. R. Jarrett, London.
W. Carter, Sunderland.	B. Johnston, Mutley, Plymouth.
H. F. Castle, London.	J. J. Johnston, Long-town, Cumberland.
E. S. Chivers, Amptill.	F. S. G. Judd, Windsor.
R. Church, Glasgow, W.	C. S. Kimpton, Wands-worth, S.W.
A. N. Clark, Southsea.	A. Lakeman, London.
W. L. Clark, Petersfield.	G. Law, Ware.
W. E. Clarke, Ewell.	G. H. Ledger, Epsom.
G. F. Clarkson, Kensington, W.	A. J. Lee, London.
W. H. Clough, Gates-head-on-Tyne.	W. L. B. Leech, Ips-wich.
A. J. C. Cooper, Henfield.	S. T. Leste, Weston-super-Mare.
L. L. Corkhill, Ramsey.	G. E. G. Leith, London.
F. L. Crampton, Newark.	W. J. Lewis, Ferndale.
H. A. Crooke, Acton.	L. S. Littlejohn, Eccles.
L. A. Culliford, Ealing.	B. H. Lodge, Putney.
K. Dalziel, London.	P. N. Logan, Bristol.
C. T. Davidson, Harton, South Shields.	W. H. Low, London.
G. S. Davies, Swansea.	C. E. Lovick, Crows-thorne.
V. R. Davis, Aberdare.	A. M. Lusby, Fareham.
J. S. Dawson, Barking.	D. R. Lyne, Cheltenham.
W. Dean, Lewisham.	D. McLean, B.A., Cantab, Corbridge-on-Tyne.
E. Dowdeswell, Palmer's Green, N.	L. D. Maddox, Llani-shen, Cardiff.
G. S. Dransfield, Barnsley.	B. F. Matthews, London.
H. Dye, Portsmouth.	R. H. Matlocks, Winder-merne.
D. N. Dyke, London.	J. W. Mawson, Winder-merne.
E. H. M. Ebbs, Hares-den, N.W.	H. G. McCoy, High Wycombe.
W. F. Edge, Edgbaston.	
J. A. Fines, Balham Hill, S.W.	
A. E. Evans, Ferndale, South Wales.	
W. H. Fielding, Cardiff.	
E. Fillingham, Bradford.	
C. W. Filmer, B.A. Oxon, Higher Brough-ton.	







the sort of alterations or additions made to a building which would render the certificate issued by the Council void and of no effect; so that practically they would always have the Council with them. Sect. 9 began to operate on January 1, 1907, and took within its purview certain existing buildings. That purview was indeed an extended one, for, with the exception of a dwelling-house occupied as such by not more than one family, it included a very large number of the most important buildings in London. It took in par. (a) of subsect. (1), a "high building," or (b) "a building in which sleeping accommodation was provided for more than 20 persons, or which was occupied by more than twenty persons, or in which more than twenty persons were employed." A "high building" meant any building any story whereof is an "upper story" and "upper story" meant "any story the level of the surface of the whereof was at a greater height than 50 ft. above the level of the roadway." It should be carefully noted that what was deemed a safe height in the Act of 1894, viz., 60 ft., had now been reduced to 50 ft., and that would bring in a very large addition to the number of existing buildings to be brought under the Council's domination. The *modus operandi* under that very important section appeared to be as follows:—The Council was to form an opinion as to whether or not those certain existing buildings were not provided with a proper and sufficient means of escape therefrom in case of fire, and it must be admitted that that power to form an opinion was a very wide one indeed. It, of course, gave power to enter buildings, to take plans, elevations, and sections of them, and then within the quiet solitude of Spring Gardens they would be subject to the critical analysis with which some of them were familiar. And if the Council could not bring within its notion of what was not "proper and sufficient" pretty well every building in London (with the exception of certain exempted buildings) over 50 ft. in height, or containing sleeping accommodation for more than twenty persons, then he was aware of the attributes of the Council which in many instances had brought them into somewhat public prominence. When the Council had arrived at the opinion required, they might "at any time serve on the owner of such building a notice requiring him to provide such means of escape as could be reasonably required under the circumstances of the case," and he looked forward with interest to the glorious fights there would be over the interpretation of the word "reasonable." Curiously enough, no guidance as to the word was afforded under the interpretation clauses of the Act. The notice referred to was to specify in detail the requirements of the Council. They had no ground for calling into question the ability of the Council to issue that notice, and the owner of the building, the subject of the notice, was to "do all such works and things as might be necessary to comply with the requirements of the Council under this section." It was true that the owner might, within twenty-one days of the notice, submit to the Council "alternative proposals," and if the Council accepted those he need not go on with the others. Subsect. (4) of sect. 9 did not authorise the Council to require any means of escape from any story of certain buildings other than the upper story. In other words, it would appear to be lawful to be burnt to death at a height of 40 ft., but not a height of 50 ft. Sect. 10, subsect. (1), referred to projecting shops. The "projection" was, under the Act, "7 ft. or more beyond the main front of any building of which it forms part and in which any persons are employed for sleep." In all such cases the projection was to be provided by the owner "with a roof constructed of fire-resisting materials, not less than 5 in. thick." That clause would affect many hundreds of shopkeepers in the Metropolis, and it largely depended upon the administration of the clause whether an owner's business was to be stopped, or whether he might be permitted—as he thought later on in the Act would be permitted—to pug the ceiling joists from the upper surface and to render the roof fire-resisting, or whether he would be compelled to take off roof and ceiling to form the fire-resisting covering referred to. The clause

gave permission to construct a "lantern light," or "ventilating cowl," in the roof, but they must not be less than 6 ft. from the main front of the building—what harm a "lantern light" or "ventilating cowl" would work in case of fire, if either were placed 3 ft. from such wall, he did not know. Sect. 12 dealt with dormer windows or doors opening on to roofs, or other proper means of access to roofs, and he did not think that any reasonable objection could be urged by architects to that clause. Sect. 13 dealt with the "conversion of buildings," which really meant that practically no alteration could be made in a building which would render it not in conformity with the provisions of the Act without the consent in writing of the Council. It was another section which, to his mind, entrenched upon the domain of occupancy, and it might be stretched to any length by a "busy body" controlling authority, as the section went on to say that "convert" shall include any change of user, whether involving any structural alterations or not, and notice of such conversion shall be given to the district surveyor by the owner or occupier of the building to be converted." Sects. 16, 17, and 18 dealt with district surveyors, their duties, and their fees, and sect 17 converted, he thought, district surveyors into policemen or detectives. Sect. 22 referred to appeal to the tribunal, which might be made within two months after the owner might be dissatisfied with the proceedings of the Council under certain sections, and he might add, with pleasure, that the power to so appeal extended to several important sections. Sect. 23 was one which more nearly upset the idea of an Englishman that "his house was his castle." It gave power to the Council, their officers, and district surveyors, to, at all reasonable times, and after reasonable notice, to "enter, inspect, and examine any building, structure, or premises to which he might have reasonable grounds for thinking that the provisions of that Act applied." Judging by the prying proclivities of some sanitary inspectors, who very quickly formed what were, to their minds, "reasonable grounds for thinking," he trembled for the man who had a building more than 50 ft. high from the pavement, or who had premises which afforded sleeping accommodation for more than twenty persons. Sect. 24 dealt with penalties for non-compliance with the provisions of the Act, and he commended the dominating paragraphs of that section to all would-be offenders who might think that they could successfully evade the thoughtful care of their protectors. No! the lawyers had been at work there, as one gathered by the use of the words "knowingly and wilfully," and he respectfully cautioned every "owner" against "knowingly and wilfully" doing anything in this world without the consent of the Council. Sect. 28 was marginally described as "for protection of Inns of Court," and that was the only piece of real humour which he had detected in the Act, because it turned out that the Honourable Societies, respectively, of the Inner Temple, the Middle Temple, Lincoln's Inn, and Gray's Inn should be exempt from the operations of the Act; in other words, the whole of the lawyers occupying those inns might be left to be burnt to death under the subheading of "Protection." They in that room knew a great many lawyers in those inns, and they raised their voices against selecting them to remain victims of risks which no other members of the community might incur. There were several other exemptions from the Act which, he thought, ought not to be, because it seemed as if the rich owners of those London could secure exemption from those first serious inroads upon property. The first schedule of the Act dealt with fire-resisting materials, and he was somewhat surprised to find "granite" in the list. Of course, there was not a material in existence which would not "go" in a furious fire, and granite would probably be the first to split up and lead to a catastrophe. In the case of up and lead to a catastrophe. In the case of 2 in. to 1½ in. finished thickness, but he had always thought that in staircases the wall strings certainly need not be as thick as the other parts. In subsect. (7) of the schedule certain squares of glass specified are not to exceed "16 sq. in."—whether they mean a square 4 in. by 4 in., or a square

1 ft. 4 in. by 1 ft. 4 in., he did not know. The second schedule dealt with fees payable to district surveyors, and he thought it would be generally conceded, bearing in mind the status of many of our district surveyors, that however much money the Council might have wasted or might waste, they were certainly not wasting much on the fees to be paid to district surveyors. They must remember that it was an Act, and not a Bill, and that they must all do the best they could with it. Its success or failure would depend very largely upon the manner in which it was administered, and they in that room would not condemn the administration until they had had a fair trial. The administrators had to keep the spirit of the Act, rather than the letter, before them, and much trouble would be saved. As to the drafting of the Act, he thought it was much clearer, on the whole, than many other Acts, but it would have been still clearer if it had been punctuated. Why Acts of Parliament should not be made more intelligible by punctuation, Heaven only knew. As regarded the general provisions for escape by roof, he thought power should have been conferred to compel adjoining or recalcitrant owners to consent to ladders being attached to their premises. They all trusted the Council to administer the Act in a reasonable manner; if they did they would have the assistance and co-operation of all architects; if they did not they must look forward to constant attempts at evasion and to bitter litigation, which would neither protect lives nor advance the real interests of the biggest metropolis in the world. In concluding, the lecturer said that he would like to add that a well-written leading article on the new Act appeared in the *Builder* of November 18 last, the reading of which he commended to all those who had not yet perused it.

Mr. J. Douglass Mathews said that, as the Chairman of the Committee appointed to deal with the Bill, it was perhaps right that he should say what had been done. There was scarcely a point which had been touched upon which had not received the careful attention of the Committee of the Institute, as well as the full attention of the Parliamentary Committee. He might say that the procedure before Parliament was somewhat different to what had been anticipated, as the evidence was heard on the preamble, whereas it had been thought the evidence would have been heard on the clauses. A great many days were taken up with the hearing of the preamble of the Bill, and then the clauses were rushed through. The Institute took a strong stand on the point that the County Council were the fire authority for London, and they maintained that the first duty of the Council was to provide every possible means of escape from outside the building. He had a strong case on this point, for the statutes of the County Council showed that, consequent on the improvement in the fire-escape apparatus owing to the attention called by the Queen Victoria-street fire, the loss of life from fire was materially decreased. He felt that there was little doubt that this lamentable loss of life was due to the fact that the brigade had not a ladder long enough to reach the windows, and that no staircase in the world would have saved the poor creatures who perished. Mr. Woodward mentioned the Tribunal of Appeal, and that was a question which was keenly fought before the Parliamentary Committee. The Institute felt strongly that the Tribunal should be duplicate, but, unfortunately, although their counsel had attended every sitting of the Committee, he was not in the Committee-room when this particular clause came on, and so they lost their chance. With regard to plans and drawings, lawyers always said that everything was a plan, and they could not get them to understand differently. In this new Act, however, there was a considerable reduction in the number of plans required, and it was not for want of urgent representation that the number of plans required was not less even than it was. He thought, however, that everyone believed the County Council meant to carry out the Act in a fair spirit. They saw evidence of this in the administration of the Factory and Workshops Act, which had been much easier in the past few years than formerly. Of course, the new Act was a serious one, and would be a difficult one



to administer, but if they were trying to prevent loss of life it was no good making an Act of Parliament which would be perfectly useless, and, therefore, it was impossible to do without stringent requirements if the Act was to be of any use at all. As to the Act itself, the plans to be deposited were only those which showed the means of escape; and, with regard to the certificate, unless they heard from the Council within a specified time the approval of the Council was to be taken as granted, and that saved a great deal of worry. As to the change of occupation, it must be remembered that a building might be used for the storage of inflammable material, and what might be a safe thing one day might be a very unsafe thing later on, and, therefore, that was a thing which must be dealt with. It was true that the height of the building was reduced from 60 ft. to 50 ft., and that was due to the fact that the fire brigade distinctly pointed out that, although it was possible to carry hose up 60 ft., yet the power of the water was greatly lessened. From a computation made it was shown that the number of buildings between 50 ft. and 60 ft. high was only a small percentage compared with the whole, and that no great hardship would result from this. Then, so far from the County Council forcing requirements, the owner had the right to submit alternate suggestions, and, therefore, it was for the Council rather to approve than to require, which was a very important matter. The reason why the clause restricted a lantern light in the roofs of projecting shops to not less than 6 ft. from the front was that, in the case of such shops projecting some distance, the firemen should have the opportunity of placing their ladders against the front of the house. Then, in the case of a large drapery establishment, the fire would generally occur in the lower floor and run up towards the roof, and the roof was the only means of escape for the inmates, and, therefore, it was required that the roofs should be fire-resisting. They agreed that pugging might be used so as not to interfere with the ceilings of the shops. The glass specified in the schedule was 4 by 4. As to the Englishman's house being his castle, he was afraid they had given up that idea many years ago. Still, the object of the Act was to prevent loss of life by fire. He did not agree that the district surveyors would be policemen, and what weighed with them was that the superintendence of the matter had better be in their hands than in the hands of an officer of the County Council. As to the Inns of Court, if the lawyers like to risk their lives that was their own business, but the exemption was in the old Act. The Institute took up the position of looking at the matter from a general point of view, and they tried to get the words in section 9 as an amendment, for it was obviously absurd to refuse the clauses in warehouses where practically the whole of the employees were on the ground floor. The Bill was an understandable Bill, which was something, and he hoped it would be administered in a fair and reasonable way.

Mr. E. A. Gruning said that, as one of the members of the Tribunal of Appeal, he thought it right to say how deeply they appreciated the loyalty of the Institute in supporting the Tribunal before the Committees of the Houses of Parliament in the attacks made by the London County Council as to their impartiality. Mr. Mathews had mentioned the fact that it would be well if the Tribunal was duplicated, and the Tribunal themselves felt that this should be so, and they were now making arrangements amongst themselves to carry this out, and were asking the different bodies who nominated the members of the Tribunal to appoint substitutes. He believed that this would be done in due course. There was no difficulty about this, because for years before he was a member of the Tribunal he held the appointment from the Institute as a substitute for the late Mr. A. Cates.

Mr. Woodthorpe quoted a number of sections of the Act, and remarked that no doubt the Act would be a serious one for many owners in London. With regard to the fire-resisting roofs for projecting shops, it would seem that these could be put in in any way they liked so long as they got what was fire-resisting. The provision for a trap-door,

or dormer window, leading to the roof was not a serious matter. He had a close knowledge of a part of the City devoted to the soft-goods trade, where a great many girls were employed, and he was confident that there were many buildings in that district in which should a fire occur, the inmates would only have a remote chance of escape. In the Queen Victoria-street fire several youths did escape by the roof, but the fire went through the trap-door so quickly that this means of escape was cut off. It must be a serious consideration for all of them as architects to provide that the roof-outlet should be free from the draft of the staircases. He knew that Mr. Woodward had strong views as to public bodies, and would like to have a Building Act of his own, but, as an architect himself, he had never had any trouble with the London County Council. With regard to the point raised as to the conversion of buildings, he might mention that that morning he had a case before him of a building built for a warehouse, which it was proposed now to utilise for giving accommodation for 300 unemployed persons. What was they to do in a case like that if they had no power to deal with the building?

Mr. E. T. Hall said his experience had been that the London County Council was always exceedingly fair. With regard to the Bill which the County Council proposed and the Act which was eventually passed, there were many and great differences. He represented a number of clients before the Parliamentary Committee, and the great objection they had was to any alteration in the Tribunal of Appeal. He urged upon the Committee from the first that architects and all who were interested in saving people from risk of fire could have the greatest possible confidence in the Tribunal, because they were not doctrinaires, but were gentlemen who were engaged in everyday work, and knew what was wanted and the proper way to deal with it, and, consequently, substantial justice was always done. It was a great pleasure for him to see that both Houses of Parliament took that view. He would point out also that the County Council had a measure of compulsion brought upon them to bring in this Bill. It was not a faddy Bill, but was due to some pressure brought upon them by the Government, and he thought they were justified in doing this. As the Act now stood, although it was strong in many of its provisions, yet he did not think it would hurt any of them who built a new building, because he was certain no decent architect would nowadays fail to put in every requirement in the Act. Of course, a difficulty always arose when they were dealing with old buildings. When before the Parliamentary Committee, the County Council said the requirements would not put owners to any great expense, and talked of a staircase costing 150*l.* or so. He was able to show the Committee that a County Council staircase which he had put in a building in Wood-street cost about 3,000*l.*, and the average cost of such staircases in City buildings was not less than 500*l.* or 800*l.* Another thing which he strongly urged on the Committee was to minimise the number of plans that architects had to give. He put it to the Committee that it was to no one's interests to have a large number of plans. The architects did not like it, and found it very difficult to justify the expense to their clients. The plans necessary to deposit had now been brought down to a reasonable number, and he did not think they had a great deal to complain of in this respect, because any authority which had to deal with a building must have the means of information to see what were the means of escape. As the Bill was originally drafted, they might have been called upon, not only to give every drawing, but every detail, and in some cases this would have meant hundreds of drawings. One alteration made in the Bill before Parliament was of great importance, and this was the clause dealing with the outlet to the roof. As the Bill was first drawn up it was provided that every house which was more than one story in height should be provided with the means of escape from the roof. Of course such a provision as that was wise in regard to buildings in the heart of the City of London, but, it must be remembered, that Bill applied to the whole of London, from Hampstead to the Crystal

Palace. It was absurd when they were dealing with suburban houses situated in perhaps one acre of land to say that there should be means of escape in the roof for a house of two stories. It was well asked by a member of the Committee: "What is to happen when they get on to the roof?" He answered that he supposed they would stop on the roof until they slipped off. No one would dream of getting on the roof of a house at Sydenham-hill to escape from a fire. As the section was now drawn, the house must exceed two stories, and must be above a certain height. Even then in some cases it would certainly be absurd to make such provision for escape, but, taking it all round, and having regard to the responsibilities of the County Council, he did not think the Bill was very exacting if it was reasonably administered, and he believed that this would be the case.

Mr. A. Maryon Watson said that Mr. Mathews told them that the Institute directed their criticism to the fire brigade, and he mentioned the loss of life from fire in London in 1898. According to the evidence of Captain Hemphill, in that year the expenditure on the fire brigade from the rates was 197,000*l.*, and in 1903-4 the expenditure had risen to 239,000*l.* It was stated by Captain Hemphill that they had got the fire brigade as efficient as it could be got, and any further expenditure on the brigade would not save more lives. With regard to the reduction in the height of protected stories from 60 ft. to 50 ft., a great point was made by Captain Hamilton. Captain Hamilton drew a distinction between what he called "life-saving ladders" and "fire-fighting" ladders, and said that, with life-saving ladders, they could only save life slowly at 49 ft. perpendicular height; at 50 ft. they could save life with great difficulty; while above that height the saving of life was a sort of forlorn hope. It was on that evidence mainly that the height was reduced from 60 ft. to 50 ft. He was not quite sure that the point as to the parapet had been made clear. Under the old Act they had to have an access to the roof in a building of 30 ft. in height if there were a parapet. Now in a building over 30 ft. high they had to have access to the roof and a parapet or handrail. With regard to the exemption of low buildings in which there were not more than two families, even in that case if the building happened to be behind a projecting shop it had to have means of access to the roof.

Mr. George Elkington said that the consideration of the Act had already been forced upon many of them who practised in the City, not only in regard to new buildings, but also in regard to the question of contracts as regarded old existing buildings. It would be interesting to know what the position was as between the landlord and the tenant with regard to this Act when it came into operation. He thought that those of their colleagues who were district surveyors and members of the District Surveyors' Association should try and get some think like a general consensus of opinion as to what would be necessary in existing buildings to render them fairly safe. He did not mean that they should draw up hard-and-fast rules, but they might have a kind of understanding, so that when an architect or a contractor went to a district surveyor they would be able to get some indication of what would be required. He understood that the County Council were not proposing to formulate regulations or by-laws, and that rendered it more necessary that they should know what was desirable. In the case of a factory they knew what would be required, but, in the case of those high buildings, would it not be sufficient to have one ordinary staircase so isolated on each floor that fire would not run up it and get to the roof, or would it be held necessary to have a second exit? Those were questions which it would be well that district surveyors should come to some decision upon to help them. Mr. Woodward said that the Act did not attempt to define what the word "reasonable" meant. Perhaps it was well that there should be no definition, or otherwise it might be that what the County Council thought right was reasonable, and what anybody else thought right was not reasonable. It was quite possible for them to thoroughly appreciate the courtesy they



met with from the staff of the County Council without feeling in sympathy with the extreme views of that body in their public capacity.

The Chairman said that he did not feel qualified to speak much on the subject. He had had to deal with the London County Council, and he must say that he had found them exceedingly reasonable. They all knew how difficult it was to put anything connected with building into legal form, and the difficulty must have been much more than in the drawing up of the ordinary Act. The Act appeared to have been drawn up as well as possible, and there was reason to believe that it would be administered in a perfectly reasonable way, so that it should not bear too heavily on architects or property owners. A vote of thanks having been accorded to Mr. Woodward, the proceedings terminated.

#### MAGAZINES AND REVIEWS.

In the *Art Journal* Mr. Paul Waterhouse brings to a conclusion his most interesting and far too short series of papers on "Painters' Architecture." He had purposely intended to omit those painters who were actually architects, but makes an exception in favour of Raphael and his graceful temple in the background of the "Marriage of the Virgin," of which he suggests, with every appearance of probability, that the source is to be found with Brunelleschi or Bramante (Bramante we should say by preference). But why does Mr. Waterhouse say the building is a duodecagon? (Query—"dodecagon"? At least "duodecagon" is not in our English dictionary.) It appears to us to be a sixteen-sided building. The point of sight is on the central axis of the picture, and the building placed exactly central. Seven sides are shown, and the two sides parallel with the axial line of the picture would not show any face to the front of the composition. There are seven visible faces, the middle one in elevation, the three on each side on the cant. The next face on each side would be that at right angles with the central face, and then we should have the remaining seven corresponding to the seven faces visible in front. Even if we suppose the side limit of the plan to be an angle and not a face, it makes fourteen sides; we do not see how to make twelve out of it. Paris Bordone's "The Doge and Fisherman" shows a curious piece of nondescript classic architecture—columns with Romanesque capitals and an entablature breaking over them, and elliptical arches above the entablature; but the whole serves to give a fine scenic setting to the picture. The two most remarkable examples given are, the extraordinary and painstaking realism of Gentile Bellini's representation of St. Mark's, forming the background to "The Procession in the Square of St. Mark"—a realism which is emphasised by the insertion of a photographic view of St. Mark's on the same page; and the powerful and poetic conception of a Gothic tower which forms the background to John van Eyck's drawing of "St. Barbara." A reproduction of this forms the frontispiece to the number, and a most remarkable conception it is in the way of ideal architecture. Other articles in the number are a short one by Mr. Addison McLeod on some unpublished drawings by Michel Angelo; one by Professor Melani on the Chateau Strozcosco at Milan and its collection of art treasures; and one by Mr. A. G. Webster, with sketches by the author, on the evidently charming and picturesque little old-world town of Burford. The *Burlington Magazine* commences with an article by Professor Baldwin Brown on the interesting subject—"How Greek Women Dressed." Some people in London may remember how the subject was taken up a good many years ago by a lady, then well known in London society (now dead), who gave a Greek dress dance at her house, where all the ladies went in ancient Greek dress (the men were allowed to go in "swallow-tails"), and how attractive some people looked in it; one lady in particular gave the impression of having just walked out of one of Leighton's pictures. Professor Brown gives the analysis of the formation and composition of the dress in a very complete manner, remarking that "the Greek dress is one of the most typical products of the Hellenic genius. It exemplifies better than almost anything else the capacity of this

gifted people for producing the most beautiful effects by the simplest means." We might add that one cause of the beauty of Greek dress is that it is itself what may be called a typical form of dress; it seems to be dress in the abstract, not dress which is the fashion of a decade or of a generation. Miss Lina Eckenstein contributes an interesting article on "The Purpose and Value of Ancient Egyptian Art." Her idea as to the purpose of Egyptian art is that it was to give a faithful representation of fact, in which the artist "was always clear and direct in his utterances. At no time did he drift so far away from life as to practise art for art's sake." This may be in the main true, though it is perhaps put in rather too sweeping a sense. There is at least a great deal of symbolism in Egyptian art which has the ideal element in it; look for instance at that remarkable incident in the set of drawings recently on view in the British Museum, of the two leopards looking opposite ways on each side of a kind of small altar, and labelled "Yesterday" and "To-morrow." And are not the temples and the avenues of sphinxes, in their way, "art for art's sake," and the bracelets which are among the illustrations to Miss Eckenstein's article? It is a good thought at the close of the article, that part of the interest of Egyptian art for us lies in the fact that it influenced the art of the shores north of the Mediterranean, and "thus in being brought into contact with the productions of ancient Egypt we are confronted by that which has helped to mould our taste." The Egyptian chairs, both painted and actual ones, are a witness to this; imitations of them (some have been made) would suit us perfectly well for modern use, both in regard to taste and convenience. Mr. C. I. Holmes contributes an article on Richard Wilson, whom we think he a little over-rates. There is a calm beauty and often nobility of sentiment about Wilson's landscapes, but we cannot regard him as one of those who can be classed among the great landscape painters; it can only be said of him, *proxime accessit*. We have not followed out the changes in his work, but Mr. Holmes is probably right in saying that there is a considerable difference between the landscapes painted in Italy (where he was for six years) and those after his return to England, partly from the loss of the atmosphere of Italy, partly because he lived in London, was very poor, and probably got little opportunity of painting direct from Nature. His "Aque Albule," a reproduction of which forms the frontispiece to the magazine, is a beautiful composition, full of the melancholy spirit of what Ruskin called the "sad and cemetery shore." Mr. Ingleby Wood contributes an article on the subject of what he calls "Medieval Architectural Refinements," a subject which will probably be dinned into us for some time to come by industrious propagandists; but as Mr. Wood was the secretary for getting up the exhibition of Mr. Goodyear's photographs at Edinburgh, he must naturally be regarded rather in the light of an interested advocate than an impartial critic. As we have touched on the subject on another page of this issue, we only remark here that among "architectural refinements" he counts the lowering of the second arch of the crossing at Siena "in order to give a false perspective." We must not be too sure that this was the object; but if it was, instead of an architectural refinement we should call it an architectural vulgarity, which would offend a sound taste when found out. We observe that Mr. Wood remarks that the volume of Pennethorne was at its appearance looked upon "as the vapouring of a crank." It was not quite as bad as that, but it is nevertheless the fact that to a great extent Pennethorne was a crank; that he pushed his theories a great deal further than they would bear (he went to the absurdity of maintaining that the Parthenon was designed to be viewed from only one particular point on the Acropolis, and was only correct when seen from that point); this was shown in the review of his work which appeared at the time in our columns, and with such effect that the publisher wrote a bitter epistle to the then editor of this journal, the late Mr. Godwin, complaining that "he had stopped the sale of the book." We wonder whether Mr. Wood really knows Pennethorne's book, and all that his views imply.

The *Magazine of Fine Arts*, the first number of which reached us too late to be

included in our last month's notice, promises, to judge from this, to be an excellent illustrated art publication. It again includes an article on Richard Wilson, who seems to be getting specially taken up just now by writers on art; and there is no doubt that by the public he is totally underrated if not unknown—many people who consider themselves to take an intelligent interest in pictures do not even know his name, and it is well that more attention should be drawn to him. Sir James Linton, who writes the article, thinks that what is against him is that he could never sufficiently get rid of certain conventions in landscape-painting; in fact, his pictures are compositions rather than nature, except when he was painting direct from nature in Italy. When he returned to England he painted English landscape in the Italian manner, and there is always more or less a feeling of unreality about it. We are glad to see among the illustrations to the article the two small pictures in the National Gallery in which Roman ruins form the prominent subject—"Hadrian's Villa" and the one called "View in Italy," part of a ruined vault with a battered statue leaning up against the broken wall. They are full of the spirit of Roman decay. Mr. Laurence Housman writes an article on Donatello as "the great forerunner of modern sculpture." We like his first sentence: "Perhaps the most perfect proof of artistic form is to be found in the serenity with which it survives the period of its innovating force." Other articles are on "Jordaens," by Professor Rooses; on "Sicilian Woven Fabrics," by Mr. A. F. Kendrick; on "Peruvian Pottery" (an ugly stuff it is), by Dr. Max Schmidt.

The most important building illustrated in the *Berlin Architektur-Welte* is the Imperial Patent Office, by MM. Solf & Wichards; a pleasing building in a kind of quasi-Elizabethan style with no vagaries about it; its extensive plan has been well fitted on to a very irregular site. The Swinemunder bridge, a steel bridge of which Herr Krause is the engineer and Herr Möhring the architect, is an awful affair as far as æsthetic is concerned, but we in England have no right to criticise German bridges much in this respect. The concluding illustrations show some furniture in the new style (but not so "new" as some examples) designed by an architect, Herr Nachlicht, some of which is ingenious and not unpleasant.

The *Architektonische Rundschau* gives an illustration of the Rathaus at Charlottenburg, by MM. Reinhardt & Süssenguth, of the most terrible detail, to which no mere words can do justice; one feels grateful that, with all our modern vagaries in architecture, it would hardly be possible, to find anything in our cities as bad as this; at least we never have. Vienna seems, more than Berlin, to keep some dignity of style and avoidance of mere eccentricity; the large mansion in the Auhofstrasse, by Herr Van Neumann, if ornate, is also stately; it would have been better if the four circular angle turrets had been carried down to the ground; they hang rather heavily on the building. A "Grabmal," monument over a tomb, designed by MM. Ziesel & Friedrich of Cologne, has some of the solemn fancifulness which Germans know how to impart to such monuments.

The *Monthly Review* contains a very well-written article by Mr. Edward Hutton on the paintings in the Prado Gallery at Madrid, with some good comparative criticism on the art of Titian, Velasquez, and Raphael. We entirely agree in his fine and eloquently expressed appreciation of Titian, the greatest of all painters—"always expressive, always at the height of the situation; nothing has come from his hand that does not live—legions of figures, men and women and children splendidly naked, beautifully clothed, horses and dogs, and bulls and trees and mountains, and sea. He is like a natural force in his profound energy." On the Raphaels at the Prado Mr. Hutton throws a good deal of doubt, regarding them as at all events not up to the painter's reputation.

The *Nineteenth Century* contains a most interesting and valuable article by the Rev. E. Ledger (Gresham Lecturer on Astronomy) on "The Sun and the Recent Total Eclipse." It forms a kind of summary, in a form intelligible to those who are not scientific astronomers, of what is already known about



the sun, and what are the principal means of investigation which are being pursued to enlarge, by slow degrees and long and patient observation, the present narrow boundaries of our knowledge. It is an article that should be generally read, for all educated people, whether or not their general pursuits are scientific, should endeavour to keep their minds in touch with the scientific discoveries of the day. In the case of the sun, the problem is so vast, and the means of investigation depend on such delicate and recondite experiment, that there is quite a romantic interest in the subject.

In the *Century* the third article in the series on "Historic Palaces of Paris," by Camille Gronkowski, is of considerable interest; it describes the Hôtel de Crillon, which outwardly forms a part—the left-hand part—of that noble façade of Gabriel's which stands at the north end of the Place de la Concorde. The history of the building is traced, and a description given of its interior decoration, which appears to be of the highest order of art of the period. A curious point in the history is that, in order to complete the architectural aspect of the Place at the bidding of Louis XV., who was impatient to see its effect as a whole, Gabriel's elevation was at first erected as a façade only, the actual buildings in its rear being carried out in a more leisurely manner afterwards.

In *Scribner* Mr. F. Fowler, under "The Field of Art," discusses what he calls "The Lesson of Bouguereau." He seeks to know why the apparent perfection of Bouguereau's work did not meet the approval of his contemporaries in art. After a good deal of disquisition, he puts it, rather well, that Bouguereau felt life pictorially, not really. He made pictures of things, not characteristic impressions which were felt as human situations humanly observed. A peasant was to him a pretty object placed in a pretty scene, not a human being of the soil and living on the fruits of his labour." Yet some of Bouguereau's peasant children are charming, and remind one a good deal of Reynolds's and Gainsborough's children. They are much better than his classical subjects. We might say, to put it still more shortly, that Bouguereau was a painter of very complete technical power without a touch of genius. An article on "Holbein," by Mr. Kenyon Cox, is an excellent piece of critical analysis.

The *World's Work* contains an article on "The Incandescent Electric Lamp," describing the process of its manufacture; on "The Choice of a Motor-car," by the Editor; and on "The Lebaudy Airship," by Mr. L. Ramakers, which, however, though it gives a most favourable account of the performances of the balloon, does not give any very clear information as to its principle of working. Mr. Lewis Hind continues his papers of artistic travel under the title "The Education of an Artist." We do not think the imaginary narrator rises to the height of Raphael's San Sisto Madonna. He has taken up the now usual enthusiasm for Velasquez, which we share to a great extent. Velasquez was a greater master of the art of painting in itself—of texture and colour and character—than Raphael; but after all, that Madonna and Child represent a conception of spiritual beauty that was beyond Velasquez.

The *Antiquary* contains a good article by the Rev. W. G. D. Fletcher on "The Tower of the Abbey Church, Shrewsbury," with a long quotation from the report of Mr. Brakspear, the architect to whom the repair of the tower was entrusted. The writer comments on the neglect of Shrewsbury, especially by American visitors, who "land at Liverpool, pass a night at Chester, and the next day journey on to Stratford-on-Avon, little dreaming that in passing through Shrewsbury station they are leaving unseen a town full of the most exquisite bits of antiquity that can anywhere be met with." Mr. A. Chas. Jonas writes an article (with an illustration) on the Whitgift Hospital at Croydon, partly as a protest against the local vandals who want to destroy it, having already destroyed all its surroundings.

The *Gentleman's Magazine* contains a very well-written and picturesque article on "The Evolution of a Railroad Metal," detailing the whole process from the "pig" state to

the final rolling. It contains definite information, imparted in such a way as to render it interesting to general readers. Under the title "London Laid Open," Mr. J. H. Macmichael, who appears to have been for many years a collector of Roman and other relics out of London excavations, gives an account of his method and of some of his numerous finds. We gather, from the closing notes under the usual heading Table-Talk, that the present editor takes leave of his readers, and that the magazine appears in January in a new form and new management.

#### THE ARCHITECTURAL ASSOCIATION.

THE ordinary fortnightly meeting of the Architectural Association was held on Friday, last week, at No. 18, Tufton-street, Westminster, Mr. John Murray, Vice-President, in the chair.

The minutes and nominations having been read, the following gentlemen were elected members of the Association, i.e., Messrs. Paul Faraday, P. R. Fincher, K. Dalglish, C. W. Long, H. W. Spark, T. C. Black, C. G. C. Payne, H. Griffin, jun., H. Sudlow, F. C. Barrow, A. G. Taylor, and Flint-Browne.

#### New Building Fund.

The Chairman then announced the following additional donations to the Building Fund, i.e. :—

Chas. Wall, Ltd.	£25	0	0
E. E. Nixey	2	2	0
F. A. Foster (double subscription)	1	1	0
F. J. Lloyd	1	1	0
F. E. Lloyd-Downes	1	1	0
E. Boehmer	10	6	
J. W. Denington	10	6	
J. E. Hunter	10	6	
Geoffrey Lucas	10	6	
C. A. Sharp	10	6	
A. Dunbar Smith	10	6	
W. C. Waymouth	10	6	

The Chairman announced the President's "At Home," to be held at 18, Tufton-street, on December 8, at 8.30 p.m. Morning dress will be worn.

Mr. A. Maryon Watson, hon. secretary, announced a Camera and Cycling Club meeting on December 19, when a paper will be read by Mr. Francis Bond on "Bay Design in the English Medieval Churches."

#### Turkish Architecture.

MR. E. F. Reynolds then read the following paper on "Turkish Architecture":—

MR. President, gentlemen,—The student of Turkish architecture is confronted by a somewhat unusual initial difficulty. He finds that there are few authorities on the subject, that they give but meagre information, and, if he further pursues his inquiry, that much of the information is inaccurate and misleading. The slowness of the knowledge to be gleaned from books is assuredly not due to any lack of intrinsic interest in the subject, but rather to lack of opportunity. For if the student proceeds to Turkey and attempts to study the buildings themselves, his difficulties only increase, and, indeed, become well-nigh unsurmountable. Religious fanaticism and political suspicion have almost altogether closed Turkish doors against the inquisitive architectural infidel, and only by the most exceptional good fortune may the right to enter, sketch, and measure be obtained. Through the courtesy of the Royal Institute of British Architects and the British Embassy at Constantinople such good fortune was my own experience, and, in company with Mr. J. B. Fulton, I was able to give some study to the subject on which your Council has invited me to speak.

The Mohammedan religion has been as powerfully represented in building as the Christian religion, and Turkish mosques represent the most impressive and a most characteristic phase of Turkish architecture. I propose to confine my remarks to this aspect, entirely disregarding the palaces, the castles, the bazars, and the domestic buildings which show other aspects of the same art, and, further, to deal almost exclusively with the great mosques of Constantinople.

#### Brûsa.

Perhaps the best way to approach the subject will be to take a preliminary glance at two mosques at Brûsa, the Turkish capital in Asia Minor before the conquest of Constantinople. Ulu Jami, the Great Mosque,

represents a type of plan derived from the original courtyard type. The rectangle of the building is divided by massive piers and arches into twenty square bays, each covered with a cupola set on pendentives, except one central bay, which remains open to the sky. The construction is of brick, the piers being square on plan and the arches pointed in outline; and the internal walls, originally covered with tiles, are now whitewashed and decorated with writings from the Koran. Light is introduced by windows in the bases of the cupolas, and the interior, with the cross-views half blocked by the forest of great piers, is heavy, though picturesque, in effect. A free-standing minaret flanks each side of the façade, and a later portico shelters the central entrance.

Yeshil Jami, the Green Mosque, was built in 1420, and represents a complex variety of the later cruciform type of plan. The plan is complicated by the fact that the mosque was built on the site of a Byzantine church, and also because it was the royal mosque, and, therefore, included special chambers for the Sultan. The arms and the crossing are covered with domes, the square compartments being reduced to the circle by means of simple stalactite pendentives. The walls, internally and externally, are faced with marble masonry, and the windows, niches, and doorway of the façade are richly carved with a decoration of very advanced character, including stalactite work and arabesques in low relief. The internal gallery and alcoves for the Sultan are sumptuously covered with dark-blue tiles, threaded with the gold, green, and white of slightly raised patterns. The whole building is a storehouse of early Turkish art, full of that Persian influence which was the fountain-head of Saracenic art, just as Greek influence had been the vital source of classical art.

These two mosques may be taken as typical of Turkish building prior to the conquest of Constantinople, differing from other Saracenic work of the time only as varieties of the main stock, closely related to the mosques of Egypt and Persia, and perfectly normal in development.

#### Santa Sophia.

BUT, with the conquest of Constantinople, the natural growth of Turkish mosque-building was radically modified by a new influence—an influence strong enough to produce an almost complete change of flower and fruit. This alteration was the effect of a single building—that Church of Santa Sophia which had already exercised so profound an influence in the history of art, and which was now to lend its vitality to an alien creed. Rumours of the splendour of the church had long been current in Persia, and Mohammed himself had preached its conversion to a mosque. The Turks, therefore, regarded it as a predestined possession, and it may be that we owe its preservation to this view. But, not content with its possession, the Turks emulated its qualities, and henceforward they founded all their great mosques on its model, disregarding their own traditional forms or altering them in unison with their new ideal.

The change was probably less due to real aesthetic appreciation than to a desire to invest their own religion with an easily-adapted magnificence. Mohammedanism was a militant religion whose fast rising power had outstripped its expression in outward grandeur, and the possession of the greatest church of the East gave the Turks a new scale and model for its architectural exhibition. But, further than this, the readiness and completeness of the change were in large measure due to the national character. The Turks were a military, rather than an artistic, race, and they were always dependent on other nationalities for the fulfilment of their aesthetic needs. The Persian quality of their mosques at Brûsa has been mentioned, and at Constantinople their most famous architect was an Armenian. The Turks themselves had little of the subtle instinct of the artist; to them art was a slave to minister to their pomp and luxury, rather than a spirit to be sought with toil and glad self-sacrifice. A close parallel may, indeed, be drawn between the character of the Turk and the Roman, and the comparison is rendered more striking by the similarity of experience in their contact with the art of another



1202. But, whereas the Romans had adopted Greek forms for the decoration of their own structure, thereby stifling the expressive evolution of its true qualities, the Turks, on the other hand, adopting only the plan-type of Santa Sophia, leaving themselves free to adapt and develop it in accordance with their needs, and to clothe it with fresh expression by a thoroughly Saracenic mode of decoration.

But Byzantine and Turkish art may not be regarded as altogether alien to each other. In Byzantine art there had been a strong infusion of Eastern influence, so strong, indeed, that, as compared with Roman art, its qualities are distinctively Oriental; and although that influence was qualified by its infiltration through a Greek race, yet it preserved much of its original character. In return, the ascendant power of the Byzantine empire and the fine quality of its art had given a reflex radiation which enriched the roots of the mediæval Saracenic school among others. In their westward advance to Constantinople the Turks passed over soil which was fertile with Byzantine influence, for Brûsa was a completely Byzantine city when they entered into its possession; and this could not have been entirely without effect on a race of the Turkish temperament. Hence there was already a certain affinity between Turkish and Byzantine art—an affinity showing itself in broad tendencies rather than special particulars.

#### Ritual.

The requirements of Mohammedan ritual are simpler than those of Christian ritual. The mosque proper is preceded by a forecourt, which gives additional space for the crowds of the faithful who assemble at the great festivals, and at the centre is placed a fountain of ablution. The mosque itself provides a sheltered place for prayer, and, so long as sufficient floor-space is provided, its general shape may vary very considerably. A small niche in the centre of the eastern wall indicates the direction of Mecca, but it has no such ceremonial significance as the altar in the Christian Church. Thus, such a form of plan as the Great Mosque of Brûsa would be impossible for a church service, only about one-quarter of the congregation being able to see the position where the altar would be placed; but the Mohammedan does not face toward the Mecca niche, but parallel with it and toward Mecca itself. Further, spiritual equality is an essential idea of the creed, and there is no such distinction as between laity and clergy. Hence the floor is one open, level area, and there are no such smaller chambers as chapels and vestries.

Applying these conditions to S. Sophia, it is evident that, although simplification was necessary, yet in its main lines the plan was eminently suited to Mohammedan ritual. It would be remembered that both religions were of Eastern origin, and that many observances applied to them equally. Thus the custom of washing before prayer was practised by the Christian also, and the cloistered forecourt of S. Sophia, with its central fountain, was identical with Mohammedan requirement. On the other hand, the Christian narthex was meaningless to the Mohammedan, for the system of neophytes, who were promoted by degrees to the full entrance of the Church, did not exist in his religion. Internally, the broad, unbroken space under the dome and semidomes precisely fulfilled the conditions of Mohammedan worship, and it was this principle of covering a large area which was the main theme of the subsequent Turkish mosques. The aisles of S. Sophia, necessary to give depth of abutment to the great arches of the dome, were also retained, but their subdivision in height by galleries was discontinued. These galleries had been reserved for the use of women in the Christian Church; but a Mohammedan controversy had decided that women have no souls, and their galleries were accordingly abolished in future mosques. The exedrae, or subsidiary apses, seem to have been regarded as obstructions to that broad floor-space which was the Mohammedan ideal, and the whole tendency of mosque-construction was toward a great square described around four isolated piers which sustained the central dome.

#### The Mosques.

The mosques were built on a grand scale, and the more powerful Sultans successively vied with each other in erecting a magnificent tribute to Allah and a convincing proof of their own power. Several of the mosques approach S. Sophia in size, but perhaps more astonishing than their size is the sustained, yet concentrated, energy of their building. Within little more than a hundred years some seven great mosques were built in Constantinople which are definitely larger than the innumerable smaller mosques that fill the city, and any one of these alone would make the city notable. It may be said that a series of buildings is here brought together which, under other social conditions, would have been scattered among several centres, that the whole empire contributed to this congregated magnificence. But, however that may be, this series of great mosques is an amazing testimony to the power and greatness of the Turkish Empire which at one time overshadowed Europe.

#### The Bayezid Mosque.

The first mosque to be built in Constantinople was erected by Mohammed the Conqueror himself; but it was destroyed by an earthquake and rebuilt at a later date, and, so far as I know, no record of its original design remains. The earliest existing great mosque was built by Bayezid II. in 1497-1515. This is one of the smallest of the imperial mosques, the forecourt and mosque forming a double square on plan, which measures 268 ft. by 135 ft. The forecourt has three entrances, and is surrounded by a cloister six bays square, each bay being defined by pointed arches set on columns and covered with a cupola set on pendentives. The mosque itself is set out as an exact square, 120 ft. 9 in. across internally, and the four central piers are so placed as to include two of the four equal bays of the aisles, these bays being covered with cupolas on pendentives. The arcades which subdivide the north and south sides of the central square bear tympanum-walls filling the great arches, these walls rising above the aisles and pierced with windows. The dome is carried on pendentives which close around the great arches, and at the base it is pierced with a ring of windows after the manner of S. Sophia.

But the crux of the whole design was the management of the semidomes. It has already been said that the Mohammedan architect seems to have felt the apses and exedrae of S. Sophia to be obstructive, and he solved the difficulty by making them an affair of vaulting only. On the ground plan of all these mosques there is no sign of the complex domical forms which are so conspicuous externally, and the whole of them are ingeniously carried on arches. In this case the semidomes of the exedrae are altogether omitted, and the great semidome is carried on simple pendentives, so that it is a repetition of half the central dome.

This mosque is of special interest on account of an unusual development at the west end. The western aisle is extended on each side by additional wings, so that an uninterrupted vista, 272 ft. in length, is obtained. Each wing is divided into three bays, and covered with five cupolas, their supporting arches carried on other arches in a most astonishing and characteristically Oriental way. Such an instance is in itself sufficient proof of the perfect familiarity with arched and domical construction, for none but the adept would venture to play with his methods so freely. The bases of the minarets project from the extremities of the wings, and porches connect them with the outer wall of the forecourt; while, on the south side, two libraries add yet further length to the wing. I think that these wings, minarets, and libraries were added after the original building of the mosque, and probably themselves not all at the same time.

The external view of the mosque shows the high outer wall of the forecourt, with its rows of window-openings and its entrances, and the repeated cupolas of the bay divisions. This principle of covering by a series of cupolas, and the consequent subdivision of the plan into square compartments, is an essentially Oriental method of roofing, and its influence penetrated all Eastern building. The cupola, or dome, has

always been a common mode of construction in the East, applied as readily to the meanest dwelling as to the palace and shrine, and, for the proper appreciation of Oriental architecture, it is necessary for us to forget that special significance of the dome which its rarity in the West has conferred on it.

Beyond the forecourt rises the mosque, its dome, semidomes, and cupolas, all intimately expressing, and almost repeating, the forms of the interior. The four great piers beneath the dome are marked by circular turrets, and the two minarets rise clear from the buildings below, a twin and slender contrast to the broad, curved masses of the mosque. This close intimacy between internal and external form had also been characteristic of Byzantine building, but only inasmuch as it is characteristic of all Oriental building. Such simplicity and candour of construction is one of the finest qualities of Eastern art, and, at the same time, distinguishes it from the more complex methods of our Western art.

#### The Mosque of Selim.

In 1520-26 Suleiman I. built a mosque to the memory of his father, Selim I. The plan is extremely simple, consisting of nothing more than a single great dome, set with pendentives on a square of wall, and with the usual forecourt attached. The building shows little of the influence of S. Sophia, and may be regarded as the largest instance of the smaller type of mosque, having no relation to the main development of the great mosques.

#### The Shah-Zadeh Mosque.

The next great mosque—that of the Shah-Zadeh—was also built by Suleiman I. in 1543-48, and it exhibits several changes which ultimately became embodied in the traditions of mosque-building. Its architect was an Armenian, named Sinan, and he seems to have gathered together the vague tendencies of his day, stamping them with his personality and setting the standard which henceforward guided the design of Turkish mosques. He may well be compared with such a man as Bramante in Italy or Inigo Jones in England.

The Shah-Zadeh Mosque is of medium size, measuring 145 ft. by 166 ft., while the forecourt measures 133 ft. by 147 ft., giving a total length of 278 ft. The forecourt is surrounded by a cloister of unusually large bays, each being 28 ft. square; and the north and south arcades have deep wall-arches with projecting piers. The mosque itself is set out in the exact form of a square, and there are three principal innovations to be noticed. The first is that the application of semidomes is no longer confined to the east and west sides of the central dome. All the four sides are treated exactly alike in this respect, and the expression of length, given by the north and south arcades in the previous mosque, and reminiscent of the Christian Church, is exchanged for a more central and perhaps more logical emphasis of the great dome. Although, as compared with the Bayezid Mosque, the actual floor space is only increased by the omission of two columns, yet the æsthetic restriction of the north and south tympanum-walls was removed, and the whole interior filled with a wonderful sense of expansion. The second point of originality lay in the introduction of subsidiary semidomes in the bases of the great semidomes; and the complete domical scheme of the apses of S. Sophia was thus reproduced, although entirely supported on arches and not indicated in any way on the ground plan. A difficulty arises in fitting the curves of the lesser semidomes within the rectangular lines of the lower plan, and to this was probably due the simpler form of the earlier Bayezid Mosque. This difficulty was solved in the Shah-Zadeh Mosque by playing back the main piers so as to give room behind the great arches for the full development of the lesser semidomes, and some such device was generally adopted afterwards. The curves of the subsidiary semidomes left only small spandrels on plan to be supported, and these were filled out with courses of corbelling. The third point of fresh development was the extension of buttresses on the north and south sides of the mosque. This was rendered necessary by the increased scale of building and the



greater height of the dome, and, with the Oriental dislike of projection, or in the desire of utilising the whole extent of building, the spaces between the buttresses were filled with arched galleries. These were partly used as porticoes, and they became a permanent feature in later mosques and an important factor in the external aspect of the façades.

Externally, the higher development of the plan is reflected by a further complexity of grouping. As in the Bayezid Mosque, each several part of the internal doming may be clearly traced, from the cupolas over the aisles, the great and lesser semidomes, up to the central dome. The circular turrets over the four main piers are here more marked than in the former mosque, and their cupolas are deeply corrugated. An enrichment of carving is applied most effectively to the cresting of the drums and to the shafts of the minarets, and there is a certain refinement and delicacy of form throughout which is sometimes lacking in later work. Viewed from the ground the mosque is of most shapely proportions. The main square of the plan is carried up to a constant cornice-level, and serves as a grand base on which is set the complex pyramidal outline of the domical roofs. The external arcades give deep and restful shadow, and the minarets, set in the middle of the plan, accentuate the grouping and clear it from any confusion.

#### *The Suleiman Mosque.*

Sultan Suleiman I., or the Magnificent, seems to have been a truly Augustan patron of the arts, for, in 1550, Sinan, the architect, began the building of his third great mosque, which is called the Suleimaniyeh after him, and which, in point of size and natural position, dominates almost all Constantinople. It is set on the summit of the low hills, which rise from the Golden Horn on the one side and from the Sea of Marmora on the other, and it is a most conspicuous landmark from all parts of the city and from the very sea itself. The mosque is 227 ft. in width and 203 ft. in length, and, with the forecourt, makes up a total length of 359 ft. It is interesting to compare the size of this, the largest of the Turkish mosques, with the Church of S. Sophia, its prototype. The church is 237 ft. wide and 291 ft. long, its total length, including the original forecourt, being about 444 ft. Thus it will be seen that, while appreciably smaller than the church, the mosque is, nevertheless, on a most magnificent scale; and it should be remembered that it is merely one of a series and no unique effort. The diameter of the dome is 85 ft. 4 in., as compared with 101 ft. 8 in. in S. Sophia.

The forecourt is nine bays wide and seven bays deep, and has three entrances in the usual positions, the western entrance being elaborated with chambers on either side. The mosque itself in some degree indicates a reversion to an earlier type, for only the east and west sides of the dome have semidomes applied to them, while the north and south sides are filled with arcades bearing tympanum walls. I can find no reason for this reversion in the mosque itself, and am inclined to surmise that some reactionary influence may have been brought to bear on the architect, Sinan, similar to that which compelled Wren to build St. Paul's Cathedral on the Gothic plan.

The arrangement of the dome and the east and west semidomes, with their lesser semidomes, is similar to that of the Mosque Shah-Zadeh. The north and south aisles under the dome are divided into three bays, and these are grouped in a novel and somewhat curious manner, the central bay being larger than the other two. This setting-out has the result of putting several of the arches out of centre with the cupolas which they carry, and the effect is not altogether satisfactory. Another result of this arrangement is the pushing forward of the outer walls in the central bay of the mosque, the other parts of the outer wall remaining in the usual position and allow four deep porticoes between the buttresses.

Externally, the grouping is less compact than in the previous mosque. The great arches beneath the dome had always been sustained by internal buttresses passing over the aisles, but here, probably on account of the great scale, the buttresses project

above the roofs and add a further complication to the already complex formation of cupolas and domes. They rise in steps up to the octagonal turrets over the main piers, and, while still keeping within the general pyramidal outline, they are rendered the more conspicuous by the absence of the north and south semidomes. A novelty is introduced in the great pent-roof which projects over the external galleries. Its purpose is to shelter the faithful while performing their ablutions at the series of fountains below, and it was generally adopted afterwards. For the first time, also, four minarets were erected, two in their usual position at the junction of the mosque and forecourt, and the other two, of less height, at the western angles of the forecourt.

In some respects the exterior is less successful than that of the Mosque Shah-Zadeh. The proportions are heavier, and the buttresses appear to be a mechanical expedient which has not yet been entirely brought into place with the other parts, while the gigantic scale tends to give an almost uncouth aspect to the complicated grouping of the roofs. But these are defects which appear only at close quarters, and it would almost seem as though they were due to a distortion of perspective produced by the enormous size of the building; at any rate, when viewed more distantly, the mosque crowns the hill in a most stately manner, forming one of the most perfect groups in a city of fine architectural grouping.

#### *The Ahmed Mosque.*

The next great mosque was built by Ahmed I. in 1608-14, facing the ancient Hippodrome and close to S. Sophia. In scale it is almost equal to the Suleiman Mosque, measuring 214 ft. by 364 ft.; and the forecourt is the largest in Constantinople, for its width includes the external galleries of the mosque. The mosque itself represents the highest development of Turkish planning, for not only are semidomes applied to all four sides of the central dome, and not only are subsidiary semidomes applied to all of them, but also, in three cases, the number of the lesser semidomes is three instead of the usual two. In previous mosques the third subsidiary semidome was represented merely by a wall-arch, but here the greater internal depth of the buttresses allows its full development; and further, this internal depth of abutment is articulated with piers and arches. Altogether, the mosque is covered with twenty domical forms, besides various barrel-vaults, and the interior is filled with the interest of their curving modulation up to the central dome. The four piers under the dome are gigantic fluted columns, 18 ft. in diameter, and built of marble masonry; but the circular form looks somewhat weak and lacking in rigidity, notwithstanding its enormous size. Another striking feature of the interior is the great number of windows; fifty are shown on the ground plan alone, but, together with those in the upper walls, the cupolas, and domes, there are over three hundred windows in all to light this one vast chamber.

As in all these mosques, the exterior is a faithful translation of the interior, and, as the planning is the most highly developed, so the external roofs attain their greatest elaboration. The same progression from the lesser and great semidomes up to the central dome which is essential to the interior is inversely reproduced in the pyramidal outline of the exterior, mounting to the culmination of the same great dome; while the large octagonal turrets represent the great piers, and the stepped buttresses represent the abutment-arches. As before, the main square of the plan rises above the lower galleries and porticoes, and gives a massive base for the complex group of domes. The exuberant expansion of design permeates the whole building, and not four, but six, minarets rise around the mosque, emphasising and relieving its domed mass by their own slender height. There are few Mohammedan mosques with more than four minarets, and the erection of these six led to a charge against the Sultan of wishing to vie with the Holy Mosque at Mecca.

#### *The Yeni Valideh Mosque.*

In 1615 a mosque was commenced by the wife of Ahmed I., and, remaining unfinished,

was completed fifty years later for another lady, the mother of Mohammed IV. This mosque, the Yeni Valideh Jani, differs from other mosques in situation, for it is not raised on an eminence apart, but is built on the shore of the Golden Horn, and surrounded by the business of a market-place. Although of comparatively small size, its dimensions are still very respectable. The width of the mosque is 156 ft., while the total length, including the forecourt, is 272 ft. The forecourt is of the normal type, entered by three doorways and surrounded by a cloister covered with cupolas. The mosque has semidomes on all four sides of the main dome, and each of these has two subsidiary semidomes, except at the west, where the design of the Ahmed Mosque is recalled by three subsidiary semidomes. The main piers are of a cruciform plan, and the smaller western piers are octagonal. The external porticoes and galleries and the position of the two minarets follow the arrangement of previous mosques, which had now become a settled tradition.

The same traditional quality which was observed in the planning also moulded the external form. There were hence no new problems to be solved; the possibilities of mosque-building had been explored within the limits which the Turks had set themselves, its principles had been finally determined, and the building of a mosque had in a large measure become automatic. The discontent of the artist still found a certain scope in refinements of proportion and expression, but the time of large constructive originality was over; and, for a brief period, Turkish art passed smoothly along the high level it had attained, still moving by the impetus of the past ascent. Thus the walls and domes of the Yeni Valideh Mosque were composed with the perfect familiarity of previous experience, and the later date of its building is indicated by slight changes in the adjustment of the parts and by a care for well-calculated effect, rather than by any distinguishing novelty.

#### *The Mosque of Osman.*

By the end of the XVth century the Turkish Empire had passed the meridian of its power, and the subtle relation between politics and art was reflected in a decline in energy and taste of building. For more than a hundred years no great mosque was built, and the Mosque of Sultan Osman, erected in 1748-55, shows the first sign of Western influence, a faint of the Rococo Renaissance. The scale of building is smaller than in any of the previous imperial mosques, and the plan is treated with a certain freedom which shows an effort after novelty. The forecourt is of a unique shape, the western bays being set out on a semi-decagonal form. The several bays are covered with the usual cupolas on pendentives, and the interspaces are covered with barrel-vaults. The mosque itself consists of a single great dome set on pendentives, and the most remarkable point of construction is the way in which these are carried. The weight is not taken by the solid walls, as the plan would suggest, but by four great arches which spring from piers at the angles of the mosque, the walls themselves becoming mere filling. At first sight it would appear that the arches are merely decorative, and that the walls take much of the direct weight, after all; but the tympanum are so pierced with windows that there is little strength of masonry left. The arches evidently take the weight of the dome, and they depend on the remarkably slight abutment of the angle piers. The dome is of light construction, and the piers are weighted with turrets, but the design is certainly very daring; and the dome, with an internal diameter of 81 ft. 9 in., is no plaything, being the second largest Turkish dome in Constantinople. Although the construction is still distinctively Turkish, the decoration has become an extraordinary Saracenic version of the Rococo Renaissance. Mouldings are freely used, and often with very refined profiles; but the walls of the forecourt and the interior are frittered with pilasters, and the fine simplicity of typical Turkish work has been almost altogether lost.

[\* \* Owing to the pressure on our columns this week, we are compelled to divide Mr. Reynolds' interesting paper. The remainder of the paper, and some notes of the discussion, will be given in our next issue.]



## THE QUANTITY SURVEYORS' ASSOCIATION.

An ordinary general meeting of the Quantity Surveyors' Association was held on the 6th inst., in the Commodore's Room, Holborn Restaurant, W.C., Mr. A. J. Gate, Vice-President, in the chair, when Mr. E. B. Hollis read a paper entitled, "Some Thoughts on the Quantity Surveyor—and his Relation to the Building Owner, the Architect, and the Builder."

After a few preliminary remarks, he said it had occurred to him that the quantity surveyor's relation to the principal parties with whom he was usually brought into contact, in the ordinary exercise of his vocation, might be profitably touched upon as to the restrictive title of "Quantity Surveyor," and its actual definition. He was aware that some surveyors of good repute and practice object to the prefix of "quantity" to that of surveyor, on the ground that the preparation of bills of quantities does not exclusively embrace the whole scope of the work which passed through their hands. He submitted, however, that it was because they were principally, if not altogether, men who deal chiefly with quantities as applied to the building and allied trades, that they were now fairly and rightly entitled to the distinctive designation of "quantity" surveyors, in contradistinction to the more general term surveyor, which might, and did, in many cases, cover a multiplicity of branches of the profession in which "quantity surveying" was conspicuous by its absence.

**Definition of a "Quantity Surveyor."**  
He would suggest the following definition of a "Quantity Surveyor"—

A man having, first, an expert knowledge of building construction in all its varied phases.

Secondly, knowledge of the mode of measurement of cubical, superficial, lineal, and numerical items of the various trades and artificer's work involved in the erection and completion of buildings, together with the monetary values thereof.

Thirdly, a knowledge of the particular Building Acts, or Acts, or local by-laws, which may legally govern the various stages which the building will pass through from inception to completion.

Fourthly, such knowledge of the various styles and orders of architecture and its parts as may enable him to truly describe the particular details of a work.

Fifthly, an intimate acquaintance with modern building laws and requirements, the law of dilapidations, arbitrations, compensations, light and air, and other easements with respect to public or private buildings, and the value of property for insurance or other purposes.

Sixthly, a comprehensive grasp of the nature of the work to be done, which, with strict accuracy and method in his procedure, may enable him to estimate before the builder, bills of the exact quantities of all materials and labour required to be provided, from which the cost of the particular structure which he is dealing may be clearly estimated.

In this somewhat lengthy definition he had included accuracy as a desideratum for the quantity surveyor. This was, indeed, a sine qua non of his existence. He was aware that the layman's general reading of the word "quantities" was far different from that which he had attempted to define. He said the layman's idea, but some professional men's view of "quantities" was perilously vague.

**Some Bills of Quantities.**  
He had before him a bill of quantities, not, he was glad to say, prepared by a member of that Association, or by a surveyor in London practice, in which occurred the following items—and these in a job in which the brickwork ran to between 200 and 300 rods. The first item was:—"So many yards superficial, tuck pointing to front, measured gross, including all openings."

The next item was:—"Allow to finish all other internal and external walls struck from plan."

From another bill he took the following items extracts:—

"No. 1. Digging sump hole 15 ft. deep from surface and as large as necessary to enable man to work."

They would see how beautifully the quantity surveyor had made the size of the sump proportionate to the girth of the man digging it; small man, small sump; and vice versa. Again:—

"2051 ft. sup.—73 rods nearly, 14 in. reduced brickwork in time mortar in walls and foundations, dry brick lining to sample (sic), 15 ft. deep below surface of ground not larger than necessary for working in while making."

He hardly knew what the result would be if a small man dug the hole, and then a large-sized bricklayer was turned on to finish it.

As to the quantity surveyor's relation to the building owner and the architect, as the architect in his relation to the quantity surveyor became practically the mouthpiece of the building owner, perhaps, for the sake of brevity, he might consider these two relationships together, as, whatever the quantity surveyor did in the interests of the architect, was, to all intents and purposes, in the interests also of the building owner.

**Should Bills of Quantities Form Part of the Contract?**

As a point vitally affecting the building owner, this might be a fitting place for a few words on that much-debated question:—"Should the bill of quantities form part of the contract?" This was a question which, in one phase or another, was constantly confronting them, and which was coming more and more to the front amongst members of the profession, and was one, he thought, which claimed their earnest attention, with a view to having it settled in some way, upon a more common-sense and less haphazard basis than at present obtains. In cases where the bills of quantities were part of the contract, the employer's main grievances, he took it, were these:—That, until the building was complete, and the accounts had been adjusted, some uncertainty—varying, of course, with the magnitude, etc., of the structure—existed as to the exact amount he was spending upon it. This was, of course, from the point of view of the business man, not only a novel, but an eminently unpleasant, situation. He could order a yacht or a motor-car, and know exactly the amount of the cheque he would have to draw in exchange for either. But, should he decide upon building a house, he must be satisfied with a more or less approximate estimate, which could only be replaced by an exact figure upon the completion of the building. And, in cases where a limited sum only was available for this purpose, it might conceivably be the case that great inconvenience might arise when, upon an adjustment occasioned by a "shortage" in the original bill of quantities, an extra sum of money was called for to meet such a contingency. When the quantities formed part of the contract, the employer paid a fair price for what he obtained, and would receive a credit for any items which might have been taken "full" in the original quantities. So that, upon the whole, there did not appear to be any justifiable cause of complaint upon his side. Of course, the usual business risks he must take in any case, such as the builder's failure before the completion of the contract, with its very serious inconveniences; then workmen's strikes were always an unknown quantity, and might arise at any moment—so to speak—causing delay in the carrying out of the works, and frequently (as in the case of a large factory) very substantial monetary losses and inconvenience.

Until quite recently the opinion was held by many, besides himself, that it was the builder who benefited by the system, as he would be free from any risk of loss in consequence of the lack of skill in, or by any negligence on the part of, the quantity surveyor; inasmuch as any errors which appeared in, and any omission from, the bill of quantities would be rectified. In view of a judgment in the recent case of *Patman & Fotheringham v. Pilditch*, in which it was held that an omission from a bill of quantities was not an error, and was not capable of being rectified under clause 12a of the R.I.B.A. Conditions of Contract, they would probably agree that a case might frequently arise in which a builder would hesitate, if not positively refuse, to sign a contract of which a very indifferently prepared set of quantities formed a part.

The correction of casual errors was one thing; but, occasionally, it might be necessary for a builder or his representative to endeavour to convert a bad set of quantities into a good one, and to measure many items of labour which an inefficient surveyor, for instance, would neglect to measure. His own opinion was that making the quantities part of the contract would ensure a more thorough consideration of doubtful points in the specification and plans, and lead to the weeding out of any doubtful point in either—a consummation devoutly to be wished.

**Writing of Specifications.**

Another point of interest to the profession was the writing of specifications. An archi-

tect, who should see in his mind's eye his ideas complete, with all its variety of material, form, and colour, not only in the shell of his creation, but in the finishing thereof, was, of course, the proper person to describe what he wanted. Many architects, however, could not give the time to go so far into this branch of their profession, and were content with jotting down notes of the principal points they desired embodied in the specification, leaving the elaboration to the quantity surveyor. When one was in the habit of constantly working for an architect, his various mannerisms and wishes soon became familiar to the surveyor, who could then draw the specification without much danger of many, at least serious, errors of omission or commission. Some architects, on the other hand, favoured them with a too full specification, in which one paragraph nullified another, and perhaps both were at variance with the drawings. Of the two evils, most of them would prefer the former.

**Conditions of Contract.**

Perhaps reference might also here be made to the conditions of contract. It was not even now unusual to find a form issued containing a long series of clauses, traditional in their arrangement and spirit, which probably had been learnt by heart by the pupil, and subsequently adopted by him, when he became a principal, without any very thorough analysis of their meaning, and which were made to do duty indiscriminately to all works as they came to hand, under any and all circumstances. In a form such as he had alluded to, the clauses were, in many cases simply repetitions, and repeated themselves with nauseating monotony. A clear form of contract greatly facilitated the settlement of the account, more especially in its relation to the question of penalties.

**The Architect and the Surveyor.**

As by virtue of the architect's authority the quantity surveyor was most often directly employed by him, it resolved itself into the ordinary business instinct, that, so far as possible, he, the quantity surveyor, should save the architect as much trouble as he possibly could. And it might thus frequently happen that in his "taking off" many items, perhaps not indicated in the specification, and often but vaguely by the plans, would present themselves. It was here that the practical knowledge of the quantity surveyor would have scope. A list can be prepared of what might have been taken under such circumstances, and at the conclusion of the "taking off," perhaps one interview between the architect and the quantity surveyor, provided with such a list of notes and queries, would be sufficient to clear all doubts, and then, so far as the dimensions went, all would be plain sailing.

There were subsidiary, but important, matters, too, in which the surveyor's advice and training might be of service, and should, of course, be tendered to the architect. He referred to the complex legal questions which might, and did, crop up. Again, in erecting a new building or buildings upon a site already covered with old structures, the question arose as to the best way of preparing the site for the new works. This, if a work of any magnitude, would resolve itself into one of two alternatives, viz., (1) If the whole of the old materials were cleared away; (2) if a portion of the old materials might be used in the new works. In the first case the works, in pulling down, might be measured floor by floor, beginning with walls, then floors, roof, then the finishings, doors, windows, etc. This, carefully done, with an inner column showing the credits for the several items, was, in his opinion, the fairest system in which this part of the work could be arranged. In the second case, a bill, such as he had indicated, would still give the work to be done in pulling down and clearing away, whilst the credit value would appear in the reduced rate for the concrete, brickwork, etc., in which the old materials might be re-used. Of course, there were other ways in which these pulling-down works might be treated, such as tenders from house-breakers, or by daywork upon a schedule. This latter course did not, however, commend itself to him, more especially as the house-breaker's trade was carried on in a large way by solvent and responsible firms.



*The Quantity Surveyor and the Builder.*

As to the relation of the quantity surveyor to the builder, it was a simple truism to say that the modern builder was well able to look after himself. With his modern system of checking the quantities with his returns, whether from merchant, yard, shop, or foreman on job, any "shortage" stood a poor chance of not seeing the light.

Another, and not infrequent, cause of difference between the builder and the quantity surveyor was the insufficiency of the description of some of the items appearing in the quantities. As they were aware, owing to various causes, the drawings were frequently not placed in their hands until about the time when it was expected that tenders would be invited, or, at all events, somewhat near that period. The consequence was an inevitable rush at high pressure to expedite the preparation of the bills, which were then, in some cases, prepared from very incomplete details and rough notes only as a basis for the specification. Thus, under the circumstances, some conflict between the builder and the surveyor might not unnaturally be expected to arise, but with tact, and doubtless the exercise of the "give and take" spirit, matters, unless of a very grave nature, could generally be amicably adjusted.

*Pricing of Items not in Quantities.*

Another matter which might be referred to was the pricing of items which did not particularly appear in the quantities by reason, perhaps, of a section of, say, a cornice or architrave, as drawn and taken, being substituted by perhaps a larger one for some sufficient reason of the architect. Recently I had a case in which the architect altered the whole of his small architraves by using a 3-in. by 2-in. section instead of the 3 in. by 1 in. as shown by the original details, and, of course, as taken in the quantities. There was a considerable quantity of this particular item, both straight and circular, in deal and pitch-pine. In the hurry of the job, no price was agreed with the builder for this extra, and in his account he claimed just double the contract price of the original section for the larger one, contending that, as the superficies of the section was twice that of the one he had priced, he was entitled to the same proportion of rate for the larger size. This, of course, from that gentleman's point of view, was strictly correct, and, financially, most satisfactory. The builder, however, eventually saw that, although the section of the material was doubled, such was not the case with the labour involved in preparing and fixing it, and terms were agreed upon a somewhat more reasonable basis.

*Measuring Works in Progress.*

Another, and, in some cases, most onerous duty of the quantity surveyor was the measuring of works in progress, for the amount of the certificate. Too much care could not be taken in this, more especially if there should have been any serious alterations in either the details or the materials used in construction, both of which contingencies might have arisen from circumstances familiar to them all. In buildings which were being carried out in different portions as they might be required, the labour involved in measuring for certificates might easily be very great, and much responsibility rested upon the surveyor in arriving—and that with more or less rapidity—upon the amount that could justly be certified for, which generally fell short of that expected and asked for by the builder.

*The Association, and Accuracy of Bills of Quantities.*

Mr. Hollis then alluded to a clause in their Articles of Association to which he drew the attention of all connected with the building trade, i.e., clause 13, which explicitly stated, "That any member of the Association who shall supply bills of quantities holds himself responsible for their accuracy, and to pay for all losses caused by his errors therein." With all sincerity he said that, in his experience, he knew of no other body of professional men having had the honesty and courage to voluntarily bind themselves to recoup any losses arising from their mistakes, and this clause alone was one which made the Quantity Surveyors' Association deserving of the best support of all

those who desired equity in their business dealings. As hon. secretary of the Association, it had come to his knowledge that certain London members of the profession had withheld application for membership by reason of the existence of the above clause. What good reason could there be for their hesitancy? Many of these same gentlemen, when taking up an appointment as quantity surveyor to the London County Council, or other corporate body which insisted on the financial responsibility of those they employ, did not hesitate for one moment to commit themselves by written contract to such a guarantee as clause 13 implied. Surely no gentleman of the profession, having been guilty of an error in the preparation of his bills, but would elect to be judged by a tribunal of his expert brethren, rather than at the hands of a jury of laymen.

*The Builder, etc.*

He assumed that at the beginning of the job, when the trenches, concrete, and footings exceeded in depth and width—owing to some unforeseen circumstances—the measurements shown on the plans, that their measurements of the actual work were checked and initialed in their dimension book by the builder's authorised representative. If the extras and omissions should be fairly large in proportion to the size of the job, there would doubtless be a surveyor on the builder's behalf to meet them, a course of which he much approved for the reason that there was less likelihood of the necessity for worrying the architect, and that the builder, whatever the result to him, would perhaps be the more satisfied. However, whether a surveyor appeared for the builder or not, he again pleaded for scrupulous accuracy in figures and in description. The clearer the latter the more easily would the pricing be done. There would, of necessity, be many items dissimilar to those in the priced original bills, but a keen surveyor, with a desire for absolute fairness, would not have much difficulty in approximating a price, which, when once fixed after due deliberation, should not be lightly altered. The final adjustment of the account was a comparatively simple matter, and if the surveyor throughout this trying time had to himself been true, and brought to his work industry and integrity, then, whatever the result, whether a grumble from the building owner, the architect, or the builder, he, at least, should feel satisfied with his work, and know that his fees had been well deserved and hardly earned.

He did not purpose going into the question of the desirability of having quantities taken out for any proposed works. He thought that question had long been settled in the affirmative by those in a position to know best, and now our leading architects were the first to insist upon the practice in justice to their clients.

The builders, of course, had, as business men, always looked upon a good bill of quantities as a safeguard and a protection, and it was now for only very insignificant matters that a firm of standing would give an estimate in competition where the quantities had to be taken off by themselves.

*Preparation of Quantities Outside London.*

As to the difficulties of a quantity surveyor when called upon either to prepare or adjust a bill when the work lies outside the domain of London practice, as they were well aware, the differences in the mode of admeasurement of many items of work in the north, and London, and the south generally were varied and curious. And this divergence was not confined to one or two trades only, but extends to most of them. Uniformity in measurement was, he believed, making some progress throughout the profession, but a great deal remained to be done before even the London quantity surveyors agreed as to the best manner to place before the builder that standing dish of dispute—the bills of labour and materials of Bath, Portland, and other stonework. Generally their own practice and experience would tell them the system which would enable the estimator to best grasp the amount of labour involved in producing certain results; and with that, until some more hard-and-fast lines were laid down by some or the other authority, they must be content, always adhering to that fundamental principle that accuracy in all matters would earn its own

reward, and that this aim, carried to the legitimate end, would produce a bill of quantities, the primary object of which was to facilitate and expedite the calculation of the probable cost of the building, for, as their motto had it, "For which of you intending to build a stithet not down first and counteth the cost."

The Chairman, A. J. Gate, F.S.I., in inviting discussion, said that the Association numbers 150 members; in response to advertisement the hon. secretary had received eighty-three applications for the Syllabus, and already eighteen gentlemen have expressed their intention of sitting for the forthcoming examinations. Arrangements have been made to hold simultaneous examinations in South Africa, where there are members and numerous applications to sit for the examinations. A sub-committee on Professional Practice has been formed, and the hon. secretary will be glad to hear from any member who desires the advice or opinion of the Committee on any points arising in their practice. As a proof that the Association was exercising an influence for good, the hon. secretary had lately been advised that the Northern Quantity Surveyors were meeting in conference an Architectural Association in that locality to formulate a uniform scale of fees which should be mutually satisfactory.

On the motion of Mr. A. G. Cross, seconded by Mr. W. W. Barber, a hearty vote of thanks was accorded to Mr. Hollis for his paper, and a brief discussion ensued in which Messrs. C. J. Mann, T. W. Biggs, C. R. Mitchell, G. A. Orits, and H. B. Sanders took part. Several speakers referred to clause 13, and pointed out that there was no guarantee to the building owner on the employer's part that the surveyor would pay for any errors he was responsible for in his quantities. The surveyor might be a man of straw and without bond-holders, for instance, or some security, the employer was not benefited by the clause. A young surveyor might have the misfortune to make a serious error, or his clerk might make a mistake which passed notice, and what guarantee was there that that surveyor could pay 1,000l. on so? The Chairman stated that the penalty so far as the Association was concerned, was that a member would be expelled if he failed to comply with the rule. A member replied that to expel a member for a mistake seemed rather hard, and he thought that the penalty for a mistake should be governed by the extent of the fees received, and if there were mistakes on the other side they should be set off against the surveyor's mistakes.

Mr. Mann said he was not in favour of going beyond the law in the matter of errors in quantities, and those who were taking up the other position were making a special contract to do something which the law did not wish them to do. However, surveyors did not wish to repudiate their responsibilities for errors.

Another point touched on was the small percentage at which some surveyors did work—at unfair prices, and with results which were often seen in the bad work done.

Mr. A. G. Cross remarked that he considered making the bills of quantities part of the contract was an evil system, inasmuch as it tended to lower the status of the quantity surveyor. There should be a proper scale of fees applicable to the different classes of work with which they had to deal, and the Association was giving this question their attention.

A member observed that the sooner the quantities were ordered and paid for direct by the employer the better, as it would prevent the work of one architect getting into the hands of a firm of quantity surveyors who might, in time of pressure, "farm" it out and become sweaters of the worst type.

Mr. C. R. Mitchell said that in America the system of obtaining substantial bonds from the builders for the due performance of their obligations was general, and he remarked that the difference between "error" and "negligence" in a bad bill of quantities was very shadowy.

On the motion of Mr. H. Englan seconded by Mr. H. W. Crickmay, the discussion was adjourned, and a vote of thanks to the Chairman, proposed by Mr. Wall, Lawrance, brought the proceedings to close.



## CAMBERWELL SCHOOL OF ARTS AND CRAFTS.

The annual exhibition of students' work at the Camberwell School of Arts and Crafts, Peckham, was opened on Tuesday last, and will continue open till the 18th inst. The Exhibition consists of a great deal of very ordinary work, showing much painstaking effort, and, as such, worthy of commendation, but in many cases scarcely of sufficient interest to justify public exhibition. Here and there work of a higher order attracts our attention, and, doubtless, a little art is better than no art at all.

A few architectural designs are exhibited. That for a country house is creditably planned and well drawn, though the circular room pillars shown as mullions to some of the windows would hardly have a good effect in reality. The other designs, and also the sheets of masonry and building construction work, are disfigured by poor printing. The art of lettering is taught to a number of students of the school; it seems a pity that it cannot be extended to include other classes, including those for architectural students.

The woodcuts shown are interesting, and a few of them clever, notably those by Messrs. Wakefield and Waters. The costume studies in pencil and chalks show good work. Mr. Purvis, jun., has a promising sketch of a typical landlord of the old school. The execution of the silversmiths' work is good, although some of the ornaments tend towards the barbaric, and the shapes of the candlesticks and goblets exhibited can hardly be described as graceful, though quite in accordance with the present style of such art-work. The black-and-white work is interesting, though few of the drawings are free from that amateurish touch which almost necessarily stamps the work of the young student. Some initial letters, by Mr. D. F. Wood, and a German song-book cover, by Mr. I. W. Campbell, show clever handling. The set of designs for a pack of playing-cards, by Mr. V. B. Kell, is one of the best things in the show, and the same student exhibits a good design for stained glass. The executed specimens of stained glass are well above the average. A number of works in embroidery, lithography, figure-modelling, etc., are also on view.

## THE TRIBUNAL OF APPEAL UNDER THE LONDON BUILDING ACT:

GOVERNORS OF GREY COAT HOSPITAL, WESTMINSTER, v. THE DISTRICT SURVEYOR OF WESTMINSTER.

On Tuesday the Tribunal of Appeal, consisting of Messrs. J. W. Penfold, A. E. Gruning, and A. A. Hudson, sat at the Surveyors' Institution, 64, George-street, to hear an appeal made by Mr. Osborne Smith on behalf of the Governors of the Grey Coat Hospital, Westminster, under sect. 78 of the Act against the following requirement of Mr. E. Drury, District Surveyor, by his letter to Messrs. W. Lishon & Co., Ltd., on November 10, in regard to certain proposed additions to the Grey Coat Hospital, viz., separate means of exit of the width provided in sect. 80 (b and c) communicating directly with the street or open space must be provided from each floor or level, and that all doors and barriers must be made to open outwards, and no outside locks or bolts must be affixed thereto. Mr. Trolllope (Trolllope & Winkworth) appeared for the Grey Coat Hospital, and Mr. Godfrey, of the Solicitors' Department of the London County Council, represented the District Surveyor.

Mr. Godfrey drew attention at the outset to the notice to the County Council, which stated that an appeal would be made under sect. 78 against the requirements of the District Surveyor under sect. 80. He wished it made clear under which section they were proceeding.

The Chairman said they had better first hear the case of the appeal.

Mr. Trolllope said the Governors of the Grey Coat Hospital had entered into a contract for the building of a new wing at the east end of the school building in Rochester-row. The school buildings were surrounded with a high wall, and were quite distinct from the street. The plans of the proposed building had been approved by Mr. Felix Clay, the Advising Architect to the Board of Education, but the District Surveyor had now raised difficulties with regard to staircases, but the Governors asked the Tribunal to allow them to proceed. It was a very old school, and the wing on the west side had been built before the Building Act was passed. He objected to the District Surveyor's requirements on the ground that clause 80 only applied to public buildings,

but in the case of this school it was not a public building, and the public had no right to come into the place.

Mr. Hudson said that, as he understood it, the notice was given under sect. 80.

Mr. Godfrey said the notice was given under sect. 78, and then it went on to say that the appeal was against the order of the District Surveyor under sect. 80. The fact was that the reference in the surveyor's notice to sect. 80 was merely gratuitous, and was only for the appellants' information as to the sort of building required. He did not state that the building came under sect. 80.

Mr. Osborne Smith gave evidence, and said that what they appealed against was as to the reasonableness or otherwise of putting a second staircase into a secondary day school for girls, which consisted of small classrooms to a great extent. Was it reasonable to make them put a second staircase from the second floor leading to the playground? He interpreted the District Surveyor's requisition to mean a stair on the second floor to discharge into the playground, which was to be an entirely separate staircase not communicating with any other parts of the building. This was a three-story building, and he took it there was to be another staircase from the first floor also discharging into the playground.

Mr. Godfrey said that what the District Surveyor wanted was a separate staircase from the second floor. The staircase already provided was sufficient for the first floor if it communicated directly with the open space.

Mr. Smith said he had provided a concrete staircase 4 ft. 6 in. wide from the second floor, and he contended that this was sufficient for 136 children. What the District Surveyor wanted were two staircases which should have no communication between them. The school was only used during the day from 9.30 to 4 o'clock. The science room on the top floor was of fire-proof construction with a concrete floor, and the staircases from first and second floor passages were also of concrete. The other floors were of wood and plaster ceilings. There would be little artificial lighting. If the District Surveyor's requirement was carried out there would be no intercommunication inside the building, and a person to get to the second floor would have to come out of the building and go up another staircase.

Mr. Godfrey said there would be no objection to the internal staircases going to the top if it was made smoke proof on the top of the first floor. All that was wanted was a further means of escape in case of fire.

The Tribunal examined the plans with Mr. Smith and Mr. Drury, and pointed out where it would be possible to place an external staircase from the second floor; and the parties agreed to confer together with a view to deciding on details. The parties also came to an agreement with reference to the doors.

## WESTMINSTER CITY COUNCIL.

The usual fortnightly meeting of this Council was held on Thursday last week at the City Hall, Charing Cross-road, S.W.

**Cleaning and Repairing of Stonework.**—The General Purposes Committee reported having received from the City Engineer a report that some part of the coping outside this Hall had fallen away. The committee had instructed the engineer to examine and report upon the condition of the whole of the stonework, and to obtain tenders for any extensive repairs which might be necessary. The Committee submitted certain tenders, which will be found in another column, and the Council agreed to accept the lower of the two estimates.

**Disinfecting Station.**—On the recommendation of the same committee the Council agreed to pull down certain of the houses in Arneway-street for the purpose of erecting a disinfecting station on the site.

**Wardour-street Improvement.**—The Improvements Committee recommended, and it was agreed, that the Council should lay down an improvement line for the widening of Wardour-street on the west side to a minimum width of 50 ft. throughout its entire length, with a view to the widening being carried out as individual premises are pulled down, and that the London County Council should be asked to contribute to the various sections of the improvement.

**Site for New Library.**—In view of the fact that the lease of the Trevor-square Library expires in 1912, the Public Libraries Committee were requested to take the necessary steps towards securing a site for a new library in the Knightsbridge District.

**BUILDERS' BENEVOLENT INSTITUTION.**—We have been asked to state that at the recent dinner of this Institution Mr. H. H. Bartlett (Perry & Co.) contributed 30l., and Mr. James F. Parker (Patman & Fotheringham) collected 120l. on his steward's list.

## Fifty Years Ago.

FROM THE BUILDER OF DECEMBER 8, 1855.

## REGENT-STREET.

NASH, poor man, confiding on a greater amount of Communist tendency than is ever likely to animate the breasts of any four or five neighbours, grouped many a set of four or five houses, so as to make believe that they were each of them denizens of so many Egyptian, Greek, Roman, or Italian palaces. It is no use now, so far as Regent-street is concerned, discussing whether such make-believe combinations were wise or not; they exist, and must for the present be accepted as "*faits accomplis*." Let us suppose Brown, Jones, and Robinson, to whom we may add Smith and Green, to be in occupation each one of a fifth of one of these Palazzi or Propylons, as the case may be, and then let us trace what becomes of what no doubt Nash described to George IV. as a capital idea for obtaining a "grand unity of effect." Brown, No. 1, is a model tradesman, who puts scarcely anything in the windows, who accepts his tenement *in toto*, and whose pride it is to maintain it in exactly the same stone-coloured condition in which he received it from the "party" of whom he took the business some twenty years ago. Jones, No. 2, is of quite a different stamp: he only took his present house in the fancy trade some two years since. The little windows of the propylon would not do for his goods, not they; so the first step is to put in a new front, chosen regardless of expense, with plenty of gilding, plate, and looking-glass, and abundance of Louis Quinze scroll-work, with a blazing inscription, recording the name of Jones and the articles he deals in, such as may be read nearly from one end of the street to the other.

Robinson, No. 3, is known in the street as a business man; he despises what he calls Jones's flash; his new front is all substantial and serious—no putty and gilding, but all solid brass and mahogany, with the heaviest Roman mouldings. Poor Smith held No. 4 for a few months only. After the first few weeks he commenced those "alarming sacrifices" which filled his shop with customers for a month or two, and after a month or two with creditors. His affairs go into the lawyers' hands; his shutters are shut; and his landlord's affairs having become deranged, owing to his having advanced Smith money, so they have remained for the last two or three years—dirty, dinginess, and "melancholy having marked" No. 4 "for their own." No. 5 is Green's "well-known Emporium of Commerce." As a corner house, it stands conspicuous in the street, and bristles with activity. Green's own establishment is a little bit of the Boulevards suddenly dropped amongst us. Has not the clever Celestine Dentelle made the most of the first floor, with her "modes" and "bric-a-brac," her neat little muslin blinds, and conspicuous bonnets? Are not the rooms above, the celebrated "billiards," to which London and foreign flats and sharps resort to waste their money in mysterious communications on the subjects of "le sport" et "*les sweepstakes*?" Thus, while our friends Brown, Jones, Robinson, Smith, and Green struggle with the world, what becomes of poor Mr. Nash's palace or propylon? and by multiplication of ditto-dittos, what becomes of the aspect of Regent-street and our unfortunate street architecture altogether?

## Illustrations.

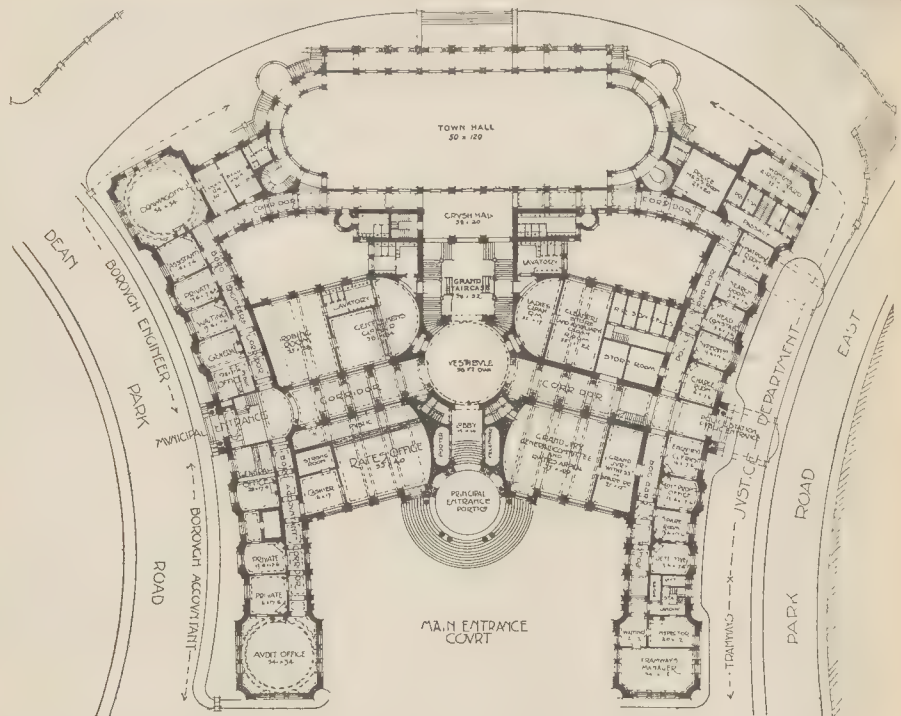
## DESIGN FOR PROPOSED MUNICIPAL OFFICES, BOURNEMOUTH.



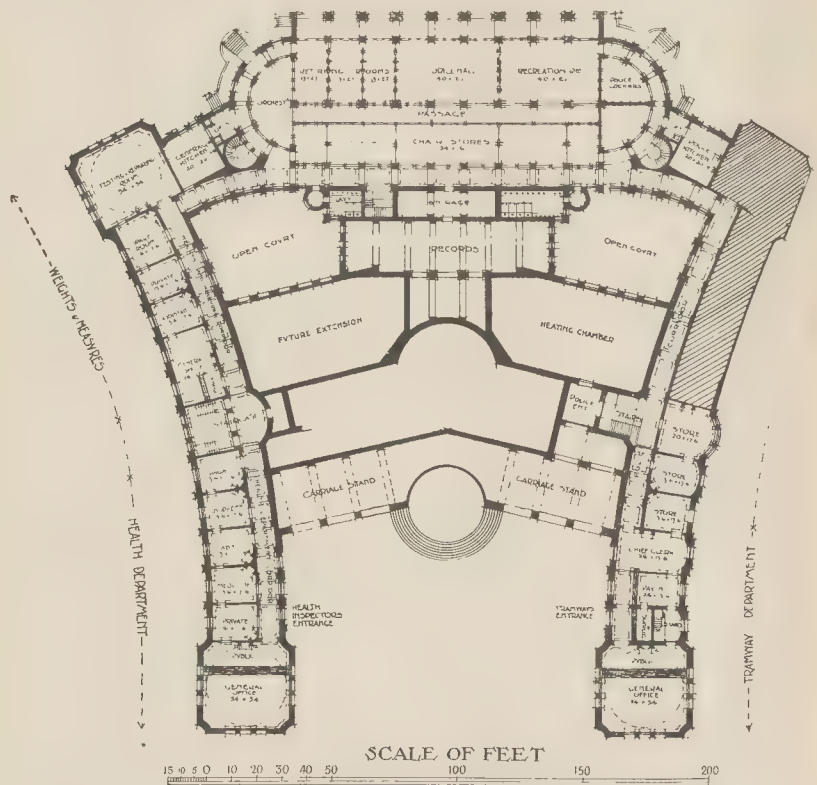
PAMPHLET containing a small-sized illustration of this design, with a description of what is proposed, was sent round to the Press a week or two back, but we preferred to wait till we could get the original drawing from Bournemouth to reproduce it in a manner more worthy of the fine quality both of the drawing and the design.

The architectural treatment and the drawing are by Mr. C. E. Mallos; the plan is made in collaboration with Mr. Lacey, the

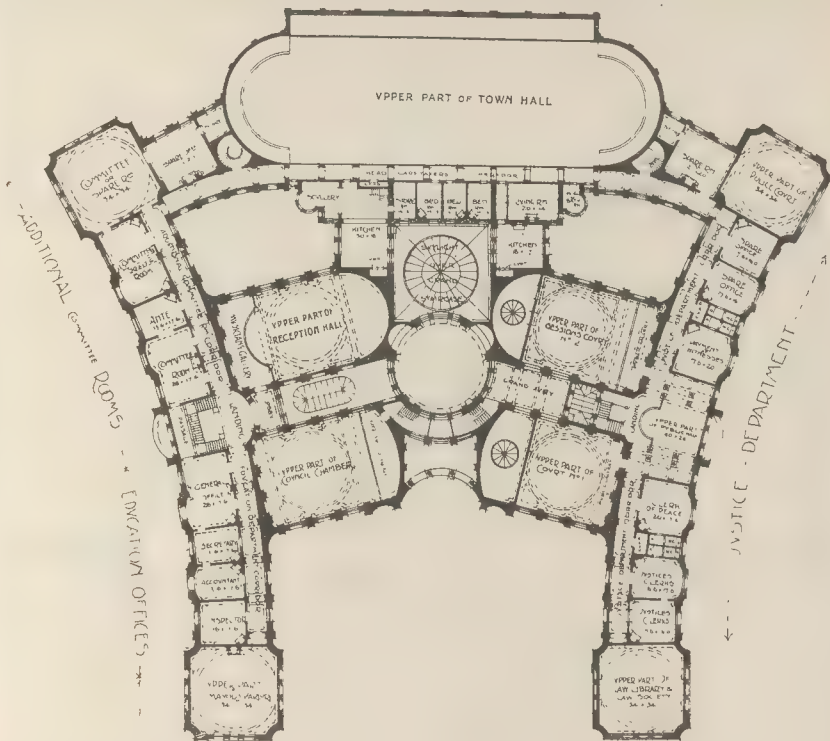




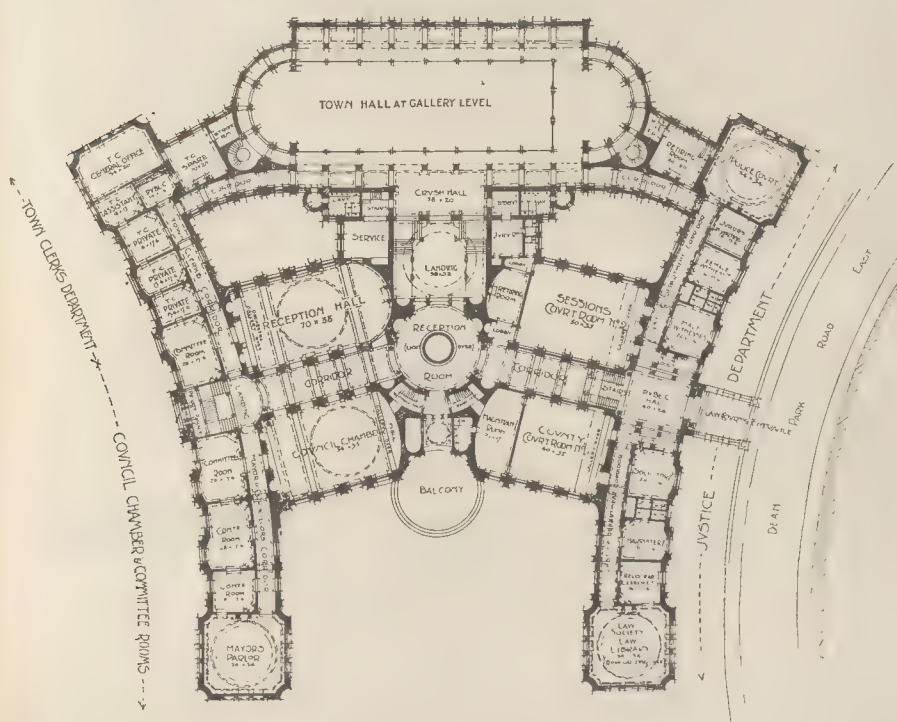
Lower Ground Floor (Level with Dean Park-road West).



Basement at Old Christ Church-road Level.

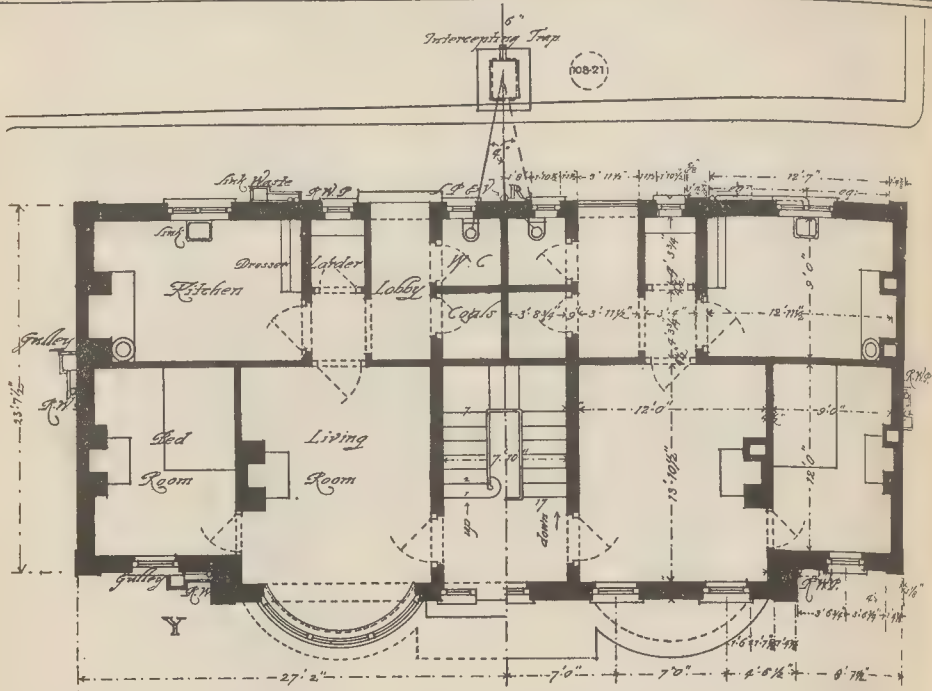


First Floor.



Upper Ground Floor (Level of Dean Park-road East).





Ground Plan.

First Floor Plan.

Almshouses, Wood Green: Plans of One Block.

Borough Engineer. The guiding principle of the plan was that its general form should be determined by the outline of the site; and the following out of this idea has led to the evolution of an exceedingly fine and architecturally effective form of plan, which arises naturally out of the conditions of the site.

The varying levels of the ground have afforded an opportunity (which is quite unique) of planning a building in such a manner that three distinct ground floor levels are obtained, each with a separate entrance

Christchurch-road is occupied on the west by the offices of the Health Department, and on the east by the tramway offices and a portion of the Police Department.

At Mr. Mallows's request we omit the sections, as it is intended to make some modification in them. We give the four plans.

We think the design as a whole one of the finest architectural conceptions for a Town Hall that we have seen, and we hope it may be carried out.

#### ALMSHOUSES AT WOOD GREEN.

THESE buildings were erected for the Charity Trustees of S. Leonards, Shoreditch,

at a cost of between six and seven thousand pounds.

The materials employed were Lawrence's red bricks for the general facings, and Eureka green slates for the roofs. The iron railings and gates and the sundial were supplied by Messrs. T. Ealey & Sons. The cartouches in the pediment of the front building containing married couples' quarters was carved by Mr. W. Hearn.

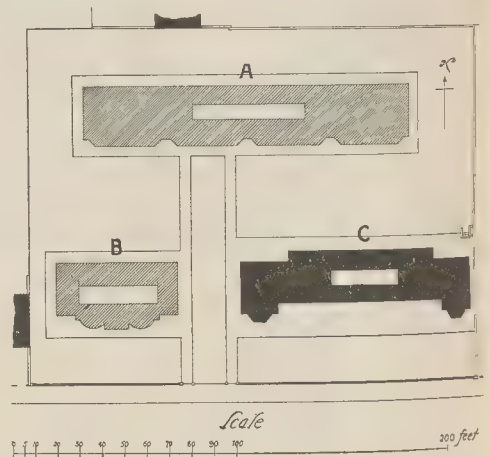
The general contractor was Mr. C. Gray, Hill, of Coventry, and the architect Mr. Alfred W. S. Cross.

We give a block plan showing the general disposition of the buildings on the site, and the detailed plan of block B, which is the subject of the lithograph illustrations.



Sun dial at Almshouses, Wood Green.

from the street. Thus the ground floor level of the Municipal Buildings is placed in Dean Park-road West, that of the Law Courts in Dean Park-road East, which level becomes the upper floor of the Municipal Buildings on the other side. The ground floor level of



Almshouses, Wood Green. Block Plan.

A. 26 tenements for single persons. | B. 4 tenements for married persons. | C. Existing almshouses.

## COURT OF COMMON COUNCIL.

The Lord Mayor presided over a meeting of the Court of Common Council at the Guildhall on Thursday last week.

**Rate Works.**—On the reference of the 16th ult. relative to the London Unemployed Fund, as to putting in hand works of public utility during the coming winter, it was agreed to take steps to expedite any paving or other works which may be in contemplation.

**Gas v. Electric Lighting.**—The Streets Committee presented a report in connexion with a scheme agreed to in May last for lighting Lower Thames-street and Monument-street by means of incandescent gas under high pressure. The committee also submitted a report from the City Engineer for extending the improved lighting at an increased initial cost of 135l. 6s., entailing an additional annual sum of 11. 8s.—Mr. Deputy White asked whether the electric lighting committee had been afforded an opportunity to replace their old electric lamps with those of a more improved kind.—Mr. Saqui said the electrical engineer had stated that, if the electric lighting company was permitted to adopt up-to-date apparatus the gas companies could not compete successfully with electricity.—Mr. Morton, in connexion with the London Electric Lighting Company had had every opportunity of improving its methods of street lighting, but for the last ten years it had done nothing.—The committee's recommendation was carried.

**Paving Works.**—It was agreed, on the recommendation of the Streets Committee, that the contract with the Val de Travers asphaltic Company for repaving in footway of Nicholas-lane, between King William-street and Cannon-street, be cancelled, and the present York stone be maintained. Also that the Improved Wood Pavement Company be called upon to maintain the carriageway pavement of Fleet-street, between Bourne-street and Temple-bar, for a period of five years from January 1 next at 1s. 6d. per yard super per annum, in accordance with the terms of their contract. And that the wood pavement of the Old Bailey be kept in repair pending the rebuilding of the Sessions House by the same firm.

**Store-rooms and Dwellings.**—The Bridge House Estates Committee were authorised to erect store-rooms and dwellings for the Superintendent Engineer and Town Bridge-master on land at the southern approach to the Tower Bridge, at an estimated cost of 2,600l.

**Widening of Fleet-street.**—The Improvements and Finance Committee brought up a report relative to the improvement of Fleet-street, and recommending that a formal adjudication be passed to acquire the ground needed to widen the public way in front of No. 59, Fleet-street.—This was agreed to.

**Inscription on the New Sessions House.**—Mr. Deputy Ellis submitted the report of the City Lands Committee on the question of the inscription at present appearing upon the New Sessions House, and also the name appearing on another part of the building; and recommending—(i.) That the inscription "Defend the Children of the Poor and Punish the Wrong-doer," be retained. (ii.) That the new building be called the "Central Criminal Courts."—Mr. Williamson moved that the inscription be removed, and the words "Central Criminal Courts" substituted therefor. After a long discussion the amendment was lost, and the Committee's recommendation carried.

## THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, Sir E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee it was agreed to lend Hammersmith Borough Council 4,400l. for public library; the Royal Borough of Kensington 11,500l. for housing purposes; Poplar Borough Council 1,817l. for paving works; and Woolwich Borough Council 7,500l. for electric light installation. Sanction was also given to Woolwich Borough Council to borrow 820l. for electric lighting purposes.

**Plans of Proposed New Schools, etc.**—The Education Committee reported as follows:—

The Board of Education on May 27, 1902, sanctioned the erection of a school for the accommodation of 80 children on a site in sub-division K of the West Lambeth (School Board) division, and compulsory powers were subsequently obtained over a site in Lawn-lane (Kennington). The plans for the accommodation as specified below.—Boys, 25; girls, 266; infants, 256; total, 798. (School planned for enlargement.) Halls—Boys, girls, and infants, 40 ft. 6 in. by 11 ft. Three-story building.—Classrooms—Boys, 48, 40, 40, 40, 40, 40, 48, 48, 48. Drawing classroom and science room—600 sq. ft. Area of playgrounds—Boys, 50 sq. ft. per child; girls, 54 sq. ft. per child; infants, 27 sq. ft. per child. It is also proposed to erect a schoolkeeper's house. The total cost of erecting the school is estimated at 19,690l.

per child; girls' and infants', 27 sq. ft. per child, including girls' playground on top of building. It is also proposed to erect a schoolkeeper's house. The total cost of erecting the school is estimated at 20,332l.

The Board of Education on August 6, 1901, sanctioned the erection of a school for the accommodation of 800 children in sub-division AQ of the West Lambeth (School Board) division, and compulsory powers were subsequently obtained over a site with a frontage to Garratt-lane, which is known as the Fountain-road site (Wandsworth). The plans provide accommodation as specified below.—Boys, 275; girls, 275; infants, 280; total, 830. (Schools planned for enlargement.) Halls—Boys, 57 ft. 9 in. by 26 ft. 6 in.; girls', 57 ft. 9 in. by 26 ft. 6 in. (Two-story building.) Classrooms—Boys, 50, 45, 45, 45, 45, 45; girls', 50, 45, 45, 45, 45, 45. Drawing classroom and science room, 600 sq. ft. Area of playgrounds—Boys, 50 sq. ft. per child; girls' and infants', 70 sq. ft. per child. It is also proposed to erect a schoolkeeper's house. The total cost of erecting the school is estimated at 21,414l.

The Board of Education on July 27, 1901, sanctioned the erection of a school for the accommodation of 800 children in sub-division AR of the West Lambeth (School Board) division, and compulsory powers were subsequently obtained over a site in Franciscan-road (Wandsworth) for the purpose. The plans provide accommodation as specified below.—Boys, 256; girls, 256; infants, 252; total, 764. (School planned for enlargement.) Halls—Boys, 55 ft. by 26 ft. 4 in.; girls', 56 ft. by 26 ft. 4 in.; infants', 54 ft. by 26 ft. 6 in. (Three-story building.) Classrooms—Boys, 48, 48, 40, 40, 40, 40, 48, 48, 48. Drawing classroom and science room, 600 sq. ft. Area of playgrounds—Boys, 51 sq. ft. per child; girls', 54 sq. ft. per child; infants', 27 sq. ft. per child. It is also proposed to erect a schoolkeeper's house. The total cost of erecting the school is estimated at 19,690l.

The Committee also recommended:—

That the estimate of expenditure on capital account of 1,562l., submitted by the Finance Committee in respect of the preparation of working drawings etc. in connexion with the schools proposed to be erected on the undermentioned sites, be approved:—(a) Kennington—Lawn-lane (new school). (b) Wandsworth—Fountain-road (new school). (c) Wandsworth—Franciscan-road (new school). (d) Poplar—Lancet-street (special school). (e) That expenditure on capital account, not exceeding 1,562l., in respect of the preparation of working drawings etc., in connexion with the schools proposed to be erected on the sites named in the foregoing resolution be sanctioned.

Mr. McKinnon Wood said that the approximate estimate of cost of erecting the three new day schools worked out at 25l. 0s. 8d., 26l. 15s., and 24l. 12s. per head respectively. This was really the beginning of the Council's school-building operations, and, in the near future, these operations would be on a large scale. A large number of non-provided schools were unsuitable, and they would have to find fresh school places. He thought they should have some report on the subject so that the Council could give an intelligent vote on the matter.

Mr. Melville Beachcroft moved, and Mr. H. P. Harris seconded, that the recommendation be referred back in order that the Committee might report as to the rules which had hitherto governed the planning of new schools, as to whether any alteration thereof is desirable or practicable, with a view to greater economy of construction.

The Rev. A. Jephson said it was no good building in a cheap and nasty style, for many of the non-provided schools which, since 1870, had been built cheaply, were now in a deplorable condition.

Sir W. Collins said that they did not want to go back to the old jerry-built schools of past days. He would give the information asked for, but he could hold out no prospect that these new schools would not be required.

The amendment, on this understanding, was withdrawn, and the recommendations were postponed.

**The Works Committee.**—The Education Committee reported, further, as follows:—

"The Council on May 23, 1905, approved an estimate, amounting to 3,241l., in respect of the erection of a school on the 'Beaufort-house' site (Fulham), for the accommodation of 60 mentally defective elder boys. The Council, on July 18, 1905, also approved a supplemental estimate of 132l. for additional works required by the Board of Education on the former site decided that the work should be carried out by Messrs. Stimpson & Co. as an addition to their contract for the new elementary school on the site. In consequence of the death of Mr. Stimpson, the firm has agreed that the Works Committee be prepared to undertake the work at the amount of the architect's estimate, viz., 3,369l."

It was now recommended:—

(a) That the resolutions of May, 23, 1905, and

July 18, 1905, approving estimates of 3,241l. and 132l. respectively, and sanctioning expenditure of these amounts in respect of the erection of a school on the 'Beaufort-house' site (Fulham), for the accommodation of sixty mentally defective elder boys, and agreeing to place the work in the hands of Messrs. Stimpson & Co. be rescinded. (b) That the work of erecting a school on the 'Beaufort-house' site (Fulham) for the accommodation of sixty mentally defective elder boys be executed without the intervention of a contractor; and that the drawings, quantities, specification, and building estimate of 3,364l. be referred to the Works Committee for that purpose."

An amendment was moved by Mr. Goodrich to refer the matter back in order that the work might be put out to tender, but, after a brief discussion, the amendment was defeated, and the recommendations were agreed to. In the course of the discussion which took place on the matter, Sir William Collins said, in answer to a remark made by a previous speaker, that the builders of London had expressed their disinclination to tender against the Works Department. Mr. Howell J. Williams said that the feeling amongst builders was not antagonistic to the Department. The Department had a fine depot and some splendid machinery, and was it wise to starve it? The Council should help the Department to become a greater success than it had been. Mr. E. White said he thought the Council ought to know whether, if the tender of the Works' manager was below the architect's estimate, the work was given to the Department at the price of the estimate, and whether, if above, the work was cut down to suit the price of the estimate. It was true that years ago Mr. Mowlem Burt had said that contractors would not care to tender against the Department, but since then things had changed, and he was certain that the builders of London would be glad to tender if the chance were given them. The Works Department did their work well, and so did most builders, and there was nothing to choose between them in that respect, but work ought to be tendered for, and if it were, and the Department came out lowest, the general satisfaction would be great.

**Central School of Arts and Crafts, Holborn—Light and Air.**—The Education Committee reported as follows:—

"The Council on June 6, 1905, sanctioned expenditure not exceeding 1,150l. in respect of the compensation and costs in connexion with the settlement of the claim made by the trustees of the Strickland estate in consequence of damage to their rights of light and air by the erection of the Council's Central School of Arts and Crafts (Holborn). An arrangement has been arrived at which provides, *inter alia*, that, when the trustees demolish their old buildings in Orange-street, which are opposite the Council's Theobald's-road fire-station, they are to be at liberty to rebuild the front wall to a height of 52 ft. and to an angle of 45 degrees. It was advised that this is a reasonable stipulation, and we have communicated with the Fire Brigade Committee accordingly. The negotiations have been necessary in order to bring the arrangement to a conclusion satisfactory to both parties. The fee to be paid to him may be increased from 30 to 35 guineas. We are of opinion that this request is not unreasonable. The sum already sanctioned by the Council will be sufficient to meet the additional expenditure."

The Committee recommended accordingly, and the Council agreed.

**Apprenticeships.**—The following recommendations of the Education Committee were agreed to:—

(a) That no expenditure be incurred by the Council in respect of apprenticeship premiums. (b) That, with a view to establishing a system of industrial scholarships and of trade schools, an inquiry be made among the employers in the skilled mechanical trades in order to discover—(i.) Whether the employers would co-operate with the Council in encouraging and affording facilities for apprentices or learners to attend evening classes on technical subjects.

(ii.) Whether they would be prepared to allow apprentices or learners to be present for part of the week at trade classes held during the day. (iii.) Whether they would be willing to take as apprentices or learners children, as they leave school, and permit them to attend, for part of the week, trade classes held during the day. (iv.) The extent of the demand for trade schools and the most suitable industries to be taught therein in the various districts of London.

(v.) How far the employers would be prepared to assist the Council by their advice in the establishing of such schools, and by awarding the pupils attending them special privileges."

**Archaeological Discoveries.**—The Local Government Records and Museums Committee reported as follows:—

"We report that during excavations on the site for a fire-station in Cannon-street a Roman bath was unearthed. The inside dimensions of the bath are 6 ft. 3 in. by 10 ft. 6 in., and the weight about seven tons. On hearing of the discovery, steps were



immediately taken to preserve this valuable and interesting relic, which we had hoped it would have been possible to place in the Horniman Museum, but the accommodation there was insufficient. The Parks Committee have, however, offered to undertake temporarily the custody of the bath, and to store it in the mansion in Clissold Park. Operations are now in progress for the removal and preservation of the bath.

In the course of the erection of a factory in Jewry-street, Aldgate, there was discovered a portion of the old London wall, 23 ft. in length and 7 ft. in height. The owner of the factory is aware of the antiquarian interest in the relic, and has arranged for it to be kept in position, so that it will now project about 3 ft. into one of the rooms on the lower ground floor of the new factory; but as an additional precaution, we have suggested to him that the wall should be protected by a galvanised iron netting similar to that round the Roman remains at the Coal Exchange.

**London Squares and Enclosures (Preservation) Bill.**—The Parliamentary Committee reported that they had been in negotiation with the various owners of garden squares and enclosures in London with a view to securing their sympathy with, and support to, the object which the Council seeks to attain, viz., the preservation as breathing spaces of the large number of garden squares and enclosures which, in the interests of the public health of London, it is eminently desirable should remain unbuilt upon. In the result they state that up to the present the owners of some fifty squares and enclosures, which comprise an area of, approximately, 55 acres, have consented to the inclusion of their properties in the Bill. Among the owners thus consenting are the following:—The Crown (represented by H.M. Office of Woods), the Marquess of Northampton, Lord Camden, the Ecclesiastical Commissioners, Sir John Dickson Poynder, M.P., the Provost and College of Eton, and the Governors of St. Bartholomew's and St. Thomas's Hospitals. The only material alteration made in the Bill since its approval by the Council on August 1 is the addition of a clause inserted at the instance of H.M. Office of Woods to the effect that the Council shall, if so required, undertake the management and maintenance of the scheduled lands that are under the charge of the Commissioners of Woods, and which consist of three small enclosures.

**Rotherhithe Tunnel.**—The Bridges Committee reported what progress has been made with the construction of the tunnel between Shadwell and Rotherhithe, authorised by the Thames Tunnel (Rotherhithe and Ratcliff) Act, 1900. The Council, on February 9, 1904, accepted the tender, amounting to 1,088,484l. 16s. 1d., of Messrs. Price & Reeves in respect of the work. The order to commence work was given to the contractors on April 20, 1904, and the time allowed for the completion of the work is five and a half years from that date. Up to the present time satisfactory progress has been made with the construction work. Of the two shafts on the south side of the river, No. 1 shaft has been sunk to its final level, and the concreting at the bottom is nearly finished, while No. 2 shaft, which is on the bank of the river, is being built. On the north side of the river No. 3 shaft is completed. In order to facilitate the construction of the tunnel under the river, the contractors are, in the first instance, driving a small tunnel, 12 ft. 6 in. in diameter, lined with cast-iron. This tunnel has now been driven for a distance of 600 ft. under the river from shaft No. 3 towards the south side of the river; the air pressure used varies from 14 lb. to 20 lb. per square inch, according to the state of the tide. At the bottom of No. 3 shaft, a large shield for the driving of the permanent tunnel is being erected. The cut and cover work on the south side is practically completed, and the opening approach is well in hand, while, as regards the north side, the excavation for the open approach has been commenced. The value of the work executed to date is estimated at 135,000l., or about 12 per cent. of the contract amount. In addition, considerable progress has been made with the acquisition of the property needed for the approaches to the tunnel.

**The Charing Cross Station Disaster.**—Replying to a question, Capt. Hemphill said that the Council had no control over the buildings belonging to railway companies, but that it was desirable that they should have. The station was now under the observation of the Council's officers.

The Council soon afterwards adjourned.

## APPLICATIONS UNDER THE 1894 BUILDING ACT.

**THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—**

### Lines of Frontage and Projections.

**Strand.**—An addition to an iron and glass shelter at the entrance to the Royalty Theatre, Nos. 73 and 74, Dean-street, Soho (Messrs. Smees & Cobay for Miss K. Santley).—Consent.

**Poplar.**—An iron and glass shelter in front of the Prince's Theatre, East India Dock-road, Poplar (Messrs. Owen & Ward for Mr. C. Soumes).—Consent.

**Hackney, Central.**—Buildings upon a site abutting upon the western side of Chatham-place and southern side of Belsham-street, Hackney (Messrs. Hodson & Rowlandson).—Consent.

**Wandsworth.**—A house on the northern side of Church-lane, Tooting, to abut upon the western side of Moring-road (Messrs. Nash & Lillywhite for Mr. J. S. Trotter).—Consent.

**Hampstead.**—An addition at the side of the porch at No. 5, Oppidians-road, Primrose-hill, Hampstead (Mr. W. E. Sanders for Mrs. C. Braby).—Consent.

**Hackney, North.**—The retention of a projecting hood to a cottage at the rear of No. 69, Clapton-common, Hackney, abutting upon Braydon-road (Mr. A. C. Jackson).—Consent.

**Islington, East.**—The retention of projecting signs at No. 151, Englefield-road, Islington (Mr. A. Grabham).—Consent.

**Islington, East.**—The retention of a greenhouse at the rear of No. 68, Sotheby-road, Islington, southward of No. 64 (Mr. A. Mitchell Torrance for Mr. H. C. Harris).—Consent.

**Kennington.**—That the application of Mr. F. Hington for an extension of the periods within which the erection of bay windows and a porch to No. 52, Priory-road, South Lambeth, was required to be commenced and completed, be granted.—Consent.

**Kensington, North.**—Bay windows and pent roofs to fourteen dwelling-houses on the western side of Wallingford-avenue, St. Quentin-avenue, North Kensington (Messrs. Trant, Brown, & Humphreys).—Consent.

**Lewisham.**—One-story shops on part of the forecourt of Nos. 29 and 31, Beacon-road, Hither Green, Lewisham (Mr. H. Kent).—Consent.

**Northwood.**—The re-erection of No. 26, Vaughan-road, Lambeth (Mr. G. G. Rogers for Mr. H. G. Westcott).—Consent.

**Wandsworth.**—A porch to a house on the eastern side of Kenfield-road, Wandsworth (Mr. A. Williams).—Consent.

**Wandsworth.**—A one-story shop as an addition to No. 54, High-street, Tooting (Mr. S. S. Dottridge for Mr. E. Dottridge).—Consent.

**Marylebone, West.**—Permission to retain a projecting shop front with cornice and wooden trusses at No. 105, Church-street, St. Marylebone (Mr. W. R. Phillips for Mr. W. Prested).—Refused.

**Hampstead.**—Permission to retain an iron and glass porch at No. 54, Glenlock-road, Hampstead, abutting upon Glenilla-road (St. Pancras Iron Work Co., Ltd., for Mr. H. Edgeton).—Refused.

**St. Pancras, North.**—A one-story shop on land adjoining the Catholic Apostolic Church, Gordon House-road, St. Pancras (Mr. S. E. Spencer).—Refused.

**Lewisham.**—A building at the rear of No. 132, Arngask-road, Catford, to abut upon Torrion-road (Mr. H. Lewis-Upham for Mr. H. Bown).—Refused.

**Wandsworth.**—A one-story shop on part of the forecourt of No. 408, Merion-road, Southfields, Wandsworth, to abut also upon Lavenham-road (Mr. T. Aldred for Mr. W. G. Davey).—Refused.

**Westminster.**—A one-story shop in front of No. 79, Victoria-street, Westminster (Messrs. Griffin & Woodall for Mr. H. Webley).—Refused.

### Width of Way.

**Hampstead.**—Retention of a building at "Northcourt," Hampstead, with the forecourt boundary fence at less than the prescribed distance from the centre of the roadway of College Villas-road (Messrs. Hudson & Hunt for Mr. W. Scott).—Consent.

**Strand.**—An addition to Nos. 10 and 11, Hop-gardens, St. Martin's-lane, Strand, with external walls at less than the prescribed distance from the centre of the roadway of Hop-gardens (Messrs. George Trollope & Sons and Colls & Sons, Ltd., for Messrs. Johnson, Matthey, & Co.).—Consent.

**Wandsworth.**—The retention of the engineer's cottage at the Grove Hospital on the north side of Blackshaw-road, Tooting, with the forecourt boundary fence at less than the prescribed distance from the centre of the roadway of the street (Mr. W. T. Hatch for the Metropolitan Asylums Board).—Consent.

### Width of Way and Projections.

**Strand.**—Buildings with projecting oriel window and balconies on a site abutting upon the west side of Kingsway, and upon the sites of No. 3, Great Queen-street, and No. 64, Parker-street, Strand (Mr. A. Sykes for Mr. O. Owen).—Consent.

**Strand.**—A wood and glass showcase to No. 524, Regent-street, to abut upon Argyll-place (Messrs. F. Sage and Co. (1905) Ltd., for Messrs. T & J. Ferry).—Refused.

### Lines of Frontage and Space at Rear.

**St. Pancras, South.**—A building (University College Hospital, Medical School and Nurses' Home) on a site abutting upon Gower-street, University-street, and Huntly-street, St. Pancras (Mr. E. Waterhouse).—Consent.

**Strand.**—The re-erection of Nos. 48 and 49, Jermyn-street, St. James', with balconies (Mr. W. Woodward for Mr. S. T. Miller).—Consent.

### Space at Rear.

**Hackney, Central.**—A deviation from the plan approved for the erection of a building on a site abutting upon the west side of Macra-street, and north side of London-lane, Hackney, so far as relates to an increase in the height of the building (Mr. C. G. Smith for Mr. W. Frith).—Consent.

**Wandsworth.**—A modification of the provisions of sect. 41 with regard to open spaces about buildings so far as relates to the proposed erection of buildings on the west side of Stream-hill, at the corner of Drevstead-road, Wandsworth (Messrs. Taylor & Sons).—Refused.

### Deviation from Certified Plans.

**Strand.**—A deviation from the plans approved for the erection of a building on the site of Nos. 36 and 36A, St. James'-street, and No. 64, Jermyn-street, St. James', so far as relates to the substitution of one air duct for two air ducts (Mr. W. Woodward for Mr. L. Thomas).—Consent.

### Formation of Streets, &c.

**Wandsworth.**—The retention of hoardings at the ends of Elborough-street, Southfields, Wandsworth (Messrs. Palmer & James).—Consent.

**Northwood.**—That an order be issued to Messrs. R. Ellis & Son, sanctioning the carriage or laying out of a new street for traffic traffic upon the Sanders estate, to lead from Denmark-hill to Dumbleton-road, Lambeth (for Mr. A. A. Sanders).—Consent.

**Bethnal Green, South-west.**—That an order be issued to Mr. A. P. Stokes, refusing to sanction the adaptation as a street for foot traffic only of a way known as "Reuben-street" out of the east side of Brady-street, Bethnal Green (for Mr. E. Seward and Mr. R. W. Seward).—Refused.

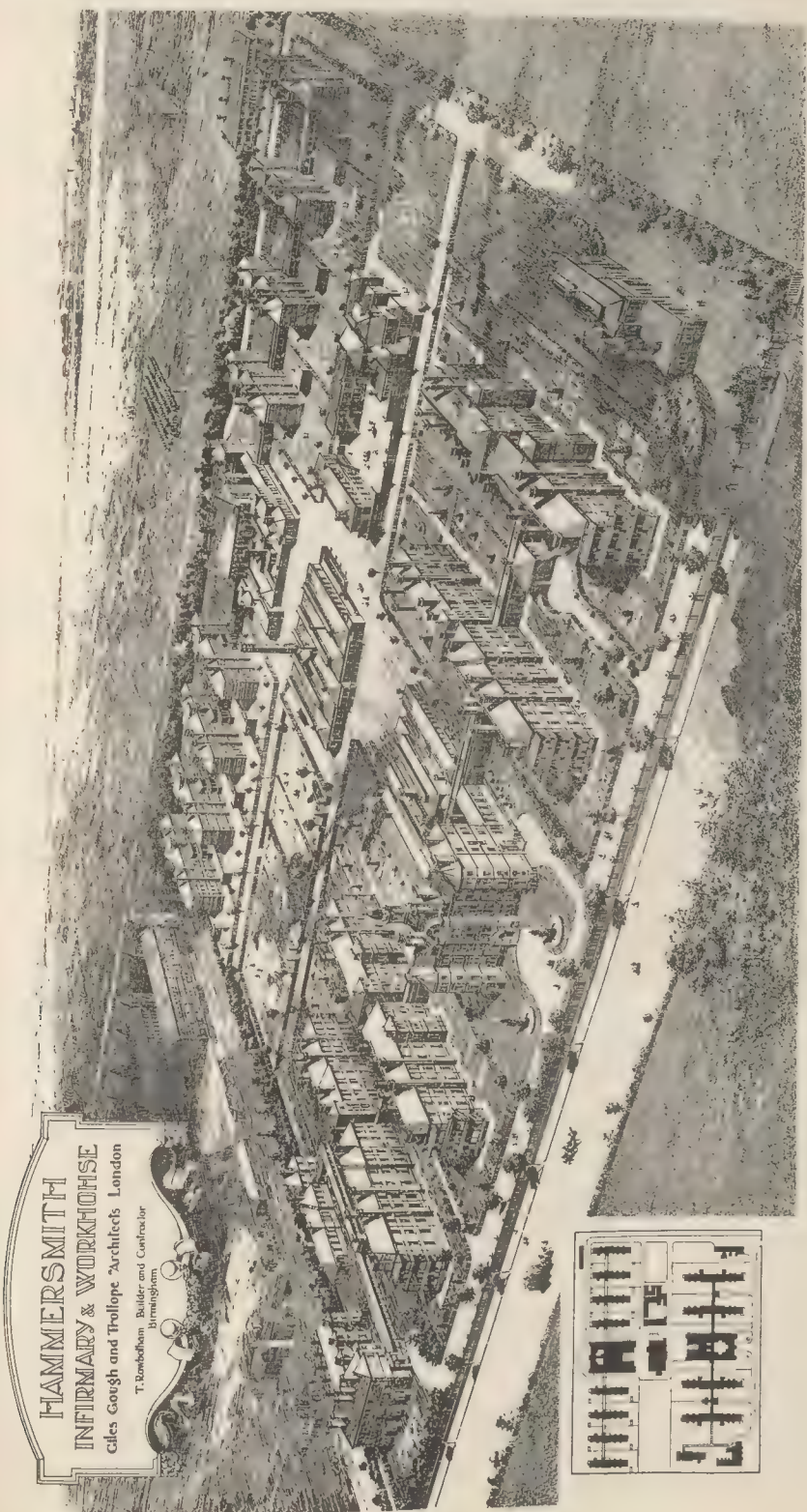
The recommendations marked † are contrary to the views of the local authority.

## NEW WORKHOUSE AND INFIRMARY, WORMWOOD SCRUBS.

THESE buildings, which are said to embody the latest and most approved practices in the design of institutions for the care of the sick and destitute poor, have been erected on a site of about 14 acres in extent, situated to the north of Ducane-road, and adjoining the large open space of Wormwood Scrubs. The buildings now completed provide accommodation for 330 patients in the infirmary and for 428 inmates in the workhouse, together with the requisite nursing and supervisory staffs. Both divisions of the institution have been so planned as to be readily capable of being extended when required. Thus, by the erection of additional blocks, and without disturbance of those already built, it is possible to raise the accommodation for patients in the infirmary to a total of 616, and of inmates in the workhouse to a total of 840.

**Infirmary.**—The infirmary, which faces the Ducane-road, has in the centre a large administrative block, containing the committee-room, medical officer's residence, dispensary, and quarters for the staff (apart from nurses, who have a separate home), also the central kitchen, larders, store-rooms, linen-rooms, staff mess-rooms, &c. Passing through the administrative block, and leading therefrom eastward and westward, is a main corridor, giving access to the east side to the pavilions for male patients, and on the west to those for female patients. The principal patients' blocks, each of which is three stories in height, and provides accommodation for 150 patients, are planned as double pavilions—that is to say, that on each floor there is, to the north of the main corridor, and in line complete with all its appurtenances, another similar larger ward with its adjuncts. Each of the large wards above referred to contain twenty-four beds, and has, in convenient proximity, its own group of supplementary apartments, comprising a nurses' duty-room, with separate larder; a small ward, to contain one patient; a bathroom, lavatory, linen-room, storeroom, and a projecting annex containing the sanitary offices. Each of the large wards, to







south has, in addition, a dayroom for the use of convalescent patients, with a verandah on its sunny and sheltered side. A block or pavilion for lying-in cases is provided, and is placed to the west of the main building and well separated therefrom. It is approached by means of a covered way leading from the end of the main corridor on the female side. The nurses' home is a detached three-story building, having a cheerful south aspect, and situated within the south-west angle of the site. It is approached from the main building by a covered way, and contains accommodation for forty-one persons. Each nurse has a separate bedroom, and there are large general sitting-rooms and a lecture-room. The operation block is placed to the north of the main corridor, and approached therefrom by a short connecting corridor, being thus well separated from the ward blocks. It contains a large specially arranged and lighted operation-room, an anæsthetic-room, and a surgeon's consulting-room.

**Workhouse.**—The buildings of the workhouse are quite separate from the infirmary, and are confined to the northern portion of the site, with the exception only of the receiving block, which is combined with the porter's lodge, placed at the south-east angle of the site, and contains separate receiving-rooms for males and females, each with examination-room, bathroom, etc., and with an eight-bed observation dormitory adjoining. On the first floor are two store-rooms for inmates' own clothes, and in rear is a disinfecting apparatus. The whole block is arranged with a view to its supervision by the porter and portress, whose lodge adjoins. The administrative block is placed in the centre of the range of workhouse buildings, and contains committee-rooms, master's residence, library, surgery, and residential quarters and mess-rooms for the staff, central kitchen, larders, store-rooms, linen-rooms, etc., and the general dining hall, which will be used also as a chapel. Covered ways run east and west connect this block with the workhouse pavilions, of which there are two for males to the east of the administrative block, and two for females to the west, each three stories in height. The designing of these pavilions has presented a somewhat difficult problem in planning, it being necessary, in order to obtain due classification, that each pavilion should contain separate accommodation for five different classes of inmates, each class requiring its own separate dayroom and dormitory. This sub-division, which is as necessary for the comfort of the inmates as for their proper supervision, is provided in the pavilions that have been erected, each of which contains the requisite dayroom and dormitory space for the following inmates:—Ten very infirm, twenty infirm, twenty-five Class A aged healthy, thirty Class B aged healthy, and fifteen young able-bodied. Proper bathroom, lavatory, and sanitary accommodation is also provided, together with apartments for the officers in charge. The plans provide for the erection when required of four more similar pavilions. Quarters have also been provided in a separate building for six aged married couples, each having a separate bed-sitting-room, with use of common-room, scullery, etc. It is hoped in this way to mitigate the sufferings of aged couples who have been driven by misfortune to seek the shelter of the workhouse, and whom, in the absence of this accommodation, it would be necessary to separate.

**Laundry Block.**—This is placed in the centre of the site, midway between the workhouse and infirmary, both of which it serves. It contains separate departments for the workhouse and for the laundry, but these are so arranged that they may be worked either independently or together, as may be found desirable. The engineers' department is contained in a lofty basement story below the laundry block. Here is a boiler-room containing four large Lancashire boilers, which supply steam for warming the whole of the buildings, for heating water, for cooking, for driving the engines and pumps, and for use in the laundry. The boilers are equipped with an economiser, which heats the feed-water by utilising the waste heat from the furnaces. This department also contains the engine-room, pump-room, engineers' workshops, etc., and a large coal store. Two systems of subways branch out from the boiler-room to the workhouse and infirmary respectively, and provide facilities for the distribution of water, steam, and electricity to the workshop block, which is an adjunct to the workhouse, is placed to the east of the laundry block, and contains large workshops for carpenters, joiners, plumbers, smiths, wood choppers, etc., also stone-breaking shed and corn mills, the whole under the supervision of the labour master, whose office commands all the premises. Here also is a large room where such of the inmates as may have a prospect of again settling up a home of their own may temporarily store their furniture. Adjoining the workshop block are the stables and the mortuary.

**Warming and Hot-Water Supply.**—The warming of the buildings is by means of radiators supplied with hot water on the low-pressure system, the water being heated in multitubular calorifiers

placed in the basements of the various blocks, and supplied with steam at a pressure of 40 lb. to the square inch, brought through pipes from the central boilers. Similar calorifiers are also used for the supply of hot water to baths, lavatories, sinks, etc. Open fireplaces are also extensively used throughout the buildings. The institution is lighted throughout by means of electricity, supplied from the Hammersmith Borough Electricity Works. The supply is a high-pressure alternating one, the voltage being reduced, by means of transformers, before distribution.

The architects are Messrs. Giles, Gough, & Trollope. The steam boilers are supplied by Messrs. Galloways (Manchester); warming and cooking plant by Messrs. Moorwood, Sons, & Co. (Sheffield); laundry machinery by Messrs. Bradford & Co. (Salford); lifts by Messrs. Waygood & Co.; telephones and bells by the Private Wires and Telephone Company; electric lighting by Messrs. W. J. Fryer & Co.; sanitary fittings by Messrs. Twyford & Co. (Hanley); boundary walls by Messrs. Willcock & Co. (Wolverhampton). The buildings were formally opened on the 1st inst., by Princess Henry of Battenberg.

#### BOOKS RECEIVED.

BAKU: AN EVENTFUL HISTORY. By J. D. Henry. (Archibald Constable & Co.)  
THE HIGH-ROAD OF EMPIRE; Water-colour and Pen-and-ink Sketches in India. By A. H. Hallam Murray. (John Murray, 21s.)  
AXEL HERMAN HAIG AND HIS WORK. By E. A. Armstrong. (The Fine Art Society.)

### The Student's Column.

#### STEAM BOILERS AND PIPES.—XXIII. THE FLOW OF STEAM (continued).

IN formula (58) to (63) we have variants of a simple rule for calculating the weight of steam conveyed through pipes of given diameter and length, with a given loss of pressure.

For direct determination of the pipe diameter for a given discharge of steam and length of pipe, with a given loss of pressure, the formula require inversion.

As formula (62) and (63) are the most convenient representatives of the rule, and give results that may be accepted for general guidance, we adopt these as the basis of the subjoined rules for pipe diameters:—

**Pipe diameter for weight of steam per second—**

From formula (62) we obtain

$$d^5 = \frac{W^2 l}{(p_1 - p_2) D}$$

and

$$d = \sqrt[5]{\frac{W^2 l}{(p_1 - p_2) D}} \dots (64)$$

**Pipe diameter for weight of steam per minute—**

From formula (63) we obtain

$$d^5 = \frac{60^5 W^2 l}{(p_1 - p_2) D}$$

and

$$d = \sqrt[5]{\frac{60^5 W^2 l}{(p_1 - p_2) D}}$$

This could be written

$$d = \sqrt[5]{\frac{W^2 l}{(p_1 - p_2) D} \div 3,600}$$

But  $\sqrt[5]{3,600} = 5.142$ ,

and  $\frac{1}{5.142} = 0.1945$ , say, 0.2.

Whence

$$d = 0.2 \sqrt[5]{\frac{W^2 l}{(p_1 - p_2) D}} \dots (65)$$

The fifth root of a number can be obtained most conveniently by logarithms, as indicated in the following example, which also serves to illustrate the application of formula (64) and (65) to a simple calculation of the kind frequently necessary in daily practice.

**Example 30.**—Required the internal diameter of a pipe, 500 ft. long, suitable for conveying 2-lb. weight per second of steam at 50 lb. per square inch absolute pressure, with a loss of pressure not exceeding 3 lb. per square inch.

Here  $W^2 = 4$ ;  $l = 500$  ( $p_1 - p_2$ ) = 3, and, by Table XXV.,  $D = 0.1202$ .

(a) Substituting these values in formula (64) we have

$$d = \sqrt[5]{\frac{4 \times 500}{3 \times 0.1202}} = \sqrt[5]{\frac{2,000}{0.3606}} = \sqrt[5]{5,546}$$

To find the fifth root of 5,546 we proceed as follows:—Taking from a table of logarithms the mantissa of  $\log 5,546 = 7440$ , and adding the index 3 we have

$$\log 5,546 = 3.7440,$$

which, divided by the number indicating the required root, gives

$$3.7440 \div 5 = 0.7488.$$

Referring to a table of antilogarithms, the corresponding number is found to be 5604.

The index 0 indicates that the answer is between 1 and 10. Hence the correct position of the decimal point is immediately after the first numeral, and we have 5.608 as the fifth root of 5,546.

Therefore the required diameter of the pipe is 5.608 in.

(b) Calculating the pipe diameter from the delivery per minute, which is  $2 \times 60 = 120$  lb. weight of steam, we substitute this quantity, with the other values, in formula (65).

$$\text{Thus } d = 0.2 \sqrt[5]{\frac{120^2 \times 500}{3 \times 0.1202}} = 0.2 \sqrt[5]{\frac{7,200,000}{0.3606}} = 0.2 \sqrt[5]{19,960,000}$$

Proceeding as before, we find the fifth power of 19,960,000. Thus

$$\log 19,960,000 = 7.3002$$

$$7.3002 \div 5 = 1.4600.$$

The mantissa .4600 corresponds with the antilogarithm .2884, and, as the index 1 shows the answer to be between 10 and 100, the required root = 28.84.

Consequently by formula (65) the diameter of the pipe will be

$$0.2 \times 28.84 = 5.768 \text{ in.}$$

The fractional difference between 5.608 in., as found by formula (64), is accounted for by the increase from 0.195 to 0.2 of the multiplier in the formula last employed.

Thus, if we multiply 28.84 by 0.1945, the diameter becomes

$$0.1945 \times 28.84 = 5.608 \text{ as before.}$$

Formula (64) and (65) can be used in this way to obtain the required pipe diameter for any given discharge of steam per second or per minute, and by employing logarithms the process of calculation is rendered very simple and expeditious.

For setting out pipe systems with a minimum expenditure of time it is desirable to have a table for offices giving the discharge of steam in pounds per minute for pipes of different diameter. As the discharge varies with the length of the pipe and with the loss of pressure, as well as with the internal diameter of the pipe, the most convenient form for such a table is one based upon a pipe length and a pressure loss that lend themselves readily to the computation of discharges for other lengths and pressure losses.

If the table were calculated by formula (65) upon weights of steam discharge increasing progressively in predetermined units, the resulting pipe diameters would come out in fractional dimensions far more numerous than those available.

Therefore, it is better to calculate the table by formula (63) upon the pipe diameters adopted in practice, so as to obtain the weight of steam discharge corresponding with each of these. The adoption of this course makes the table shorter and does not impair its practical utility.

Table XXVII. has been thus calculated by formula (63) for pipes 100 ft. long and for a pressure loss of 1 lb. per square inch, the initial pressure being measured above vacuum, and not above the atmospheric pressure.

For any length of pipe other than 100 ft. the weight of steam discharged per minute will be

$$W_1 = W \sqrt[5]{\frac{100}{l}} = \frac{W}{\sqrt[5]{l}}$$

For any loss of pressure other than 1 lb.

TABLE XXVII.—THE FLOW OF STEAM THROUGH PIPES CALCULATED IN POUNDS PER MINUTE FOR STRAIGHT SMOOTH PIPES 100 FT. LONG

Internal Diameter of Pipe in Inches.	Initial Absolute Steam Pressure* in Pounds per Square Inch.														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
9	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

\* In using this table 15 lb. per square inch must be added to readings from a pressure gauge on which atmospheric pressure = 0.

per square inch the weight of steam discharged per minute will be

$$W_1 = W \sqrt{(p_1 - p_2)}$$

For any length of pipe and loss of pressure other than 100 ft. and 1 lb. per square inch respectively the weight of steam discharged per minute will be

$$W_1 = W \frac{10 \sqrt{(p_1 - p_2)}}{\sqrt{l}}$$

Where  $W_1$  = the required discharge of steam,  $W$  = the discharge according to Table XXVII,  $l$  = the other given length, and  $(p_1 - p_2)$  = the other given loss of pressure.

Example (31).—Find the weight of steam discharged per minute by a 3-in. diameter pipe, 100 ft. long, with a drop of pressure of 60 lb. per square inch to 59 lb. per square inch.

By Table XXVII, the discharge for a 3-in. pipe, 100 ft. long, with 60 lb. steam is 35.3 lb.

The required discharge will be

$$W_1 = \frac{35.3 \times 10}{\sqrt{400}} = 17.6 \text{ lb.}$$

Example (32).—Find the weight of steam discharged per minute by a 3-in. diameter pipe, 400 ft. long, with a drop of pressure of 60 lb. per square inch to 56 lb. per square inch.

The required discharge will be

$$W_1 = 35.3 \times \sqrt{4} = 70.6 \text{ lb.}$$

Example (33).—Find the weight of steam discharged per minute by a 3-in. diameter pipe, 100 ft. long, with a drop of pressure of 60 lb. per square inch to 56 lb. per square inch.

The required discharge will be

$$W_1 = \frac{35.3 \times 10 \times \sqrt{4}}{\sqrt{20}} = 35.3 \text{ lb.}$$

The last example shows that increase of length does not necessarily reduce the discharge, although the greater friction developed eats up more pressure. Sometimes the effect does not matter, and at other times it may interfere with the proper performance of the duty assigned to some important mechanical appliance, such as a steam pump requiring a minimum head of steam for a given lift, or an ironing machine requiring a given temperature in the steam-heated bed or roller.

The pipe diameters in the first column of Table XXVII, are those adopted in the report on "British Standard Pipe Threads," issued by the Engineering Standards Committee up to 12 in. diameter. We must point out, however, that the internal diameters here given correspond with the "nominal" diameters of the tubes, and are not the "commercial" diameters to which wrought-iron pipes are actually made.

Up to the present time no attempt has been made in this country to formulate a standard internal diameter for steam pipes of any kind. This is unfortunate, because the existing condition of chaos is apt to cause confusion. When wrought or cast iron pipes are ordered of a given size there is no saying what the actual diameter will really be, unless the architect or engineer has previously ascertained the "commercial" diameters adopted by some particular firm, and has specified that no other make of pipes shall be employed.

In their Report on "British Standard Pipe Threads," the Engineering Standards Committee have selected certain "nominal" bores up to 18 in., and for each of these have defined the "approximate outside diameter of black tube." But that is all. The leading makers have not yet adopted the dimensions nor the standard pipe threads, although we are informed that some of them will do so as soon as the standard gauges are ready. Even the adoption of these will not give uniformity, because the thickness of metal remains to be standardized.

We originally intended to calculate Table XXVII. upon standard internal diameters, but, finding no basis of the kind had been agreed upon, we have thought it better to base the table upon actual diameters which have a definite meaning, rather than upon an approximation to the average "commercial" diameters adopted by various manufacturers.

The only effect of applying Table XXVII. to pipes of "nominal bore" is to conduce to the use of larger pipes in the smaller sizes than might be employed if the "commercial diameters" had formed the basis of computation.

There are practical reasons for regarding this result with equanimity. In the first place, as the excess of "commercial" over "nominal" bore is inversely proportional to the diameter, the cost involved in the employment of tubing one size larger than may be absolutely necessary is scarcely worth consideration. Then the smaller the pipe the greater is the loss of heat by radiation and convection; therefore the greater the condensation and consequent corrosion. As the smaller pipes of a system are not usually so adequately protected by non-conducting material as the larger pipes, the condensation of steam is increased by this cause also, and it is important to remember that small pipes are far more apt to become choked than large pipes.

For these reasons it is not of vital importance to know whether, in some cases, a 3-in. pipe might be substituted for one of 4-in. diameter, or a 1-in. for a 1½-in. pipe. The larger size will certainly give increased efficiency, and the smaller size must as certainly reduce efficiency and at times may be distinctly inadvisable.

OBITUARY.

MR. H. H. ARMSTEAD, R.A.—We regret to announce the death on December 4, at his residence, No. 52, Circus-road, St. John's Wood, N.W., of Mr. Henry Hugh Armstead, R.A., in his seventy-eighth year. Mr. Armstead began his career as a pupil of E. H. Bailey, R.A., and at first devoted himself to working in bronze and silver for decorative objects. He was elected an Associate of the Royal Academy in 1875, and full Academician in 1879; in May last he was elected an honorary member of the Society of British Sculptors; he was an examiner of the Schools of Art, South Kensington; he was appointed a member of the Fine Arts Committee, Royal Commission, for the Paris Exhibition, 1900, and two years ago was appointed a member of the Jury of Award in the competition for the monument at Berne to commemorate the foundation of the Universal Postal Union. Of Mr. Armstead's works we have illustrated the memorial in the Royal Courts of Justice to G. E. Street, for which he executed the seated figure, and the figures in relief of an architect, a sculptor, and craftsmen at work, the general architectural design being by Sir A. W. Blomfield (July 3, 1886); the effigy for the monument to Bishop Olivant in Llandaff Cathedral (June 25, 1887); the figures for the reared, St. Mary's Church, Aberavon (May 31—St. John—August 23, 1890); "Maidenhod," a bust (July 18, 1885, from a sketch by the artist); recumbent effigy for the Dean Close memorial (May 23, 1885\*); "Ladas, the Spartan Runner, Dying at the Goal" (May 7, 1887\*); "The Guardian Angel," a group in relief (May 31, 1890\*); sculpture for the Julius Beer family mausoleum in Highgate cemetery (May 18, 1873); and "Remorse" (July 11, 1903\*), a small-scale female figure in marble which was purchased by the Chantry Bequest trustees and was deposited in the Tate Gallery, Millbank. For the Albert Memorial in Kensington Gardens Mr. Armstead executed the figures of poets and musicians on the south front and of painters on the east front of the base of the great canopy; and, in conjunction with Philip, he contributed the bronze symbolical statues of Astronomy, Chemistry, Geology, and Geometry upon the pillars, with those of Rhetoric, Medicine, Philosophy, and Physiology in the niches above the capitals. In conjunction with Sir E. J. Poynter, P.R.A., he executed a portion of the frieze, Royal Albert Hall, 1870. Of his works in decorative metal we may mention the Tennyson vase, for which he gained a medal at the Paris Exhibition in 1889; the Outram shield, now in the Victoria and Albert Museum; and the testimonial which was presented to Charles Keen. His other principal works include two bas-reliefs in marble at the west end of the Guards' Chapel, Wellington barracks; allegorical figures to represent "London" in the sculptured panels over the principal entrance of the Hotel Métropole, Northumberland-avenue; the reliefs of Europe, Asia, Africa, America, Australasia, and Education for the Colonial Office, Whitehall; the fountain for King's College, Cambridge; statues of Bishop Wilberforce and, at Chatham, of Lieutenant Waghorn, the founder of the Overseas Route, 1889; the Fred Walker memorial in Cockham church; a marble bust of Queen Victoria for the Guildhall, Exeter (1888); a bust in alto-relievo of the late Prebendary Webb for his monument in St. Paul's (1889\*); a bronze por-



trait medallion of the late G. Price Boyce, R.W.S. (1889\*); his modelled portrait of Miss Lottie Armistead, and bronze portrait-medallions of Mrs. Craik, for Tewkesbury Abbey (1889\*); and "Frau F. Nissen (1899\*); at Westminster Abbey, the bust of Archbishop Tait, the late carved cornice in the organcase, with the statues of Moses, St. Peter and Paul, and King David for Scott's altar-piece in mosaic, completed in 1866, Westminster Abbey; the figures of the Prophets in the medallions in the spandrels of the nave arches, Holy Trinity Church, Sloane-street, S.W.; the reredos, about forty years ago, for the church of St. Mary-the-Great, Cambridge; and three years ago he was commissioned by a committee of native gentlemen to execute a marble bust of Sir Henry Cotton for Calcutta Town Hall. We may add that Mr. Armistead married a daughter of the late Mr. H. T. Wells, R.A., and that his bust-portrait, by Mr. W. R. Colton, A.R.A., was exhibited in the Royal Academy rooms in 1903. The works by Mr. Armistead which we mark with an asterisk were exhibited in the Royal Academy in the years respectively cited.

Mr. MILLS.—The death, at a greatly advanced age, on November 22, is announced of Mr. Alexander William Mills, formerly of Manchester, and lately of Green-walk, Bowdon, Cheshire. Mr. Mills was elected a Fellow of the Royal Institute of British Architects in 1877; he was one of the original members of the Manchester Society of Architects, and was President of that Society in 1890-71. With his former partner the late Mr. James Murgatroyd, who became a member of the firm of Messrs. Mills & Murgatroyd, of Strutt-street, Manchester, architects and surveyors, fifty years ago, he practised during thirty years in Manchester, and then relinquished the active pursuit of his profession. After a competition held in 1838 Mr. Mills was appointed architect for carrying out an extension of the old Exchange building at Pennington-hill, Manchester (by Harrison, of Chester, 1806-9), and for its further enlargement in 1844-5. In the competition for the rebuilding upon the greatly increased site, more than 5,000 sq. yards, of the Royal Exchange in terms of the proprietary company's Manchester Royal Exchange Act, 1848, Messrs. Mills & Murgatroyd won the first (500 guineas) and second premiums respectively. Illustrations of the latter structure are published in the *Builder* of October 29, 1870; January 7, 1871; and November 7, 1896. The great room, with aisles, covering 4,050 yds. superficial, is reputedly the largest covered area in Europe devoted to mercantile purposes. In one number of September 24, 1881, we illustrated the firm's designs for the Manchester High School for Girls in Dover-street, Chorlton-on-Medlock, to which they added another chemical laboratory, a lecture-room, and a gymnasium five years afterwards; on March 26 of the current year we published illustrations of the interior, and of the firm's further improvements of the high school, which embrace a cookery school and a biological laboratory on the first and upper floors, respectively, of the south-west wing, the school kitchen, etc., on the ground-floor and so on. Some other architectural works by Mr. Mills in Manchester and the suburbs, comprise the Grand Hotel (formerly a warehouse), the workhouses at Crumpsall and in New Bridge-street, and, we understand, the railway station in London-road. Mr. Mills was a magistrate for the county of Chester.

Mr. WELLER.—The death is announced also, at his residence, No. 187, Tottenhall-road, Wolverhampton, of Mr. John Weller, senior member of the firm of Messrs. John Weller & Sons, of King-street, Wolverhampton, architects and surveyors. The firm prepared the plans and designs of St. Jude's Church, erected six years ago near St. Jude's Church in Tottenhall-road, at a cost of 2,200*l.*, and, for Lord Dartmouth, of the hall and institute at Burnhill Green, near Patshull, Staffordshire, to serve as a memorial of the late Earl and Countess of Dartmouth, and as a place of recreation and entertainment for those who live on and around the Patshull estate. The hall accommodates 200 persons, exclusively of the platform and gallery. Mr. Weller designed many residences and buildings in Wolverhampton and the country around, and was architect and surveyor to the Wolverhampton and District Permanent Building Society.

#### STAINED GLASS AND DECORATION.

REEREDOS, LLANBADOC CHURCH, NEAR USK.—A new reredos in St. Madoc's Church, Llanbadoc, has just been completed by the erection of six oak statues representing St. George, St. David, St. Andrew, and St. Patrick, St. Dubricius, and St. Madoc. The work is constructed in Bridgend stone in Late Decorated style, consisting of seven canopied niches, the central one, larger than the others, containing a representation of the Crucifixion in *alto relievo*, and the remaining niches the figures of the saints already named. Messrs. Veall & Sant, architects, were responsible for the design, and Mr. Wormleighton was the sculptor.

#### GENERAL BUILDING NEWS.

ST. BARTHOLOMEW, SMITHFIELD.—The reopening of the restored cloister of St. Bartholomew the Great, West Smithfield, on Saturday last week, by the Bishop of London, practically completes the work that has been going on there for twenty years. Under the able direction of the Rev. W. Panckridge, an effort was made to initiate a scheme of renovation and restoration. At that time—1885—the portion of the church used for Divine service was in a dilapidated condition, while a forge, a factory, and a school occupied various parts of the building, and what was left of the cloister had been utilised as a stable. The sanctuary and lady chapel, the north transept and the triforium have been restored to their original uses, and now the remains of the cloister have been reconstructed and roofed and the entrance to the church opened up. It is proposed, when funds permit, to build rooms over the cloister, as in monastic times, for the use of the clergy and mission workers. Sir Aston Webb, R.A., has been the architect throughout.

CHURCH, DERBY.—The Bishop of Southwell on Saturday last week consecrated the newly-erected Church of St. Osmund at Osmaston-by-Derby. The church consists of a nave and chancel under one roof, 110 ft. in length and 25 ft. wide, with north and south aisles and porches, a vestry-chamber on the north side of the chancel, and a south chancel aisle arranged for use for daily services. The nave and chancel are 65 ft. high to the ridge of the roof. The vestries have yet to be built, but a temporary vestry is provided beneath the organ gallery. The church will accommodate upwards of 2,000 persons. Owing to the low level of the site, the floor of the church has been fixed some 4 ft. above the original ground level, which has been filled in all round. The foundations were carried down to a bed of gravel, and the walls, carried upon a series of piers and arches, are constructed of Portland cement concrete, faced both outside and in with small sand-stone bricks. Dressings of Matlock stone have been used. The clear-story walls are carried on brick arches, supported by columns of buff terra-cotta, and the roofs are of pitch-pine, covered with brown slates from South Wales. A small bell turret of oak, covered with lead and oak shingles, is fixed on the ridge of the roof. The floors under the stairs are of wood blocks, and the passages paved with Wooliscroft's buff quarries; the sanctuary is paved with Hopton stone and grey slate in large squares, and the side chapel is covered with a groined roof of brick and stone. The altar is of oak, with a slab of Derbyshire fossil marble forming the table; behind it is a reredos of alabaster, with a large Egyptian onyx cross set in a background of glass mosaic. Above two of the permanent choir seats are yet fixed, the remainder waiting, as are the chancel screen and pulpit, for further funds. The church is warmed by hot water. The contractors for the whole of the work are Messrs. R. Weston & Son, Derby, and the architects were Messrs. Currey & Thompson, Derby.

EXTENSION OF WESLEYAN METHODIST CHURCH PREMISES, IPSWICH.—The memorial-stones were recently laid of the extension which is being made to the Sunday-school of the Alan-road Wesleyan Methodist Church. The alterations comprise the addition of a new school with a central hall and several classrooms; also the pulling down of the old gallery in the church, and the erection of a new one with side balconies. The work will cost about 3,000*l.*, the contractors being Messrs. Theobald & Sons, Needham Market, and the architects Messrs. Eade & Johns.

SAVINGS BANK PREMISES, ROTTERHAM.—On the 28th ult. the new premises of the Butte Savings Bank, at Rotherham, were opened. Some time ago the trustees acquired a property in Castle-street, the lower flat of which was gutted out in order that office accommodation might be provided. The flat has been divided into a public office and board-room, and a strong room has been provided; also lavatory and dressing-room accommodation. The architect was Mr. A. M. Mackinlay.

PUBLIC LIBRARY, RUSHDEN.—A new free library has been opened at Rushden. The new building comprises news-room, magazine-room, ladies' reading-room, lending library, reference library, librarian's room, book store, and lavatories. The building shows a classical front, treated in a very suitable and satisfactory manner. A vestibule leads to the central hall, from which all the rooms are reached. The hall is rectangular in shape, and the flooring is of terrazzo. Immediately facing the entrance is the lending library, which is designed upon the open access system, the librarian's counter and screen dividing it from the hall. In the library double swing doors, immediately adjoining the magazine-room and divided by a glazed screen with access door is the librarian's office. To the left of the central hall, and between the news-

room and reference library, is a separate ladies' reading-room. All the rooms are 13 ft. high, and have pitch-pine wood block floors. From the central hall a corridor to the right leads to stores, the men's lavatories, and to a side entrance. The heating chamber is in the basement under the store-room and has a fireplace ceiling. The building is heated by hot water on the low pressure system. The principal contractors have been Mr. Wm. Packwood, the sub-contractors being:—Messrs. Whittington & Tomlin for the carpenter and joiner's work; Mr. T. Higgin & Walker for plastering; and Messrs. A. T. Nichols & Co. plumber, glazier, and painter's work. The carving was executed by Mr. M. White, of Peterborough, and the wrought-iron work by Mr. Reynolds, of Harrowden. The gas fittings were supplied by the Rushden and Highnam Messrs. Dargue, Griffiths, & Co. of Liverpool; the wood block flooring, Roman mosaic and terrazzo paving was by Mr. Jos. Egan of London. The architect has been Mr. W. B. Madin, of the Town Surveyor.

#### FOREIGN.

FRANCE.—M. François Flameng has been elected at the Ecole des Beaux-Arts, a place of Bouguereau, by 19 out of 33 votes. The new Académicien is a son of the engraver Louis Flameng (himself a member of the Institut), and his father and under his name, and painting in the ateliers of Cabanel and J. P. Laurens. In 1879 he obtained the Salon Medal of Honour for his picture, "The Appeal of the Girondins"; and he painted subsequently several scenes from the Revolution. He has executed also an important work in 1895 for the Sorbonne. He has had much success also as a portrait painter. The Municipal Council of Montauban has voted a sum of 120,000 francs for new school buildings.

M. Bouillard has been commissioned to prepare plans for a new Ecole Maternelle at Falaise (Calvados).—A new firemen's barracks is to be built at Reims, on the site of the former Academy of Music.—A monumental bridge, 65 metres in length, is to be built at Calais over the ditch of the fortifications facing the sea. The cost of this bridge, which is to connect the centre of the town with the Casino promenade, will be 325,000 francs.—M. Mayer, architect, of Chartres, has been commissioned to carry out a large group of school buildings there.—The Municipality of Valenciennes have voted a sum of 2,300,000 francs for various operations of street improvement and building; among others the enlargement of the public library, the construction of a viaduct at St. Vaast, and the improvement of the water supply.—The celebrated chateau of Plessis-les-Tours, the favourite residence of Louis XI., is about to be the object of an restoration which, preserving the exterior architectural character of the building, will allow of their restoration of some of the historic chambers of the interior. The death is announced of M. Baubert, the oldest architect in the department of Seine-et-Marne, at the age of eighty-one. He was a pupil of Labrousse, and had been settled since 1864 at Melun, where he had carried out numerous town and country houses.

THE "RED HOUSE" AT PORT-AU-SPAIN.—Sir H. M. Jackson, Bart., and Mr. J. H. Jackson, have formed the Colonial Office that the restoration of the public buildings formerly known as the Red House was proceeded with during the year 1904-5, and the structural works nearly completed. The new building is considerably larger than the old, a spacious legislative council chamber and new offices being provided at the northern extremity, while two handsome and dry law courts have been added at the southern end. In the centre a lofty dome, surmounted by a cupola, covers the open quadrangle. The building, which will be perhaps the finest structure in the West Indies, will probably be completed and ready for occupation in 1906.

#### MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—It has been found desirable, under the terms of the late Mr. Alfred Waterhouse's will, to dispose of the lease of the well-known house, No. 20, Cavendish-square, where Mr. Waterhouse for so many years had his town residence, and his offices combined. Mr. Paul Waterhouse has therefore transferred his offices to rooms 14, Staple Inn-buildings, Holborn Bars, at which address his work will be conducted on and after the 18th inst. The telegraphic address will be as before "Edulis London," and Mr. Waterhouse's new telephone number is 2,399 Holborn.—Messrs. W. & J. R. Freeman, stone and granite merchants, have removed from 67, Milk-street to Great College-street, Westminster.—BOROUGH POLYTECHNIC.—The Report of this Institution, presented by the Principal (Mr. C. T. Millis) at the Annual Meeting on the 4th inst., states that the percentage passes gained in examinations was higher this last year, and the total value of scholarships v



Certificates were gained in carpentry and joinery, plumbing, brickwork, and painting. The plumbers' work and brickwork. Two full and complete certificates in plumbers' work were awarded, and successes were recorded in applied mechanics, practical mathematics, magnetism and electricity, etc. Co-ordination with the London County Council evening schools is being arranged, and several new classes have been started. A satisfactory feature of the work is the readiness with which intending students ask for and follow advice given as to their courses of study, and the increasing number of students who attend for two, three, and four years.

**SCARBOROUGH MASTER BUILDERS.**—The annual meeting of the Scarborough Master Builders' Association was held at the Albemarle Hotel last night. Mr. A. W. Sinclair (President) being in the chair. The annual report and balance-sheet of the Association were read by Mr. Hardgrave, and were considered satisfactory, after which the election of officers for the ensuing year proceeded with. It having been reported at a previous meeting that Mr. Sinclair did not desire to be re-elected President, as he had held office for five years, a hearty vote of thanks was accorded to him for his services in the chair, for his services rendered to the York Electricity Board as chair representative, and also for his services upon the Council of the National Federation. Mr. R. H. Carr, who had previously served seven years as secretary and two as vice-President, was unanimously elected President. Mr. O. Hardgrave was re-elected vice-President, Mr. F. Hardgrave was re-elected treasurer, and a committee was appointed.

**GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY.**—At the usual fortnightly meeting of the Society, held in the Technical College on the 1st inst., Prof. Gourlay presiding, Mr. John D. MacKenzie delivered a lecture on "Electricity as a Means of Comfort." The deficiencies of ordinary methods adopted in electric-lighting installations were dwelt on at some length, accounted for, in the lecturer's opinion, by an undue conservatism and conventionalism of ideas. The real objective, and one seldom attained in present-day work, was set at light and conceal the source, or, in the lecturer's words, "obtain an effective unobtrusive result." The adaptation of use was explained and demonstrated with the most modern apparatus for its effective utilisation. The lecture was illustrated with many lantern slides of electrical fittings for lighting, also of showing the different systems of wiring, and defects due to careless workmanship. **PROPOSED WHISTLER MEMORIAL.**—It is stated that the proposed international memorial to the late J. M. Whistler will consist of a monument to be set up at Chelsea after a design by M. Auguste Rodin, who succeeded Whistler as President of the International Society of Sculptors, Painters, and Engravers. The Society contribute 500*l.* towards the estimated cost, 2,500*l.* of the memorial at Chelsea, and it is intended, if the necessary subscriptions are received, to erect replicas of M. Rodin's monument in Paris and in America. Mr. T. Stirling Lee, New Gallery, Regent-street, honorary secretary to the memorial fund.

**HOUSE OF ST. LUKE, LONDON.**—The executive committee have appointed Mr. Maxwell M. Smith as architect for the building of the new house, or Clergy Nursing Home, on the freehold site No. 14, Fitzroy-square, St. Pancras, which was recently was the town house of Colonel Robert W. Edis. The hostel, founded in September, 1892, is now established at No. 16, Fitzroy-square, Marylebone-road, and a building fund of 10,000*l.* is opened.

**MUNICIPAL ART GALLERY, LEEDS.**—Mr. S. Wilson, a well-known manufacturer of Leeds, has been invited for the Art Gallery the four large decorative panels, illustrative of Labour, which Mr. Henryk Gwynn, A.R.A., recently contributed to the Royal Hall of the International Art Exhibition at London, and for which he was awarded a gold medal.

**STANDARD FOR CEMENT.**—At the meeting of the London County Council on Tuesday the Works Committee reported that the London County Council's specification for Portland cement was the standard adopted up to the present time by the Borough Council. Some difficulty, however, had been found by the cement manufacturers in complying with the great variety of specifications in existence, the London County Council's test being only one of a large number. To obviate this difficulty, which exists not only in cement but in other branches of engineering, the Engineering Standards Committee had been appointed by the Institution of Civil Engineers and other societies, and had drawn up a specification and standard test for articles of manufacture connected with the engineering and building trades, Portland cement being among the number. The London County Council, in common with most other public authorities, is now adopting this standard or specification, and the Borough Councils Committee recommended that in future contracts the Borough Council should specify the cement to be as per the

British standard specification for Portland cement passed at the meeting of the Engineering Standards Committee on December 8, 1904. This was agreed to.

## Legal.

### THE WIDENING OF PICCADILLY.

The hearing of the case of *Notaras v. the Westminster City Council* concluded in the Chancery Division, before Mr. Justice Swinfen Eady, on the 1st inst.

Mr. Montague Lush, K.C., and Mr. Ashton Cross appeared for the plaintiff; and Mr. Eve, K.C., and Mr. Methold for the defendants.

This was an action by the plaintiff, Mr. Michael Emanuel Notaras, a cigarette maker and merchant, carrying on business at No. 30, Piccadilly, for an injunction to restrain the defendants from acquiring the whole of his premises instead of such part only as was necessary for the widening of Piccadilly. Plaintiff also asked, in the event of its being held that defendants were entitled to take the whole of his property, for an injunction to restrain them from selling any part thereof to the Piccadilly Hotel (Ltd.) or any person before offering it to the plaintiff. The plaintiff alleged that, as the Council only required 22½ ft. out of 65 ft., the total depth of plaintiff's building, to widen the street he could equally well carry on his business in the restricted area.

The plaintiff gave evidence to the effect that he found it impossible to get other suitable premises for his business in the immediate neighbourhood. The premises would be better when reduced, as the new front would be wider. His turn-over from sales was 8,000*l.* a year. He paid duty to the extent of 1,600*l.* a year for tobacco purchased.

Mr. W. R. Cross, an architect, gave evidence as to the feasibility of carrying out the plaintiff's business during the operations, although he admitted that the necessary protection involved trespassing on other people's property.

Mr. Eve pointed out that there would be no access to the plaintiff's premises as he only occupied the ground floor, and had not control over the basement or upper story.

Mr. Trollope, a surveyor and estate agent, gave evidence to the effect that there was no difficulty in the plaintiff remaining where he was during the carrying out of the improvement.

Mr. Eve said that if all the owners took this attitude no improvement could be effected. The plaintiff's lease had only 2½ years to run.

At the close of the plaintiff's case Mr. Eve, on behalf of the defendant Council, submitted that it was absolutely impossible to carry out the improvement if the Council were to take only the ground which would ultimately be thrown into the street.

Mr. Howard Martin, a building surveyor, examined, said that the improvement would take two years to carry out. It would be impossible to carry out the improvement if defendants were only entitled to take the ground which would ultimately have to be thrown into the street.

Cross-examined by Mr. Lush, Structurally there is no difficulty in rebuilding if plaintiff's premises remain?—Of course there is no difficulty in doing anything if you have money enough and are foolish enough to do it.

Mr. Andrew Young, valuer for the London County Council, was also of opinion that the improvement could not be effected unless the whole of the plaintiff's premises were acquired.

Cross-examined, The supports for pulling down the building would block up the plaintiff's entrance; people would have to squeeze through.

Mr. Alexander Stenning also gave corroborative evidence.

Mr. Lush, in summing-up the case on behalf of the plaintiff, contended that the widening was a bona-fide scheme, but it would not have been effected unless simultaneously and as part of the scheme the defendants had arranged to sell the surplus land to the hotel company. The Council were to pay 80,000*l.* for the strip of land. He submitted that the agreement with the Hotel Syndicate settled the fate of the plaintiff's premises, and prevented the Corporation from acting in an unprejudiced and judicial manner. The plaintiff could be dispossessed without trouble as the end of his lease, and all he asked was to be undisturbed for that period.

His lordship, in giving judgment, said that the right of pre-emption was obviously of no value to the plaintiff. In his opinion the improvement could only be carried out by acquiring the whole of the plaintiff's property, and that the whole of the plaintiff's property, and that the agreement to action was not vitiated by the agreement to re-sell land to the hotel company. He arrived at the same conclusion as in the case of the adjoining property, that it was physically impossible to pull down only the front portion of the premises. He thought the defendants' was a reasonable and necessary requisition, and he dismissed the plaintiff's action with costs.

Order accordingly.

## PATENTS OF THE WEEK.

### APPLICATIONS PUBLISHED.\*

21,555 of 1904.—B. A. SPAULL and E. J. HALL: *Portable Scaffolding or Scaffolds.*

This relates to a portable and adjustable scaffold, and consists in the combination with a ladder, of the adjustable frame, brake, or clamp, lifting gear, or its equivalent, automatic lock or stop, side shifting tackle, and a platform, which can be raised or lowered by workmen standing on the same.

24,449 of 1904.—D. M. NESBIT and ASHWELL & NESBIT, LTD.: *Radiators for Heating Buildings, and the like.*

This relates to the mounting of a radiator or the like upon trunnions, so as to enable the same to be raised or lowered to facilitate access to the rear thereof without interfering with the steam or water connexions.

24,784 of 1904.—N. COTLAND: *Apparatus for Opening and Closing Sliding Doors.*

This relates to an apparatus for opening and closing sliding doors, and is characterised by a telescopic device connecting two double sliding doors with a double central sliding door, in such a manner that after the opening of this central door it is possible to open the two extreme doors, whilst on closing the central door the two extreme doors are closed at the same time.

25,244 of 1904.—C. HORSMAN: *Single Toothed Gauges and Mortise Gauges for use by Carpenters and other Workers in Wood.*

This relates to the construction of single tooth gauges and of double tooth gauges for use by carpenters to gauge up a piece of wood to a parallel width by means of the single tooth gauge or to gauge mark the double boundary lines of a mortise, and consists of a square stem or a round stem, and also a stem block, which is pierced with a round or other shaped stem hole to suit the shape of the stem used with the stem block.

26,930 of 1904.—PLANET FOUNDRY CO., LTD., and G. F. CALDERWOOD: *Gas Pipes for Grates, Stoves, and the like.*

This relates to a grate stove or the like, and consists of a barless grate or cradle-like holder, fixed or adjustable, artificial fuel therein, and multiple gas burners beneath the holder, and adapted to project on series of ends, gas flames into the fuel.

27,687 of 1904.—R. E. ATKINSON: *Valves and Regulators for use upon Heating Systems.*

This relates to a steam-heating system, and consists in automatically controlling the supply of steam to each radiator by a thermostatic valve, influenced by the prevalent heat in or close to the radiator, and by a diaphragm valve, the differential pressure on which is controlled by a thermostat influenced by the prevalent heat in the room or chamber in which the radiator is situated.

27,777 of 1904.—R. E. ATKINSON: *Heating Apparatus.*

This relates to a vacuum system of steam-heating or other like apparatus heated by steam, and consists in controlling the supply of steam by a diaphragm valve on the supply main or pipe, the diaphragm of the valve being under the influence of the pressure existing in the return or exhaust main or pipe.

4,004 of 1905.—T. N. ROBINSON: *Machines for Planing and Moulding Wood.*

This relates to a machine for planing and moulding wood, and consists of a friction pulley mounted loosely upon a shaft in combination with a friction disc, arranged to be moved along its shaft towards or from the centre of the friction pulley, and means for driving the feed rollers from the shaft or the friction disc.

10,348 of 1905.—C. J. FOOKS: *Casement Fasteners.*

This relates to casement fasteners, and consists in the combination and arrangement of a movable body with a pin, said pin revolving loosely in a hole of a back plate, and riveted over to form a head. The back plate is provided with two countersunk screw holes for fixing the said back plate to the window sash.

10,838 of 1905.—M. RATE: *Double Paned Windows.* This relates to a double paned window, and consists in the arrangement of the window frame, which is formed with channels connecting the space between the panes and the outer air, and wadding plugs, gauze or sieves in the ventilating channels.

13,454 of 1905.—S. J. ROSENFELD: *Combined Wash-bowls and Water Receptacles.*

This relates to a wash-bowl, and comprises an inner and an outer wall of flexible material, the space between such walls constituting a water

\* All these applications are in the stage when opposition to the grant of Patents upon them can be made.



receptacle, a stoppered opening being provided in the inner wall for the passage of the water.

19,726 of 1905.—J. R. WILLIAMS: *Metal Sheet Piling.*

This relates to a metal sheet piling, composed of individual sections lapping upon each other and locked together so that they cannot be pulled apart in a horizontal direction, and is characterised by each section being in one integral metal plate, having a transverse member and parallel members extending laterally in opposite directions from the edges of said transverse member, and being about equal in extent, whereby said sections may be alternately faced in opposite directions with the adjacent lateral members of the respective sections in face to face contact, and forming a double layer, and is also characterised by each section having locking means to receive the adjacent edges of the lateral members of the adjoining sections, whereby each section becomes locked to each adjoining section at two points.

1,021 of 1905.—E. GIULIETTI: *Stages and the like for Theatres and in Arrangements for Operating the same.*

This relates to theatres, and consists in the arrangement of several movable superposed stages provided with raising and lowering means whereby anyone of the same can be brought on to a level with the fore-scene to serve as a stage on which the actors play, whilst the stage which is immediately over the one on a level with the fore-scene rises to a suitable height, and so forms the curtains or decorations of the ceiling.

5,018 of 1905.—W. ELLIS: *An Adjustable Cap and Washer for Connecting Outlet Pipes to Flushing Cisterns or other Vessels without Screwing or Soldering.*

This relates to a telescopic and adjustable joint for flushing cisterns and similar vessels, and consists in the combination of a cap having a rubber or suitable ring or washer, with a flushing pipe, the end of said pipe being telescoped into the siphon pipe of the cistern, and held at any required height within the length of the siphon pipe, when the cap with its rubber washer is screwed up tight.

5,827 of 1905.—W. H. DRAIN: *Means for Securing Grids or Covers on Basin Gullies, Sewer Manholes, and the like.*

This relates to means for securing the grid or cover on a drain gully, sewer manhole, or the like, and consists of two dove-tailed projections on the underside of the grid or cover, and at opposite sides of the same, engaging with undercut recesses in the drain gully, sewer manhole, or the like, one of the said projections being so mounted and arranged in the grid or cover as to be capable of being turned by a key to lock or unlock the grid or cover.

17,486 of 1905.—J. MOES and G. NICOLL: *Flushing Apparatus for Water-closets.*

This relates to a flushing apparatus for water-closets, consisting of a standard, a leading valve, and a discharging valve both arranged in a governing chamber, a cock for regulating the flushing duration, branch tubes for connecting the apparatus with the water conduit, and feeding the governor chamber, an inner tube, a movable middle tube, and an outer tube forming part of said standard and lever for operating the apparatus.

#### TERMS OF SUBSCRIPTION.

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#### SOME RECENT SALES OF PROPERTY:

##### ESTATE EXCHANGE REPORT.

Nov. 23.—By BALLARD & MARSH (at Twickenham).	
Twickenham, Middlesex.—Radnor-rd., "Radnor Lodge," 1, y.r. 40s.	£560
1 and 6, Radnor-rd., 107 yds, g.r. 14s. 14s.	
1 and 3, Grosvenor-rd., 1, y.r. 60s.	815
Teddington, 2, Hampshire-villas, 1, y.r. 44s. 12s.	655
Fulwell-rd., a freshhold building site	215
Nov. 24.—By HARRY BULL (at Bedford).	
Bedford—24, Grove-pl., 1, y.r. 30s.	330
55 and 55, Westbourne-rd., 1, w.r. 27s. 6s.	320
46 and 48, Chancery-rd., 1, y.r. 90s.	865
Nov. 27.—By ELLIOTT, SON, & BOYTON.	
Soho—37 and 38, Erith-st. (s.), 1, y.r. 126s.	3,700
Regent's Park—33, Chester-ter., u.t. 9s. yds.	
g.r. 52s. 10s., y.r. 22s.	
Kentish Town—16, 18, and 20, Rochford-st., 1, u.t. 50s. yds., g.r. 15s., y.r. 127s.	780
Yarmouth, Isle of Wight—Newport-rd., g.r. 15s., reversion in 95 yds.	360
Camberwell—89 and 91, Avenue-rd., u.t. 45s. yds., g.r. 16s., w.r. 72s. 16s.	400

By HEDGER & MIXER.	
Notting Hill—5, Bedford-rd., u.t. 80s. yds., g.r. 12s., e.r. 100s.	£700
By KEMSLEY.	
Walthamstow—62 to 68 (even), Cavendish-rd., 1, w.r. 93s. 12s.	700
68 to 72 (odd), Selwyn-rd., 1, w.r. 117s.	875
Elm-gr., g.r. 10s. 10s., reversion in 93 yds.	285
5, 7, and 9, Elm-gr., 1, w.r. 53s. 10s.	500
43 to 54 (even), Chingford-la. (s.), 1, y.r. 109s. 4s.	1,150
Woodford Green, Essex—1 and 2, Bourne-cottages, 1, w.r. 33s. 16s.	860
By MOSS & JAMISON.	
Chelsea—62, Oakley-st., u.t. 52s. yds., g.r. 10s., y.r. 65s.	680
Enfield—2, Rayleigh-rd., 1, w.r. 20s. 16s.	380
By SKIDNOR & GOULDEN.	
Lewisham—High-st., "Mount Granville," u.t. 27 yds., g.r. 10s. 1s. 6.	520
By F. V. VAREY & SON.	
Holloway—Anson-rd., "Broadlands," u.t. 64 yds., g.r. 38s., e.r. 70s.	155
November 28.—By H. J. BODLEY.	
Herne Hill—158, Mayall-rd., u.t. 63 yds., g.r. 6s., e.r. 90s.	675
By BROWETT & TAYLOR.	
Battersea—Howey-st., f.g. rents 15s., reversion in 60 yds.	374
Highbury—Brunswick-rd., f.g. 12s., reversion in 38 yds.	370
Highbury—Avenell-rd., etc., f.g. 18s., reversion in 72 yds.	480
Stratford—High-st., etc., f.g. 35s., reversion in 40 yds.	750
Bethnal Green—Whiston-st., etc., f.g. 15s., reversion in 21 yds.	405
By NORRIS & HADLEY.	
Hackney—6 and 7, Sidworth-st., u.t. 65 yds., g.r. 11s., w.r. 70s. 14s.	500
By VENTRO, BULL, & CO.	
Hackney—20, 21, 22, and 23, Ada-pl., 1, w.r. 114s. 8s.	780
By SEDGWICK, SON, & WEALE (at Watford).	
Watford, Herts.—28, St. Alban's-rd., 1, e.r. 110s. 1 to 17 (odd), Bulchard-st., u.t. 60s. yds., 64, Pinner-rd., 1, w.r. 16s. 18s.	595
Pinner-rd., eleven freshhold building plots	220
By W. H. HANSON (at Gainsborough).	
Stow, Lincs.—Freshhold farm-house and 72 a. 3 r. 36 p.	2,350
November 29.—By FIELD & BONS.	
Bermondsey—50, Maltby-st., and 58, Stanworth-st., u.t. 7 yds., g.r. 4s., y.r. 56s.	145
By HUGHES & TRENCH.	
Shoreditch—112, Weymouth-ter., 1, e.r. 60s.	450
Shoreditch—107 and 108, High-st. (s.), u.t. 51 yds., g.r. 16s., e.r. 350s.	2,000
By R. T. TREY & SON.	
Dalston—28, Mayfield-rd., u.t. 15s. yds., g.r. 5s., y.r. 34s.	125
Finsbury Park—3, 7, 18, and 16, Ambler-rd., u.t. 65 yds., g.r. 25s. 4s., y.r. 18s.	1,465
Stroud Green—67, Lancaster-rd., u.t. 51 yds., g.r. 7s. 10s., y.r. 46s.	430
By T. B. WESTACOTT.	
Camden Town—125 and 136, Great College-st. (s.), u.t. 36 yds., g.r. 11s., y.r. 100s.	800
Kentish Town—55 and 57, Warden-rd., u.t. 52 yds., g.r. 14s., y.r. 92s. 4s.	630
By DOUGLAS, YOUNG, & CO.	
Holborn—3, 6, and 8, Broadbald's-rd. (Dartmouth-church), u.t. 45s. 12s., y.r. 100s.	2,970
By WYATT & SON (at Chichester).	
Chichester, Sussex—28 to 31, Cleveland-rd., 1, w.r. 56s. 8s.	620
November 30.—By R. W. HARRIS.	
Brixton—102, Loughborough-pl., u.t. 17 yds., g.r. 6s., y.r. 40s.	200
By HERRING, SON, & DAW.	
Balham—64, Rosier-rd., u.t. 5 yds., g.r. 9s. 9s., y.r. 32s.	170
By NEWBON, EDWARDS, & SHEPHERD.	
Gray's Inn-road—No. 244 (s.), u.t. 13s. yds., g.r. 8s. 10s., y.r. 55s.	280
Barnebury—17, Cumberland-st., u.t. 50s. yds., g.r. 7s., y.r. 42s.	340
Willesden—Vicarage-rd., f.g. 9s., reversion in 74 yds.	500
City-road—115, East-rd. (s.), u.t. 42 yds., g.r. 12s., y.r. 60s.	210
By WM. STEVENS.	
Dalston—59, Queen's-rd., and 62, Angrave-st., u.t. 32s. yds., g.r. 11s., y.r. 66s.	470
61, 63, 67, 69, 71, and 73, Queen's-rd. (s.), u.t. 38s. yds., g.r. 11s., y.r. 284s. (in lots)	2,165
7 and 8, Brownlow-st. (s.), u.t. 38s. yds., g.r. 11s., y.r. 64s. 12s. 4d.	540
8, Albion-sq., u.t. 38s. yds., g.r. 7s., y.r. 46s.	300
By STIMSON & SONS.	
Gray's Inn-road—47, Acton-st., u.t. 35s. yds., g.r. 21s., y.r. 40s.	100
Holloway—2 and 4, Brock-st., u.t. 50s. yds., g.r. 11s., y.r. 52s.	390
Camberwell—20 and 31, Neate-st. (s.), u.t. 7s. yds., g.r. 6s., y.r. 58s. 12s.	160
Bermondsey—57, Fort-rd., 1, u.t. 23 yds., w.r. 41s. 12s.	210
Clapham—104, Fentiman-rd., 1, e.r. 75s., 5, Richmond-ter., u.t. 22s. yds., g.r. 7s. 10s., y.r. 45s.	1,200
Herne Hill—141, Fawcraze-av., u.t. 93 yds., g.r. 8s., e.r. 45s.	200
By FRANK SWAIN.	
Notting Hill—Holland Park-ter., "The Castle" p.h., etc., g.r. 100s., reversion in 47 yds.	8,000
By CROOKS (at Maidstone).	
East Malling, Kent—"Paris Farm," 43 a. 1 r. 5 p., 1, y.r. 110s.	1,450
December 1.—By B. S. BROWN.	
Shepherd's Bush—86, 90, and 92, Godolphin-rd., 1, y.r. 110s.	1,655
56, Warbeck-rd., 1, y.r. 42s.	495

By GEO. BILLINGS.

Hackney—41, Lauriston-rd., u.t. 37 yds., g.r. 6s., y.r. 38s.

7 and 9, Gaskin-rd., u.t. 50 yds., g.r. 7s., y.r. 56s.

By J. GREIFF & SON.

Ealing—Durham-rd., f.g. rents 52s. 5s., reversion in 96 yds.

Pope's-la., f.g. 27s., reversion in 96 yds.

Devonport-rd., f.g. 44s. 8s., reversion in 98 yds.

Contractions used in these lists.—F.g. for freshhold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; f.r. for f. for freshhold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; y.r. for yearly rental; q.r. for quarterly rental; y. for yearly rental; u.t. for unexpired term; p.a. for per annum; y.s. for years; la. for land; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; g.c. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

#### MEETINGS.

FRIDAY, DECEMBER 8.

Junior Institution of Engineers.—Professor J. T. Morris on "Electric Mains for Power Transmission Work." 8 p.m.

MONDAY, DECEMBER 11.

Society of Arts (Continued Lecture).—Dr. J. A. Fleming on "The Measurement of High Frequency Currents and Electric Waves." 8 p.m.

Surveyors' Institution.—Mr. J. J. Done on "Valuations for Mortgage." 4 p.m.

TUESDAY, DECEMBER 12.

Society of Arts (Applied Art Section).—Mr. Louis N. Parker on "Historical Pageants." 8 p.m.

Institution of Civil Engineers.—Paper to be further discussed: "The Steam Turbine," by the Hon. Charles Algernon Parsons and Mr. G. G. Stoney. 8 p.m.

WEDNESDAY, DECEMBER 13.

Edinburgh Architectural Association.—Mr. L. G. Mouchel on "Pierro-Concrete Construction," illustrated by lantern slides. 8 p.m.

Society of Arts.—Mr. W. F. Mitchell on "The Commerce and Industries of Japan." 8 p.m.

Institute of Sanitary Engineers.—Annual Dinner, Holborn Restaurant. 8 p.m.

Northern Architectural Association.—Mr. T. Preston on "Italian Art and Travel," with lantern illustrations. 7.30 p.m.

THURSDAY, DECEMBER 14.

Institution of Electrical Engineers.—Adjourned discussion on Mr. W. H. Patehall's paper on "The Charing Cross Company's City of London Works." 8 p.m.

27 Square Club (International Hotel Restaurant).—General meeting. The chair will be taken by Mr. C. W. Stephenson. 5.45 p.m.

Manchester Society of Architects.—Mr. C. H. Hathcock on "Some Lessons from American Methods." 6.45 p.m.

FRIDAY, DECEMBER 15.

Architectural Association.—Mr. W. H. Bidlake on "Church Towers and Spires," illustrated with lantern views. 7.30 p.m.

Institution of Mechanical Engineers.—(1) Adjourned discussion on the Seventh Report of the Alloy Research Committee on the "Properties of a Series of Iron-Nickel-Manganese-Carbon Alloys," by Dr. H. C. H. Carpenter, Mr. B. A. Hadfield (member), and Mr. Percy Longmuir. (2) Paper to be read and discussed (if time permits), "Behaviour of Materials of Construction Under Pure Shear," by Mr. E. G. Lloyd. 8 p.m.

Junior Institution of Engineers.—Westminster Palace Hotel.—Paper on "Electric Mains for Power Transmission Work," by Professor J. T. Morris, L.E.E. 8 p.m.

Institution of Civil Engineers (Student Meeting).—Mr. E. E. Mann, B.Sc., on "Tests of Street Illumination in Westminster." 8 p.m.

SATURDAY, DECEMBER 16.

Junior Institution of Engineers.—Visit to the Electrical Engineering Works of Messrs. Johnson & Phillips, Old Charlton. 10 a.m.

PRICES CURRENT OF MATERIALS.

\* \* \* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.	
	s. d.	
Hard Stocks	1 7 0	per 1000 alongside, in river.
Rough Stocks	1 4 0	" " "
Grizzlies	2 0 0	" " "
Facing Stocks	2 0 0	" " "
Shippers	2 0 0	" " "
Flettons	1 5 6	" at railway dep't.
Red Wire Cuts	1 11 0	" " "
Best Furcham Red	3 12 0	" " "
Best Red Pressed	5 0 0	" " "
Best Blue Pressed	4 1 0	" " "
Best Staffordshire	4 1 0	" " "
Do. Bullnose	4 6 6	" " "
Best Stourbridge	3 15 6	" " "
Fire Bricks	3 15 6	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed	12 0 0	" " "
Stretchers	11 0 0	" " "
Headings	11 0 0	" " "
Quoins, Bullnose, and Flute	15 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	15 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints.	20 0 0	" " "

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.



## COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.
*DESIGN FOR EXTENSION OF COUNCIL HOUSE Selly Oak, Council Schools, Raddle Barn-lane .....	Birmingham Corporation..... King's Norton, U.D.C., Edu. Com. ....	One hundred guineas..... Not stated .....

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by
Hampton Hill Fire Station .....	Hampton U.D.C. ....	S. H. Chambers, Surveyor Public Offices, Hampton Hill
Bangor, Co. Down, School .....	Governors of Endowed School .....	E. L. Woods, C.E., Bangor, Co. Down .....
Buxton, School for 400 Boys, Kents Bank-road .....	Derbyshire Education Committee .....	C. Swain, Architect, College-road, Buxton .....
Belfast, Painting, etc., at Dispensary Stations .....	Belfast Guardians .....	J. V. Robb, Clerk, Victoria House, Belfast .....
Bingley, Sewer Culvert at Dowley Gap, etc. ....	Bingley District Council .....	R. Armistead, Engineer, 8, Charles-street, Bradford .....
Bingley, Earthenware Pipe Sewers, Dowley Gap, etc. ....	do. ....	do. ....
*LOP VANS AND WATER VANS .....	Willesden District Council .....	Council's Engineer, Public Offices, Dyne-road, Kilburn, N.W. ....
West Bartlepool, Reconstruction of Middleton-rd. Bridge .....	North Eastern Railway Co. ....	F. W. Appleyard, Res. Dist. Engrs. Office, Middleton-rd., Rochdale .....
Ballinav, Ireland, Waterworks .....	Castleblayney R.D.C. ....	B. Coyle, Clerk Council Office, Castleblayney, Ireland .....
Grays Thurrock, Stoneware Pipes .....	Grays Thurrock U.D.C. ....	A. C. James, Surveyor, High-street, Grays .....
Grays Thurrock, 135 tons of Stone Bricks .....	do. ....	do. ....
Skewdeck Spans, etc. ....	East Indian Railway Company .....	C. W. Young, Secretary, Nicholson's Lane, London, E.C. ....
Rochdale, 500 tons of Oil .....	Gas and Electricity Committee .....	T. B. Ball, Manager, Gasworks, Dane-street, Rochdale .....
Birkenhead, Flagging, Paving, etc., of Passages .....	Birkenhead Corporation .....	C. Brownridge, Borough Engineer, Town Hall, Birkenhead .....
Wolverhampton, Two Class-rooms, Bingley-st. School .....	Education Committee .....	T. H. Fleeming, Architect, 10, Queen-square, Wolverhampton .....
Wolverhampton, Two Class-rooms, at Springfield road .....	do. ....	do. ....
Wolverhampton, Desks and Chairs for School of Art .....	Harwich Corporation .....	H. Ditcham, Borough Surveyor, 7, West-street, Harwich .....
Dovercourt, Road Works, Nelson-road, etc., at Hirwain .....	Vaynor and Penderyn R.D.C. ....	R. C. Jenkins, Engineer, Cedar Road, near Merthyr Tydfil .....
Pendervn, 420 yds. of Pipe Sewers, etc., at Hirwain .....	Burton-on-Trent Guardians .....	T. Jenkins, Architect, Station-street, Burton-on-Trent .....
*ADDITIONS, ETC., AT UNION OFFICES .....	Bridlington Property Committee .....	R. H. Mathews, C.E., Town Hall, Bridlington .....
Aberdare, 61 Houses .....	Gadlys Tchaif Building Club .....	T. D. Williams, 10, Canon-street, Aberdare .....
Walthamstow, Concrete Pipes .....	Walthamstow U.D.C. ....	Surveyor to Council, Town Hall, Walthamstow .....
Stores .....	Barry Railway Company .....	Storekeeper, Broad-street, Barry .....
Battle Timbers and Pitch Pine .....	Crown Agents for the Colonies .....	Crown Agent for Colonies, Whitehall Gardens, London, S.W. ....
Edinburgh, Conveniences, etc., E. Primrose-st. gardens .....	Edinburgh Corporation .....	T. M. Franklin, County Council Office, Edinburgh .....
Cwmystyng, Alterations, etc., to School .....	Monmouthshire Education Com. ....	C. Dauncey, County Council Office, Newport, Mon. ....
Georgetown (Tredegar), Alterations, etc., to School .....	do. ....	do. ....
Materials .....	Derby Corporation .....	J. W. Wardle, Boro' Surveyor, Court House, Longton, Staffs. ....
Derby, Alterations, etc., Poor Law Offices, Beck-st. ....	Longthorpe Guardians .....	F. C. Coulthurst, Architect, 4, Albert-street, Derby .....
Newton-in-Makerfield, Rebuild, etc., Pumping Engine .....	The U.D.C. ....	R. T. Surtees, Waterworks Engineer, at the Waterworks .....
Willeby, Alton, etc., to Blocks at Hull City Asylum .....	Hull Asylums Committee .....	J. H. Hirst, City Architect, Town Hall, Hull .....
Leeds, Furnishing Infirmary (block "A") .....	Leeds Guardians .....	T. Winn & Sons, Architects, 84, Albion-street, Leeds .....
Aberystwyth, Hot Water Heating Plant at Council Sch. ....	Glamorgan County Council .....	T. M. Franklin, County Council Office, Westgate-street, Cardiff .....
Reading, Main Road Materials .....	Berkshire County Council .....	J. F. Hawkins, County Surveyor, Bank-ch. Cross-street, Reading .....
Settle, Outfall Sewers and Disposal Works .....	Settle R.D.C. ....	Barber, Hopkinson, & Co., Engineers, Crown Bank-ch. Reading .....
Coventry, Oxide shed at Toleshill Works .....	Coventry Gas Committee .....	R. W. Stevenson, Engineer, Gas Works, Coventry .....
Dalkey, Sewer at Killiney and Barnhill Roads .....	Dalkey U.D.C. ....	J. P. Gahan, Clerk, Town Hall, Dalkey, Ireland .....
Perth, Widening Street, Causewaying, etc. ....	Perth Town Council .....	R. McKillop, Borough Surveyor, Perth .....
West Hartlepool, Additions to Golden Lion Hotel .....	Chorley Corporation .....	A. Holt, Stockton-street, West Hartlepool .....
Chorley, Drainage Liquid .....	Hendon U.D.C. ....	J. Mills, Town Clerk, Town Hall, Chorley .....
*ROAD WIDENING, PIPE SEWERS, ETC. ....	Southgate U.D.C. ....	Council's Engineer, Council Offices, Hendon, N.W. ....
*MAKE-UP YORK, NATAL OAKS RD., BOWES-PK. ....	Durham County Education Authority .....	Council's Surveyor, Council Offices, Palmer's Green, N. ....
Southwick, Council School .....	Brighton Guardians .....	Brown & Spain, Architects, 12, John-street, Sunderland .....
Brighton, Boundary Wall in Chalk-lane .....	Hampton U.D.C. ....	R. Burfield, Clerk, Parochial Offices, Prince's-street, Brighton .....
Hampton Hill, Road Works, Park-road .....	Commissioners of H.M. Works, etc. ....	S. H. Chambers, Surveyor Public Offices, Hampton, Middlesex .....
*ENLARGE, RUGBY STATION, SORTING OFFICE .....	L. & N.W. & Gt. W. Jt. Ry. Co. ....	Station Sorting Office, Rugby .....
*OAKR. IRON ROOF, PADDINGTON GDS. ST. ....	Borough of Bermansdey .....	Engineer's Office, Paddington-station, W. ....
*RECON. BDG. OVER CHELSEA CREEK, LOTS RD. ....	Toxteth Park Guardians .....	do. ....
*ABERDEEN GRANITE PITCHERS, 4,000 TONS .....	Graigola Merthyr Co., Ltd. ....	Town Clerk, Town Hall, Spa-road, S.E. ....
Liverpool, Boundary Walls, etc., Toxteth .....	Great Western Railway .....	W. W. Thomas & Co., Architects, 15, Lord-street, Liverpool .....
Swansea, Stores .....	Great Crosby U.D.C. ....	The Company, Swansea .....
Great Crosby, Sewers .....	Eastern Group of Manger .....	W. Hall, Surv., Council Offices, Corporation-rd., Gt. Crosby, Lancs. ....
Havodryns, Crumlin, Alterations, etc., to School .....	do. ....	H. T. Griggs, Architect, Newport, Mon. ....
Abersychan, Alterations, etc., to School .....	Pembrokeshire Education Authority .....	D. E. Thomas, Architect, 17, Victoria-place, Haverfordwest .....
Camrose, North, Additions, etc., to Schools .....	do. ....	do. ....
Lambston, Additions, etc., to Schools .....	do. ....	do. ....
Waterston, Additions, etc., to Schools .....	Fulham Borough Council .....	do. ....
Moxgrove, Cardigan, Additions, etc., to Schools .....	Gateshead Corporation .....	Borough Surveyor, Town Hall, Fulham, S.W. ....
*MAKING-UP ROADWAY, HARBOR-STREET .....	Tiverton Corporation .....	N. P. Pattinson, Borough Engineer, Town Hall, Gateshead .....
Gateshead, Fire Brigade Station .....	Glasgow & South Western Railway .....	J. Siddals, Borough Engineer, Town Hall, Tiverton .....
Tiverton, Sewage Disposal Works .....	Harpenden U.D.C. ....	R. H. Leverton, Surveyor, Public Hall, Harpenden .....
Elderslie, N.B., Railway & Widening .....	Elham Guardians .....	J. Loneragan, 11, Cheriton-place, Folkestone .....
Harpenden, Roadworks, Burton-road .....	do. ....	do. ....
Lancashire Boiler .....	H.M. Office of Works .....	H.M. Office of Works, Store's Gate, Westminster, S.W. ....
Superheaters .....	Prestwich Guardians .....	T. Worthington & Son, Architects, 48, Brown-street, Manchester .....
*ENLARGE, OF HEAD POST OFFICE, BRADFORD .....	Llandaff and Dinas Powis R.D.C. ....	J. H. James, Architect, 18, Quay-street, Cardiff .....
Caezan, Infectious Diseases Hospital .....	West Sussex C.C. ....	W. McIntosh, County Surveyor, 22, Worthing-road, Hove .....
Horsham, Picked Surface Paving and Stone .....	Hove Council .....	Borough Surveyor, Town Hall, Hove .....
Shoreham Harbour, Broken Quartzite, Granite, etc. ....	Newport Gas Co. ....	do. ....
*MAIN DRAINAGE WORKS .....	do. ....	T. Canning, Engineer, Gasworks, Mill-street, Newport, Mon. ....
*STORM WATER OUTFALL, GROYNES, ETC. ....	do. ....	do. ....
Newport, Mon., Extension of Retort-House .....	do. ....	do. ....
Newport, Mon., Regenerative Retort Settings .....	do. ....	do. ....
Newport, Mon., Coke Handling Plant .....	Dis. Comm. Middle Ward, Co., Lanark .....	do. ....
Newport, Mon., Gas Engines and Plant .....	North Eastern Railway Co. ....	W. L. Douglas, C.E., District Offices, Hamilton .....
Newport, Mon., Six Turbines .....	Southern Gasworks & Water Co. ....	T. M. Newell, Engineer, Dock Office, Hull .....
Hamilton, N.B., Bridge over Kype Water .....	Lancaster Corporation .....	A. H. Bone, Engineer, 148, High-street, Portsmouth .....
West Hartlepool, Reconstruction of Graving Dock .....	West Suffolk C.C. ....	E. W. Mountford, Architect, 17, Buckingham-street, W.C. ....
*EXTENSION OF PIER .....	St. Mountsin Colliery Co., Ltd. ....	A. A. Hunt, County Architect, Sudbury .....
*NEW TOWN HALL, LANCASTER .....	Stow Guardians .....	R. Beckwith, Masham .....
*ADDS, ETC., SHIRE HALL, BURY ST. EDMUNDS .....	Building Committee .....	Faldon Collieries, Pontyfridd .....
Masham, Painting, etc., Wesleyan Chapel .....	Cumberland, etc. ....	R. E. Wilkes, Clerk, Stowmarket .....
Llanelli, Colliery Stores .....	Governors, Watford Grammar Schls. ....	R. Dixon, 318, Edgely-road, Chadwell Heath, Stockport .....
Pontyfridd, Widening 140 yds. of Upcast Shaft .....	Staffs Education Committee .....	C. P. Ayres, Architect, Hickmansworth-road, Watford .....
Stow, set of Deepwell Pumps .....	do. ....	do. ....
Widnes, St. Paul's Ch. Tower Completion .....	do. ....	do. ....
Carlisle, at Watermain, Seine-hill, Scotch to Asylum .....	do. ....	do. ....
*NEW SCHOOL FOR GIRLS, WATFORD .....	do. ....	do. ....
*NEW SCHOOL AT BURNTWOOD .....	do. ....	do. ....

## PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.
*SECOND-CLASS ENGINEERS, G.P.O. ....	Civil Service Commission .....	Not stated .....

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. vii. x.

Public Appointments, xvii.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays. (N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders unless under the amount tendered is stated, nor any list in which the lowest tender is under 100*l.*, unless in some exceptional cases and for special reasons.)

\* Denotes accepted. † Denotes provisionally accepted.

**ALLOTMENTS.**—For the erection of caretaker's house at various Outfall Works, for the Urban District Council, Mr. J. C. Connes, architect, Alkots. Quantities by estimate:

Brickwork	£298 13 0	R. Leake & Sons, Nor-	
Plaster	257 10 0	mantion*	£235 0 0
Painting	256 10 0	Galagher	234 0 0
Painting	230 0 0		
Painting	244 0 7		

† Painting excluded.

**MARKING TOWN.**—For private street works in Park, Rivington, and Montague Avenues, for the Urban District Council, Mr. C. F. Dawson, Surveyor, Public Offices, Rivington. Quantities by Surveyor:

	With Norway Granite Block Channelling.	With Scorin Sett Channelling.	With Concrete Channelling.
Parsons	£ 2,308 8 2	£ 2,308 8 2	£ 2,308 8 2
London	£ 2,301 17 1	£ 2,301 17 1	£ 2,301 17 1
Waterhouse	£ 2,333 5 4	£ 2,324 6 1	£ 2,262 11 5
London	£ 2,354 7 7	£ 2,326 2 1	£ 2,495 15 1
W. Glenny	£ 2,428 19 1	£ 2,367 8 1	£ 2,495 15 1
London	£ 2,442 6 1	£ 2,442 6 1	£ 2,385 15 1
J. Jackson	£ 2,513 0 0	£ 2,494 3 9	£ 2,484 15 3
J. Shollhouse	£ 2,534 19 10	£ 2,518 2 10	£ 2,534 19 10
W. Griffiths & Co.	£ 2,574 12 0	£ 2,584 0 0	£ 2,527 0 0
Starkey	£ 2,577 5 10	£ 2,549 0 4	£ 2,440 10 11
Free & Sons	£ 2,601 13 1	£ 2,290 0 7	£ 2,582 16 1
Milkin Ltd.	£ 2,748 0 0	£ 2,705 11 10	£ 2,705 11 10

† With granite sett channelling.

**LACKBURN.**—For the erection of a new Post-office, for the Commissioners of H.M. Works and Public Buildings:

	Credit.
J. Parkinson & Sons, Ltd.	£12,531 14 8
J. Neill & Sons	12,500 0 0
J. Thornton & Sons	11,981 0 0
J. Knowles	11,775 0 0
J. Whewell	11,480 0 0
J. Roland	11,100 0 0
J. Marshall & Dent	11,000 0 0
J. Peckitt & Sons	10,980 0 0
J. Livesey	10,900 0 0
J. Lewis & Sons	10,745 0 0
J. Higson & Sons	10,446 0 0
J. Cronshaw	10,260 0 0
J. W. Woolf Cronshaw & Sons	10,200 0 0

**BOURNEMOUTH.**—For construction of two passenger boats and steam and vessel offices for the Town Council, Mr. W. Lacey, Borough Engineer:

Waygood & Co., Bournemouth-road, Great Dover-street, London, S.E. £2,760

**BOURNEMOUTH.**—For making up Stanfield-road and Sedgley-road, for the Town Council, Mr. F. W. Lacey, Borough Engineer, Municipal Offices, Bournemouth:

Grounds & Newton, Richmond-chambers, The Square, Bournemouth\* £269 11 6

**BOURNEMOUTH.**—For sewerage Portland and York-st., for the Town Council, Mr. F. W. Lacey, Borough Engineer, Municipal Offices, Bournemouth:

Grounds & Newton, Richmond-chambers, The Square, Bournemouth\* £195 9 2

**BOURNEMOUTH.**—For sewerage Muscliff-road, for the Town Council, Mr. F. W. Lacey, Borough Engineer, Municipal Offices, Bournemouth:

Grounds & Newton, Richmond-chambers, The Square, Bournemouth\* £255 12 6

**CARDIFF.**—For building two cottages at Marshfield, Mr. E. Patten, Mr. J. Coates Carter, architect, Bank-buildings, Cardiff:

J. H. Evans £538 0 0 J. H. Evans £500 0 0

**CONGLTON.**—Accepted for workhouse, Conglton, Mr. W. Wyatt, engineer, 98, Radford-road, Leamington:

For Cast-iron Pipes.

For Valves and Hydrants.

**EAST STONEHOUSE.**—For erecting a new mortuary, for the Urban District Council, Mr. E. Townshend, Surveyor, Town Hall, East Stonehouse:

For the Mortuary.

**FALMOUTH.**—For surface water drainage at Berkeley-place, Mr. W. H. Tresidder, Borough Surveyor, Falmouth:

Corder & Barnicot, Falmouth\* £ 3 31  
N. Christophers £ 8 11  
F. Strongman & Sons £ 4 01  
† For lined yard for 3-in. drain; average depth of trench, 2 ft. 6 in.

**PLIXTON.**—For the construction in stone and concrete of a bridge between Plixton and Carrington over the River Mersey, for the County Palatines of Lancaster and Chester, Mr. W. Compton Hall, County Bridge-master:

M. Hawley, Ridgmont, Burnswick, Hull. £3,595 13 2

**GUILDFORD.**—For forming Middelton-road on the Woodridge Estate, Guildford, Messrs. Houston & Houston, architects and surveyors, 7, Long-acre, W.C., and 148, High-street, Guildford:

Cunningham, S. Kavanagh  
Forbes & Co. £1,607 0 0 & Co. £1,525 0 0  
Musselfilth & Sapp, £89 0 0 A. Streeter & Co. £1,477 18 9  
Hewett & Sons £1,464 16 10 G. A. Franks £1,473 0 0  
J. Smith & Sons, Ltd. £380 17 3 Co. London\* £1,430 0 0  
S. Atkins £1,607 0 0  
James & Hebburn £1,554 0 0

**HEATHER LEAZES.**—For erecting a boarding-house of seventeen rooms at Heather Leazes, near Warwick, for the Misses Smith, Mr. Temple Wilson, architect and surveyor, Alnwick:

Brickwork and Joiner Work.

R. Carse, Ambie, Acklington\* £905 5 8

Plumbing.

Reavell Bros., Alnwick\* £112 14 0

Slatting and Plastering.

J. Purdie, Alnwick\* £133 0 0

Painting and Glazing.

J. W. Kransgrill, Alnwick\* £17 0 0

**HENDON.**—For supplying and fixing of about 250 yds. of creosoted deal post and rail fencing, for the Urban District Council, Mr. R. S. Grimley, Council's Surveyor, The Burroughs, Hendon, N.W.:

	Posts. 7 ft. 6 in. by 3 in. by 7 in.	Stakes. 6 ft. by 2 in. by 4 in.	Rails. 18 ft. by 1 in. by 4 in.	Erecting. per yard.	Concreting each post.
A. Stevens	£ 2 1	£ 1 10	£ 1 5	£ 3 10	£ 3 10
Rowland Bros., Fenny Stratford	£ 2 6	£ 1 4	£ 1 0	£ 3 6	£ 3 6
D. Perkins	£ 2 6	£ 1 4	£ 1 0	£ 3 6	£ 3 6

**HENDON.**—For making-up and paving Montagu-road, West Hendon, for the Urban District Council, Mr. R. S. Grimley, Council's Engineer, The Burroughs, Hendon, N.W.:

	Net totals.	F. Deacon & Son	£245 0 0
W. R. & A. Hite	£1,320 0 0	E. J. Burton	800 0 0
Leather & Son	1,150 0 0	G. Curdington	800 0 0
Green & Smith	1,145 0 0	G. Kendall	798 0 0
G. W. Street	1,039 10 0	G. Stinchcombe	709 0 0
J. C. Small	1,025 0 0	F. Smith	696 0 0
Heywood & Sparkman	998 0 0	Hill & Nickolls	695 0 0
Myall & Upton	950 0 0	Hall & Jacobs	660 0 0
Chamber Bros.	955 0 0	Woolstall Bros.	636 0 0
W. Jarvis	924 12 6	F. F. Couch	630 0 0
Harris & Co.	920 0 0	A. J. Gardner	600 0 0
F. B. Hope	895 0 0	H. & W. Cude	590 0 0
B. Sargeant	887 0 0	N. H. Tredd	485 10 0
G. Wales	868 16 0	H. H. Baber	465 0 0
F. D. Hidd	850 0 0	Co.	465 0 0

**LEIGH.**—For reconstruction of Hurst Mill Bridge in concrete and stone, for the Main Roads and Bridges Committee of the County Palatine of Lancaster. Mr. W. Compton Hall, County Bridge-master:

H. M. Nowell, Stockton-on-Tees and Manchester £520 3

**LONDON.**—For erecting Physically Defective School, Rosendale-road, Wandsworth, for the London County Council:

F. & H. F. Higgs	£3,570 0 0
W. Akers & Co., Ltd.	3,513 0 0
Leslie & Co., Ltd.	3,390 0 0
J. Marsland & Sons	3,475 0 0
Galbraith Bros.	3,471 5 6
W. Downes	3,457 0 0
E. Triggs	3,540 0 0
J. Smith & Sons, Ltd.	3,388 0 0
L. Whitehead & Co., Ltd.	3,393 0 0
Holliday & Greenwood, Ltd.	3,354 0 0
J. Garrett & Sons	3,333 0 0
W. Johnson & Co., Ltd.	3,279 0 0
G. B. Wallis & Sons, Ltd.	3,263 0 0
T. G. Sharphington	3,257 0 0
J. & C. Bowyer, Westow-street, Upper Norwalk	3,169 0 0

[The architect's estimate, comparable with these tenders, is £3,403.]

**LONDON.**—For the construction of a new bridge over the Grand Junction Canal at Old Oak-lane, near Willesden Junction, Acton, for the Light Railways and Tramways Committee of the County Council of Middlesex, Mr. H. T. Waklam, County Engineer, Middlesex Guildhall, S.W.:

Pedretto & Co.	£6,850 10 0	S. Kavanagh & Co.	£4,959 0 0
W. H. Hyde	6,840 0 0	A. Thomas	4,928 2 0
J. Cochrane	6,305 0 0	J. T. Firbank	4,920 4 8
R. H. B. Neal, Ltd.	6,208 0 0	C. Wall & Co.	4,900 0 0
T. Turner	6,182 4 0	Edwards & Co.	4,817 7 11
Thibru Contracting Co., Ltd.	6,066 11 0	Wilkins Bros.	4,806 0 0
C. Ford	5,955 0 0	J. Strachan	4,721 0 0
Kellett, Ltd.	5,568 1 7	D. Davies	4,669 16 0
T. Almond & Son, Ltd.	5,450 0 0	R. Radford & Co.	4,669 16 0
A. Facey & Co.	5,385 5 7	G. Greaves	4,326 0 101
H. Woodham	5,359 12 4	Dewdney	4,326 0 101
W. Manders	5,275 4 5	Derby	4,326 0 101
Muirhead	5,071 18 0	Matthias	4,326 0 101

**LONDON.**—For erecting six blocks of working-men's flats, Kenley-street, Notting Dale, for the Royal Borough of Kensington:

Colley & Sons	£10,672	W. Taylor & Co.	£9,497
J. E. Johnson	10,150	Martin, Wells, & Co.	9,400
W. Johnson & Co., Ltd.	10,145	D. F. Lamplough	9,371
R. A. Lowe	10,079	J. Chessum & Sons	9,370
Holliday & Greenwood, Ltd.	9,977	F. Gough & Co.	9,354
H. Lovatt, Ltd.	9,920	A. Hudson & Co.	9,300
J. H. Bywater	9,900	J. Appleby & Sons	9,220
Leslie & Co.	9,899	W. Lawrence & Son	9,140
F. & G. Foster	9,720	Barker & Co.	9,080
H. Holloway	9,608	Leslie & Co.	8,730
C. E. Kearley	9,534	J. Garrett & Son	8,660
Cowley & Drake	9,576	G. Gray	8,350
B. E. Nightingale	9,572	E. J. Clayton	8,000
		Chambers & Bros.	7,575
		Ealing	7,575

[The architect's estimate, comparable with these tenders, is £26,911.]

**LONDON.**—For the enlargement by twenty places, of the manual training centre on the Blandford-road site, Wandsworth, for the London County Council:

Leslie & Co., Ltd.	£738 10 10	J. Shelbourne	£616 2 2
Macey & Sons, Ltd.	647 0 0	W. Johnson & Co., Ltd.	647 0 0
Loe & Co.	645 17 8	W. Lawrance	645 17 8
E. Triggs	641 0 0	Common	641 0 0

[The architect's estimate, comparable with these tenders, is £2,639.]

**LONDON.**—For a public underground convenience at the junction of Wall-street and Mare-street, Hackney, for the Hackney Borough Council, Mr. Norman Scorgie, Borough Engineer and Surveyor, Town Hall, Hackney, N.E.:

A. E. Symes	£1,813 0 0	G. Wales & Co. Jennings	£1,593 0 0
J. B. Saunders	1,762 0 0	L. Whitehead & Co., Ltd.	1,587 0 0
W. Shurman & Sons, Ltd.	1,746 0 0	Sons	1,572 0 0
Rowley Bros.	1,745 0 0	B. L. Nightingale	1,570 0 0
Davis & Ben	1,740 10 0	F. & G. Foster	1,547 0 0
J. C. Mather	1,700 0 0	T. Almond & Son, Ltd.	1,547 0 0
Spencer, Santo, & Co., Ltd.	1,690 0 0	End, N.E.	1,532 0 0

**LONDON.**—For the completion of the Fulham Palace School, Fulham, for the London County Council:

W. Downes	£3,517 0 0	Waring & White	£3,300 0 0
Leslie & Co.	3,493 4 5	Bulfinch Co.	3,300 0 0
Clarke & Bracey	3,439 0 0	L. Whitehead & Co., Ltd.	3,300 0 0
E. Triggs	3,418 0 0	C. E. Kearley	3,300 0 0
W. Smith & Son	3,373 0 0	C. E. Kearley	3,300 0 0
G. Wall, Ltd.	3,216 9 1	105th Kensington High-st.	3,098 0 0

[The architect's estimate, comparable with these tenders, is £3,120.]

**LONDON.**—For refacing, etc., the external stonework of Caxton Hall, Westminster, for the Westminster City Council:

W. H. Gascoilles & Co.	£220
A. Dreyfus	146

**LONDON.**—For carrying out a scheme of improvements in the infants' school (which is a separate out-croft building) on the Gileston-road site (Battersea), for the London County Council:

J. Garrett & Son	£2,573 0 0	L. H. & R. Roberts	£2,814 0 0
W. Akers & Co., Ltd.	2,520 0 0	W. Johnson & Co., Ltd.	2,807 0 0
L. Whitehead & Co., Ltd.	2,573 0 0	J. Appleby & Sons	2,807 0 0
E. Triggs	2,560 0 0	Sons, Cornwall	2,807 0 0
Galbraith Bros.	2,554 7 6	Works, Lam-	2,807 0 0
L. Whitehead & Co., Ltd.	2,517 0 0	hams	2,807 0 0

[The architect's estimate, comparable with these tenders, is £3,079.]



LONDON.—For the erection of three penstocks required on the northern low-level sewer No. 2, at the Stamford Brook and Counter's Creek sewers, for the London County Council.—  
J. Cochran ..... £560  
Hunter & English ..... 545  
A. Frost & Co., Ltd. .... 585  
Glenfield & Kennedy, Ltd. .... £504  
J. Blakeborough & Sons, Brighouse\* ..... 453

MILTON-NEXT-SITTINGBOURNE.—For 1,063 yds. of 12-in. and 507 yds. of 9-in. earthenware glazed pipe sewer, London and Staplehurst roads, for the Urban District Council. Mr. W. R. Warlow, Surveyor, Town Hall, Milton.—  
Millen & Christfield, Milton-next-Sittingbourne\* ..... £815 12 6

NOTTINGHAM.—For two houses, Derby-road. Messrs. A. R. Calvert & W. R. Gleave, architects, 18, Low-pavement.—  
W. Crame, Ltd.\* ..... £1,193 5 0  
[Lowest of nine tenders.]

NOTTINGHAM.—For two shops, Derby-road. Messrs. A. R. Calvert & W. R. Gleave, architects, 18, Low-pavement.—  
W. Crame, Ltd.\* ..... £332 10 0  
[Lowest of six tenders.]

OLDURY.—For heating apparatus at new school, Road End, for the Urban District Council Education Committee. Mr. A. Long, architect, 21, New-street, West Bromwich.—  
Lucas & Son, Cradley Heath\* ..... £375

PONTEFRAC.—For erection of Farm Cottage at Fairleigh, Pontefract, for Mr. James Crowther. Messrs. Garisto & Pennington, architects, Ropergate House, Pontefract.—  
Gallagher Bros. £475 3 3 Walker & Ward, Pontefract\* £397 1 10  
A. Askam ..... 434 3 10  
M. Dixon & Sons ..... 432 10 0

PRESTON-NEXT-WINGHAM.—For new council school, for the Kent Education Committee. Mr. Wilfrid H. Robinson, Surveyor.—  
P. & G. Foster ..... £2,054  
B. J. Bowles ..... 2,025  
H. Kent ..... 2,021  
A. J. Brewster ..... 2,400  
H. Lovatt, Ltd. .... 2,380  
Rowland Bros. .... 2,339  
J. H. Forwalk ..... 2,305  
G. & H. Deane & Son ..... 2,285  
R. Webster ..... 2,248  
L. Seager ..... £2,215  
Sturges Building Co., Ltd. .... 2,155  
W. J. Adcock ..... 2,095  
W. W. Martin ..... 2,071  
G. Browning ..... 2,034  
A. Ovenden ..... 2,015  
Gann & Co. Ltd., Whitstable\* ..... 1,933

RODNEY STOKE.—For constructing a collecting tank at Rodney Stoke, and providing and laying 500 yds. of 4-in. piping, for Street Urban District Council. Mr. A. P. I. Costerell, M.Inst.C.E., 29, Baldwin-street, Bristol.—  
Wright & Son, Glastonbury ..... £138

SHREWSBURY. For isolation hospital.  
P. Ritchie & Sons, Ltd. .... £2,785 0 0  
Rowland, Carr. & Co. .... 2,559 7 10  
W. A. Baker & Co., Ltd. .... 2,100 0 0  
Hill Bros. .... 2,073 0 0  
B. C. & J. Reay, Ltd. .... 1,933 0 0  
J. Harrison & Co. .... 1,851 0 0  
Harrison-Smith Building, Ltd. .... 1,825 0 0  
J. Hitchcock & Son, Ltd. .... 1,800 0 0  
Bruce & Still, Ltd. .... 1,762 0 0  
Leather & Sons ..... 1,650 0 0  
R. Iles, Ltd. .... 1,639 0 0  
C. Leather ..... 1,608 0 0  
J. McManus ..... 1,655 0 0  
Alnwick Foundry & Engineering Co. .... 1,543 0 0  
J. Mitton & Co. .... 1,525 0 0  
Young, Tinker, & Young ..... 1,497 0 0  
Humphreys Ltd. .... 1,451 0 0  
W. Harrow ..... 1,417 0 0  
Darlington Construction Co. .... 1,410 0 0  
Boulton & Paul, Ltd. .... 1,382 0 0  
Morton Bros. & Co. .... 1,350 0 0  
J. Hawkins & Co. .... 1,349 0 0  
F. Smith & Co., Ltd. .... 1,314 0 0  
Ginger, Lee, & Co., 35, Richmond-grove, East Longsight, Manchester\* ..... 1,240 4 0

SOUTHWELL.—For alterations and additions to house, Southwell. Messrs. A. R. Calvert & W. R. Gleave, architects, 18, Low-pavement.—  
F. W. Thompson & Son\* ..... £665 0 0  
[Lowest of three tenders.]

SPENNYMOOR (Durham).—For kerbing and flagging of High-street from St. Paul's-street to Villiers-street and from Clarence-street to Church-street, for the Urban District Council. Mr. C. R. Spencer, Engineer and Surveyor, Council Offices, Spenny Moor.—  
Wm. Fletcher £558 17 6 George Packer ..... 549 15 0  
George H. Bell ..... 549 15 0 J. G. West ..... 520 15 6  
John Carrick ..... Hartlepool\* £495 12 0

TEIGNMOUTH.—For the construction of a dwarf stone wall, and the erection thereon of an unclimbable wrought-iron railing, together with incidental works, at the cemetery extension in Exeter-road and Buckridge-road, Teignmouth, for the Urban District Council. Mr. C. F. Gettings, Surveyor and Water Engineer, Town Hall, Teignmouth.—  
G. H. Marshall £815 0 0 S. J. Hayman £509 1 10  
E. Harris ..... 738 11 0 W. Turner ..... 570 0 8  
J. Andrews ..... 642 8 10 P. C. Francis ..... 652 13 8  
J. Lambie ..... Teignmouth\* 564 2 0

WARRINGHAM.—For alterations and additions to Whitechapel Council School, Upper Warrington, Messrs. A. W. Jarvis & P. A. Richards, Architects to the Surrey Education Committee, 35, Victoria-street, London, S.W.—  
C. E. Kenworthy ..... £3,710 15 9  
C. Cooper ..... 3,317 0 2  
F. & G. Foster ..... 3,143 0 0  
G. Cheeseman ..... 3,127 11 0  
J. Quittenon ..... 2,999 0 0  
L. Waters & Sons ..... 2,959 5 4  
H. Kent ..... £2,835 0 0  
W. H. Hyde ..... 2,756 0 0  
W. Roberts ..... 2,743 0 0  
Marriott & Salters ..... 2,650 0 0  
E. Strathairn ..... 2,577 10 0  
J. Barker & Co. ..... 2,556 0 0  
S. Page & Son ..... 2,497 0 0

WIMBLEDON.—For structural steel and wrought-iron work. Electricity Works extension, Darnsford-road, for the Borough Council. Mr. C. H. Cooper, Borough Engineer, Town Hall, Wimbledon.—  
Norton Bros., Ballour-road, Hford\* £384 6 0  
Total amount of tender for two works.

WREXHAM.—For alterations and additions to the Bowling Green Hotel, Penybryn, for Messrs. Worthington & Co. Mr. P. A. Bevan, architect and surveyor, Queen-street, Wrexham. Quantities by architect.—  
T. Jones ..... £547 0 0  
W. E. Samuel ..... 740 0 0  
Davies Bros. .... 696 0 0  
W. Hughes ..... 685 0 0  
T. G. Haxley ..... £690 0 0  
J. B. Woolley ..... 630 0 0  
Lewis Bros. .... 597 15 6  
Wrexham\* ..... 507 15 6

YORK.—For erecting asylum farm buildings. Mr. A. Crer, Architect, Guildhall, York.—  
R. Dent & Son, Lord Mayor's Walk, York\* ..... £1,392 10 0

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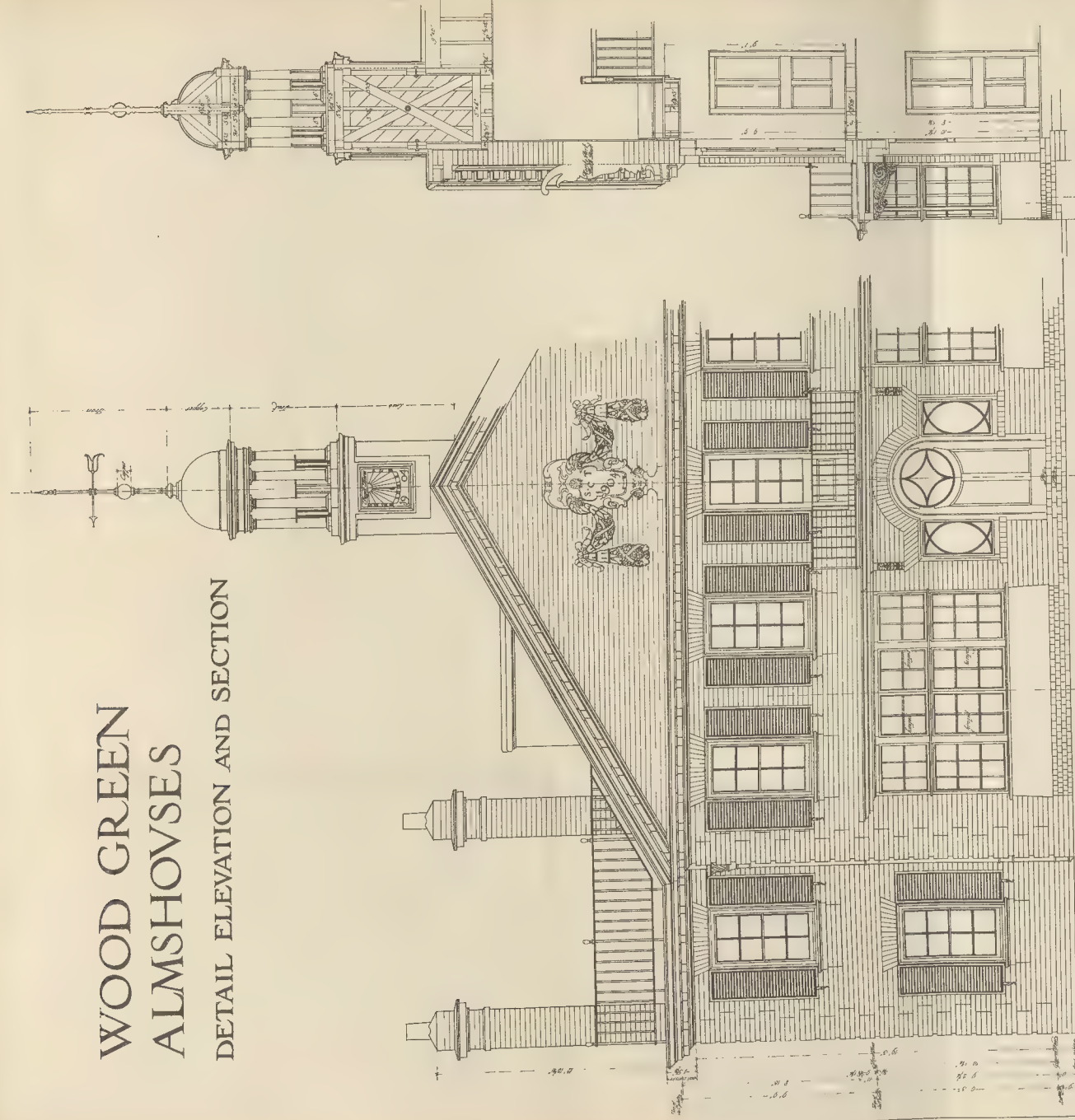
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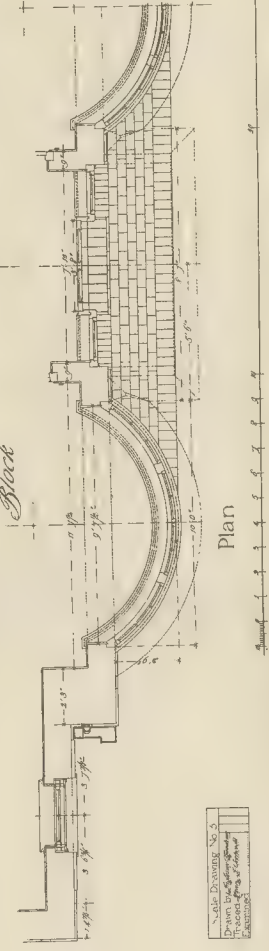
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Front Elevation, *Front*  
*Back*



Plan

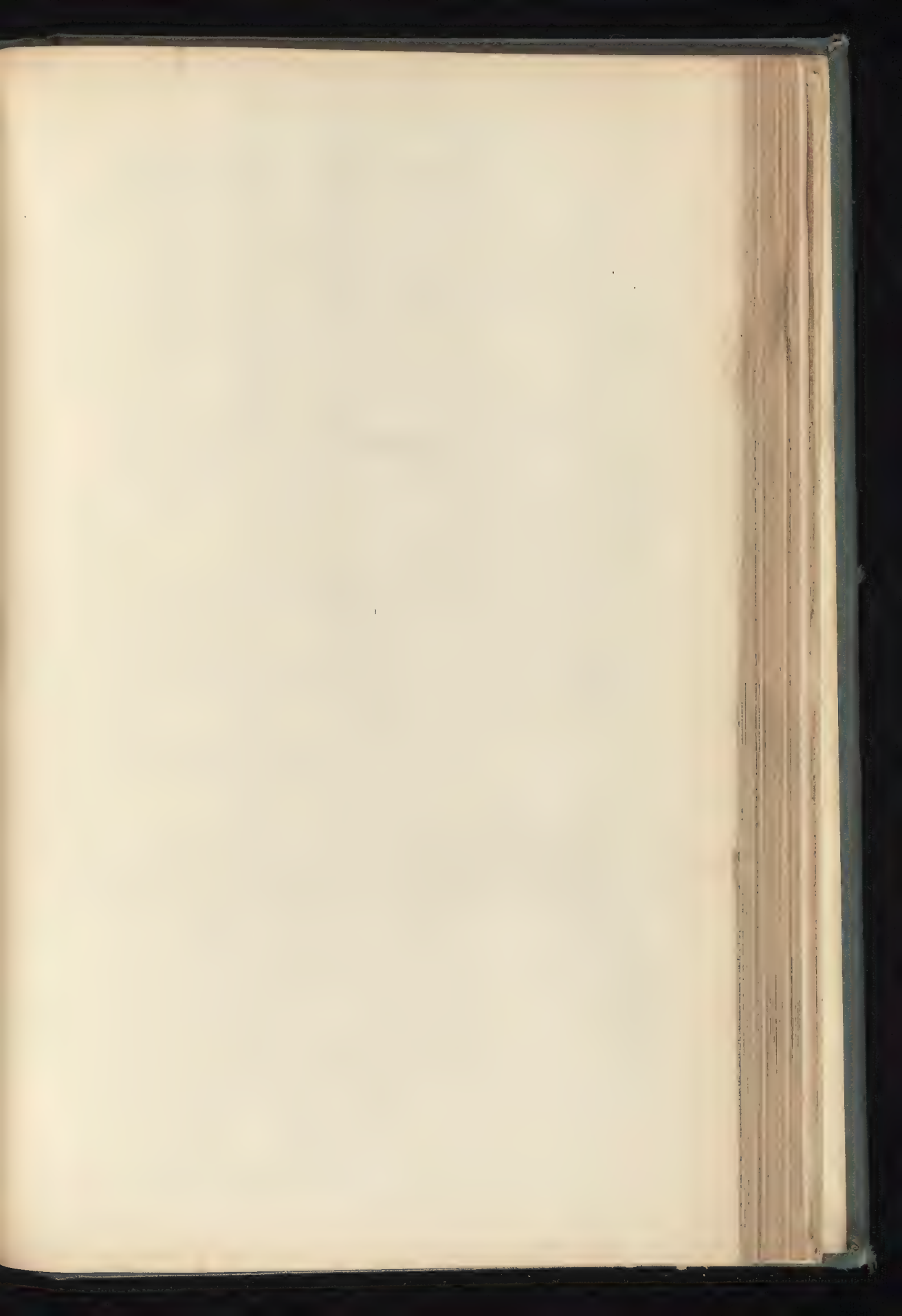
Section.

Plan of  
Soffit to roof  
over Porch.

Alfred W S Cross  
Architect F.R.B.S.  
40, New Bond Street



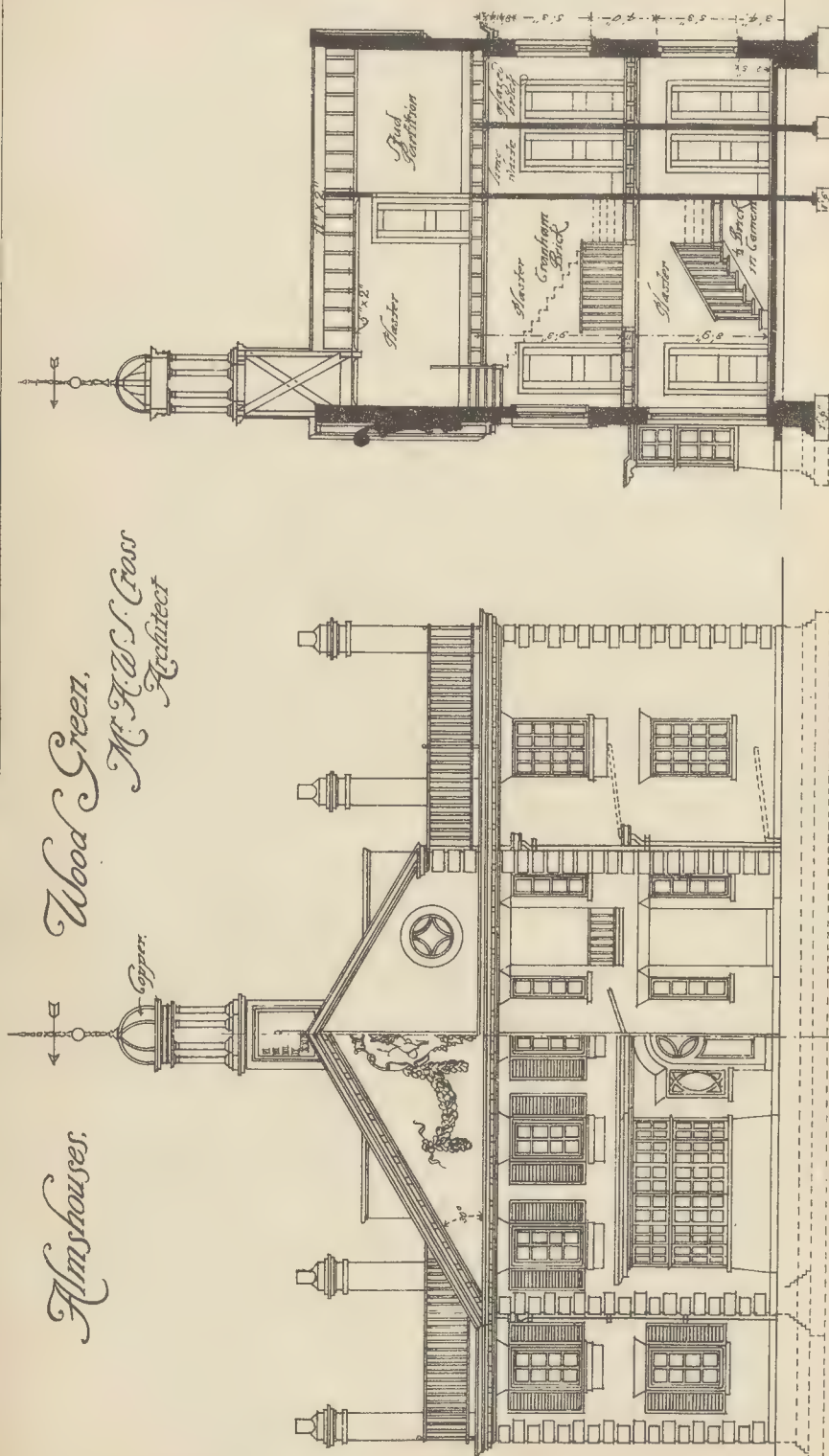






Wood Green,

Mr. H. W. S. Cross  
Architect



Front Elevation      Front Elevation  
Rear Elevation

Scale of Feet

Section F.B.

Entrance  
to  
New Film  
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# The Builder.

VOL. LXXXIX.—No. 3280.

DECEMBER 16, 1905.

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Sketch Plans for Residence at Buenos Aires } .....Mr. Leonard Nagington, Architect.  
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### Roman Masonry at Pevensey.



THE outer walls of the extensive ruins popularly known as Pevensey Castle present as good an example of Roman masonry as is to be found in the kingdom. The late

Mr. Charles Roach Smith, F.S.A., the greatest Roman antiquary of his day, considered Pevensey to be among the most remarkable of our national monuments. "Of all the Roman-walled castra in England," he writes, "that of Pevensey presents the highest claims to our admiration. It is among the largest in extent, enclosing upwards of 9 acres; it is the best preserved; and approached by the high road, either from the east or the west, its appearance is grand, and imposing." It is now some years since the above remarks were written in the "Report on Excavations made upon the Site of the Roman Castrum at Pevensey, in Sussex, in 1852," but it is unquestionably as true to-day, as it was then, that the masonry of the Roman walls in this imposing structure is of extraordinarily fine character, and has been preserved in a remarkable manner.

In plan the walls at Pevensey are irregular, and it is difficult to decide in our own mind whether they approach more nearly to an imperfect oblong or an imperfect oval form. This is a point, however, upon which it is unnecessary to enter here, as the purpose

of this article is to draw attention to certain details of the masonry of the walls and the materials of which they are built.

Most visitors probably approach Pevensey Castle from the south-west—a route which affords an excellent general view of the main or decuman gateway. Lofty flanking towers or bastions stand on each side (see lithograph plate, *Fig. 1*), and although they have suffered somewhat from the depredations of persons in want of building materials, they both are wonderful examples of the solidity of Roman masonry. The tower on the left hand or northern side (*Fig. 2*) is particularly instructive, inasmuch as it shows a practically complete series of considerably more than fifty courses of facing stones, etc., and also, where the facing stones have been torn off, some excellent sections are seen of the rubble core of which the solid mass of the bastion or tower is composed.

It is noteworthy that, whilst the mortar used with the facing stones is of that pink hue arising from admixture with pounded tile or brick, usually regarded as one of the characteristic features of Roman masonry, the mortar employed with the internal flint rubble is composed of lime and sea-sand, without any admixture of tile, and presents a decidedly colder tone than the pink mortar close by. These two flanking towers stand 27 ft. apart, a space almost equal to their height, but the excavations of Messrs. C. Roach Smith and M. A. Lower revealed a recessed wall leading internally to an arched entrance a little over 9 ft. wide.

This northern tower contains some excellent examples of Roman put-log holes placed at parallel stages about 4 ft. 6 in. apart, and at intervals laterally of slightly over 2 ft. The tower also gives some useful information as to the way in which its courses of facing stones coincide with those of the actual wall, leading to the conclusion that both are parts of the same great work, and that both were built at the same period (*Fig. 3*).

The plan of the bastions is somewhat peculiar, approximating to a semi-circle attached to a square; they measure, roughly, 30 ft. in depth by 20 ft. in width. Both bastions and walls originally reached a height of between 24 ft. and 30 ft.; whilst the walls have a thickness varying from 10 ft. to 12 ft.

The walls of Pevensey are remarkable in being, in some parts, as complete as they were originally built by the Romans. Perhaps one of the best sections now visible is the portion of the wall on the north-north-west side, shown in *Fig. 4*. Here, for a considerable space not covered with ivy, we find the facing stones remaining in about fifty-five complete courses with the precision and regularity of brickwork, but without the irritating and monotonous effect caused by the uniformity of that material.

A well-defined feature of this part of the wall is a single course, at about 9 ft. from the ground, of red tiles  $3\frac{1}{2}$  in. thick, and averaging about 12 in. long. Apparently these are square tiles, and they approach more closely to the forms used for the building up of piles in hypocausts than to the regular so-called



bonding tiles. Immediately above these tiles is a course of well-squared stones of the uniform thickness of 6 in., but of various lengths, ranging from 6 in. to 1 ft. 2 in. Two double courses of bonding tiles occur at intervals of a little over 4 ft. in the wall above, and between them, about 3 ft. below the top of the Roman wall, is a line of well-defined put-log holes 8 in. square and placed at intervals of nearly 3 ft. apart (*Fig. 6*). Traces of put-log holes in the lower part of the wall may be seen in the arrangement of the masonry, but they have generally been filled up by the builders. The top range, however, which would serve for the support of the scaffolding used for the completion of the upper part, were suffered to remain open, and so they exist to-day just as the Roman builders left them. This part of the wall has the additional interest of showing a piece of later walling built on the top of the Roman wall. It consists of nine or ten courses of rough flint work, and is probably of the time of Edward I.

One of the bastions almost at the north end of the building shows considerable evidence of rebuilding in herring-bone work, which was probably executed by the Normans. In another bastion, quite near the main gateway (*Fig. 5*), there is an interesting little patch of mending of the same character and period in which only six or seven stones are employed, but these also are placed diagonally in a single row so as to fill up the space left by the falling or removal of two or three Roman blocks.

Before leaving the subject of the bastions at Pevensey it may be pointed out that they are constructed of solid rubble, and were evidently intended to serve both as watch-towers and as platforms for the military engines in vogue at the period when they were built. During certain excavations within the area of the mediæval works at Pevensey a number of balls of stone from the local green-sand were discovered. These were spherical in shape, and of various sizes, and probably they are the actual missiles used, or intended to be used, with the engines on the bastions.

The bonding tiles have already been mentioned. They occur in double, triple, and in one bastion in quadruple courses at irregular heights in the masonry. They do not in all cases appear to be continued far into the wall. It is just possible that they may have been intended to tie the facing of squared stones to the rubble core behind, but, if so, that appears to have been an entirely unnecessary precaution, because the junction of the two is so perfectly effected by the excellent mortar employed that even now the squared stones are very firmly fixed to the wall. At a good many points, within easy reach from the ground, the facing stones have been torn off, leaving the rubble work exposed; but this has been accomplished apparently only by the use of violent means, and it must be remembered that the walls of Pevensey have for centuries served as a sort of quarry for the supply of building material. Indeed this barbarous practice was continued until about the year 1833.

To anyone who closely examines the

walls it must be clear that the materials employed and the method of their arrangement both point to efforts towards a rude scheme of colour decoration. The local stone from the green-sand formation, of which the main parts of the outside of the walls and bastions are composed, is of a greyish tint, and sometimes almost of a cream colour. At various heights in the wall blocks of stone of warm reddish brown colour, sometimes approaching a rich purple tint, and of rather large size, are inserted in the masonry. These darker stones occur in triple layers in some of the bastions, and are continued in the walls, where they form a prominent and effective feature. It can hardly be doubted that their purpose is decorative, because they are arranged in such a manner as to produce a strong effect, and are obviously placed so that the maximum of their surface is displayed. In the western bastion of the main gateway this is well shown.

Other examples of the use of almost, if not quite, identical stones in Roman masonry occur in the water-gate at Porchester Castle, and at various parts of the Roman wall of London.

There are two striking things about the Roman masonry at Pevensey which must be obvious to anyone who visits the ruins, or even only glances at the accompanying photographic illustrations. These are the solidity and the finish of the masonry. The former is well illustrated in many other Roman remains; but the latter is rarely, if ever seen, in this country in such perfection. Most of the facing stones of our Roman walls have been destroyed or seriously damaged, and the association of the two features here gives to Pevensey a special value for students who wish to understand at once the thoroughness in broad outline, as well as in minute detail, with which the Romans constructed their masonry.

It may be added that the photographs represent the actual condition of the masonry as it was a few months since.

#### NOTES.

London Fog and Smoke.

THE experience of the last few days should have the effect of stimulating interest in the Conference on Smoke Abatement, which commenced on Tuesday, under the auspices of the Royal Sanitary Institute and the Coal Smoke Abatement Society. So far as the metropolis is concerned, the chief factor in the smoke problem is the domestic fireplace, or stove, as it is technically described. We do not mean to imply that factory chimneys in London are less energetic in wrong-doing than their confrères in the provinces, but simply that their most vigorous efforts to encumber the air are as nothing compared with the enormous volumes of smoke issuing from the throats of thousands upon thousands of chimneys in dwelling-houses and other buildings. The employment of producer-gas in substitution for coal, as suggested in the paper by Mr. Aekermann, would certainly have a good effect if people could be persuaded to give up the wasteful, inefficient, and delightful coal fire. We do not think persuasion is of the least

use in this case. The coal fire is valued for its warmth alone; it is looked upon as the centre of the family circle as an excellent substitute for the wafted paper basket, and as a most convenient means of light for cigars and pipes. A familiar fire is almost as much a companion as the friendly dog and the necessary cat, and it is improbable that reformers who would banish it will find much more than theoretical support from the people at large. Practical benefit is far more likely to result from efforts to improve the design of domestic stoves. The tests recently conducted by the Coal Smoke Abatement Society show that great differences exist between various kinds of grates, and the publication of the results, together with those of the investigation now being made in connection with the furnishing of the new Government buildings in Whitehall, will be of distinct value for the guidance of architects and others in the selection of firegrates for domestic use.

WHEN a trading company makes an unsuccessful venture, or suffers severely from unexpected competition, the position is not pleasant for the shareholder; but it is the fact that the only sufferers are capitalists who have voluntarily decided to run a certain risk in the hope of a large return. Ratepayers who underwrite and pay interest on the capital of municipal enterprises of commercial character are not in a similar position. Most of them are dragged in against their wish, and none of them expect to derive any return for their money. A strong hint as to the risky nature of municipal trading is afforded by a recent report of the gas committee of the Birmingham City Council. Owing to the severe competition of producer-gas, further reduction is now recommended in the charges for power-gas from the Corporation works, and the committee state that if, as seems probable, manufacturers decide to adopt gas-producer plants in large numbers, a very considerable loss will be sustained by the ratepayers. Since the introduction of the suction type-producer, makers of gas-producing plant have been exceeding busy, and there is just ground for believing that the Birmingham and other municipal gas and electricity works will be prejudicially affected. Risk of the kind is inseparable from all commercial undertakings, from which public bodies would do well to abstain, especially in view of the rapid, and sometimes unexpected developments of modern engineering practice.

THE paper read to the Institution of Electrical Engineers of London, news by Mr. W. H. Patchell on the City of London Works of the Charing Cross Company, is of value, in that it shows what can be done by electricians in transmitting power at high pressure by underground mains. The Charing Cross Company obtained a Provisional Order for supplying electricity within the City of London area in 1891. The nearest suitable site that could be found for a generating-station was Bow, about four miles from the Bank of England. It was decided to supply the sub-stations in the City with

three-phase currents at 10,000 volts: In order to obviate the complication introduced by transformers, the generators were built so as to produce this pressure directly at their terminals. One of the generators has an output of over 5,000 horse-power, and is coupled directly with a large reciprocating engine. It will be interesting to compare the results obtained by this engine with the results obtained by the steam turbines of corresponding size which are now almost invariably used to drive large dynamos. The electric power is transmitted by ten "feeder" mains, which are all lead-sheathed and insulated with paper: The mains are laid on the solid system in steel troughs, which are heavily bonded. We are told that the bonding has been done in order "to comply with the Board of Trade requirements." We presume, therefore, that the author does not approve of this particular requirement of the Board of Trade. It may perhaps be unnecessary in this particular instance, but in the interests of public safety we approve of this rule. Apparently very little trouble has been experienced with the 70 miles of this high-pressure cable which have been laid. This is a sufficient answer to the main argument of those electricians who are agitating, and in many cases successfully, for permission to erect overhead wires conveying currents at high pressures. The electrical machinery employed at the Bow station is mainly of the Continental type, and is deserving of high praise. We agree with the author in thinking that the dynamos are a good illustration of "elegance of design, combined with solidity and stiffness of construction."

**Damages to Streets.** THE streets which were high-ways, repairable by the inhabitants at large in urban districts are by sect. 149 of the Public Health Act, 1875, vested in the urban authority, but it has been decided by the House of Lords, in the case of *Mayor, etc., of Tunbridge Wells v. Baird*, in 1896, that under this section only so much of the surface of the streets is vested in the local authority as shall enable the street to be maintained as a street. By sect. 27 of the Highway and Locomotive Act, 1878, the right of individuals is preserved to work and get minerals under the highways as long as no damage shall be done to the highway. In the case of the Mayor, etc., of *Wedgebury v. Lodge Holes Colliery Company* (current *Law Reports*), an interesting decision has been given as to the proper measure of damages when injury has been caused to the street. The defendants by mining operations had admittedly caused a serious subsidence of one of the roads, and the local authority claimed as damages the amount expended, some 400%, in restoring the road to its original level; the defendants alleged that the road could be made as common for the public as it was before with an expenditure of 65%; and the court held that the rights of the plaintiffs in the road only made this latter the amount of damages recoverable from the defendants. It is important for local authorities to remember that their ownership of the streets is limited, and that for them to carry on operations

below the surface special Parliamentary powers are required: Such special powers are often conferred upon them, as, for instance, in the case of sewers, and as to public conveniences, in reference to which we commented in our issue, July 29, 1905, on the case of *London, North-Western Railway v. Mayor, etc., of Westminster*, but in the absence of special Parliamentary authority their ownership of the streets is confined to the surface, as above stated.

**The Wall Failure at Croydon.** ALTHOUGH completely overshadowed by the Charing Cross catastrophe, the collapse of a wall last week at the Croydon Palace of Varieties was sufficiently serious to demand attention: At the time of the accident the roof and all interior details of the theatre had been removed, leaving nothing but the shell, and the contractor had commenced to build a 9-in. wall, intended to strengthen the 14-in. western wall of the structure. The outer wall measured about 60 ft. long by 32 ft. high, and when the new work had been carried up to the height of 15 ft. the upper portion of the old wall fell inward without warning, carrying the scaffolding with it and burying nine men beneath the debris. Unhappily one man was killed, but the others were fortunate enough to escape with more or less serious injuries. From the evidence given at the coroner's inquest it appears that the two walls were 10 ft. apart, the scaffolding being between them, and it is significant that the clerk of works had noticed a week before "that the intervening space was getting small." The use of a plumb-line showed the top of the wall to be 3 in. out of the perpendicular, but whether this represented recent movement or long-standing settlement we do not know. If the contractor did not know, the application of shoring would be an obviously desirable precaution, for although an inclination of 3 in. in a height of 32 ft. is not necessarily dangerous, it would be so if caused by the cutting away of brickwork for tying the two walls together. The contractor's manager stated that chases had been cut in the old brickwork 4½ in. deep by 12 in. high by from 2 ft. to 5 ft. wide, and 2 ft. apart vertically: He also admitted that the piers—1 ft. 9 in. thick and spaced 10 ft. apart—had been cut into to the extent "of 2½ in. each bond." The clerk of works stated that an ornamental bond course existed at the height where the wall broke, "and there was not a proper bond." All these things taken together ought to have suggested the necessity for efficient shoring, and we fully agree with the opinion given by the majority of the jury "that more precaution should have been taken in shoring up the wall."

**Concrete Mixers.** In the paper read by Dr. J. S. Owens, A.M.Inst.C.E., at the last meeting of the Civil and Mechanical Engineers' Society, a very useful summary is given of machinery and other appliances for gauging the ingredients of concrete and for the subsequent mixing of the materials: The ordinary method of gauging by hand consists in filling the ballast and cement into receptacles of known capa-

city, the quantity of water being determined by observation: This evidently gives full scope for the personal factor, and favours variations of consistency. It is not altogether easy to devise a gauging machine that will perform the required functions in a satisfactory manner, and the result is that several of the appliances described by the author represent compromises between hand and mechanical gauging. One of the most ingenious devices of the kind is the Trump measuring machine, in which the material is distributed from a vertical cylinder in a thin layer upon a revolving table, and a stationary blade diverts a continuous stream of the mixture into a shoot placed below the edge of the table: It is said that the results of the Trump machine are as accurate as those given by the hopper scale: Numerous types of continuous, batch, and gravity concrete mixers are described, among the last-mentioned class being a mixer devised by the author. This apparatus combines certain new principles, and consists of a shoot with baffle plates and a series of spring bars intended to deflect the material in opposite directions as it falls from each baffle. This is a very simple apparatus and seems likely to give good results. For mixing concrete to be delivered below ground level it could be employed with very economical results.

**White and Red Lead Adulteration.** It is well known that white and red lead heavily adulterated with barites and other inferior substitutes are frequently sold as genuine articles. To check this adulteration the White Lead Section of the London Chamber of Commerce are prepared to examine and report on, free of charge, any white or red lead bought as "best," "genuine," or under other description indicative of commercial purity. Any person purchasing white or red lead of this description may send a sample, weighing about half-a-pound, for analysis to "The Inspector," White Lead Corroders' Trade Section, London Chamber of Commerce, Oxford-court, E.C. The Section point out that it is a breach of the Merchandise Marks Act, 1887, to sell adulterated white or red lead under such terms as "best" or "genuine," and that they have obtained several convictions in different parts of the country against firms selling adulterated white and red lead thus described. Small dealers and retail shopkeepers when purchasing genuine white or red lead should take the precaution to see that the material is described as genuine either on the keg or on the invoice, so that should it be found to be adulterated proceedings may be taken against the vendor.

**Shrewsbury School.** THE fire which broke out on December 5 destroyed the roof and the upper part of the school building, but the chapel and school-house were untouched, and the early entrance-books, carrying the records back to Queen Elizabeth's days, together with the most valuable MSS. and volumes in the old library have been saved intact. In 1881 the school migrated from its original home to Kingsland, on the south side of the Severn, where the governors had bought 26 acres



of land and what was then known as the House of Industry, which had been built in 1765 at a cost of 12,000*l.* as a branch establishment of the Foundling Hospital, London. The hospital was soon afterwards opened as a woollen manufactory for the employment of the children of the poor. During the war with America it was rented for the confinement of prisoners of war; then, in 1784, the Union Guardians purchased it for parochial purposes. The governors of the school made extensive additions to the buildings, comprising the large schoolroom, classrooms, six boarding-houses, chapel, in the Early English style, and headmaster's house, in the "Queen Anne" style, designed by Sir Arthur Blomfield. One of two houses for assistant masters, by William White, is illustrated, and with plans, in the *Builder*, of September 10, 1881. When vacated by the school the former school buildings were taken for uses of the Free Library and Museum. The greater portion of them were built at, or soon after, the time of the augmentation of the foundation by Queen Elizabeth in 1572. They formed two sides of a quadrangle having square turrets with pinnacles at the angles, together with a chapel, over which was the library, rebuilt in 1815. The old school-house is illustrated in our columns of August 22, 1891; over the entrance were set up quaint figures of two schoolboys in the dress of the time.

Church of the Holy Trinity, Gough-square, E.C.

A SCHEME has been formulated, under the Union of Benefices Acts, for uniting the benefices of St. Bride, Fleet-street, and Holy Trinity, Gough-square, and for selling the materials and site of the church of the latter for the erection of a new church in the suburbs. The parish of Holy Trinity was taken out of that of St. Bride seventy years ago, when the number of inhabitants of St. Bride's parish and the extra-parochial precinct of Whitefriars amounted to about 8,200, of whom the parish church could accommodate only 1,500 persons. Bishop Blomfield and the rector, the Reverend Thomas Dale, moved for the erection of another church. The necessary funds having been provided by grants from the Church Commissioners and the Metropolis Churches' Fund and by subscriptions, the Goldsmiths' Company presented a site at the corner of Pemberton-row and Great New-street, near Gough-square. The site being a small one and triangular in shape presented considerable difficulties to John Shaw, the architect, who however succeeded in rendering the whole space available and built a church containing 1,100 seats (there are now much less) at a contract, by Haward & Nixon, of Stangate, Lambeth, for 3,887*l.* The church was built, in 1837-8, of yellow brick, and has a tower about 80 ft. high, designed after the Anglo-Norman manner. The plan comprises a hexagon 47 ft. 6 in. in diameter, with a large octagonal recess for the chancel, and two similar recesses, for pews, on the north-east and south-east sides. Two galleries, supported by iron columns, surrounded the interior except on the east side over the chancel, where was one gallery. The stained glass in the three circular-headed windows of the chancel was

executed by Willement. The interior was decorated in 1876, having been rearranged three years previously by Sir Arthur Blomfield.

THE lecture given by Mr. Parker at the Society of Pageants.

Arts on Tuesday evening, under the title "Historical Pageants," turned out, as he confessed, to be out of keeping with its title, as it contained no general review of the subject. But it was something better; it was an explanation and illustration of the real value of historical pageants, like that held recently at Sherborne under Mr. Parker's own management, in enabling people to realise the past history of their town, and that the men and women whose names figured in the pages of that history were not mere historical ideals, but men of like passions and like nature with themselves. Mr. Parker spoke with most effective eloquence at the commencement of his lecture on the indifference of average people to the history of the places in which they lived—how many people, in London, he said (with only too much truth), could answer if you stopped them in the street and asked why this neighbourhood was called "Adelphi"; why the Abbey was called "Westminster"; how the Strand, and Fleet-street, and Blackfriars, and the Temple, and many other places, came by their names. The Pageant at Sherborne had had the effect of teaching those who saw it and those who acted in it what was the history of their town, how great and far-reaching were its associations in the past; of taking them out of the mere prose of everyday occupation and fixing their attention on the long past and on the possible future of their city, awakening a local patriotism which might have wide-spreading effects. But for this end, he would not have considered the Sherborne Pageant worth the immense trouble and the considerable sums it cost; but the object was to assist people to realise the events and the characters of history. Mr. Parker entirely carried his audience with him; and, viewing a pageant in this light, we quite agree in his appreciation of its value. The lecture was followed by a series of lantern views and living pictures of the Sherborne Pageant.

The Leicester Gallery.

AT the Leicester Galleries there is an exhibition of works by Mr. Charles Conder, who has been taken up as a fashion by ultra-modern critics—or those who call themselves such. His feeling for colour is shown in some of the fan-designs and in some others of the exhibits; such as "The Rose Garden" (14); and his two oil sketches of Brighton Beach under two aspects (18 and 25) are good as sketches on a large scale. For the rest, we see a great many crude sketches of nude figures very imperfectly drawn, and fantastic groups of clothed figures which are vulgar in sentiment and totally devoid of artistic attraction. We have seldom been in a roomful of pictures and drawings which we were so glad to leave. In the adjoining room a collection of paintings by M. Jacques Blanche contains figure-studies which show what the

French call *chic*—a certain spirit of vigour in studies of figure and costume from very unattractive models—for the ultra-modern school of art bears in figure subjects seems to be a weakness to be carefully shunned; but his flow paintings are admirable; the larger especially, entitled "White Peonies Silver Urns" (12), is a really fine one of its class. A set of small oil-sketches by Mrs. Edmund Davis, under the general title, "Landscape Notes and Sketches," contains some good suggestions of pictures; "Storm-swept" (4), a group of thin trees in a waste bit of country is one of the best; "Summer Evening" (18), "Lowlands" (21), and "People Normandy" (23), are also noticeable as suggestions in landscape composition.

The Baillie Gallery.

AT Mr. J. Baillie's new Gallery in Baker-street there is a collection of paintings and drawings by the late Mr. Simon Solomon, whose art appears to be, to great extent, a kind of echo of Burne-Jones. There is a good deal of beauty both of design and colour in many of his works. "Many Waters Cannot Quench Love" (23), in which a nude figure Love with crimson wings floats in the air, is a lovely design; "Love Autumn" (27) is a work of kindred spirit. A pencil study of a good many figures, entitled "Behold the Bridegroom Cometh" (25) seems to have been designed rather under the influence of Blake—the two figures floating in the air above the principal group have a very decided look of Blake, except that they are better drawn than was usual with that mystic genius; while the draped figure entitled "Memoria" (5) looks like a monochrome study after Burne-Jones figure. Thus there is a kind of pervading reminiscence of the work of other artists in the collection and the half-length of "Sir Galahad" (7), beautiful enough in its way, is just the fault of Burne-Jones's conception of Arthurian knights, in being far too pretty and feminine in the type of head. There is however much that is interesting in the exhibition. Among other things to be noted are the "Hebrew Maiden Lamenting" (5), a beautiful and expressive head; "Et Lux Tenebris Lucet" (29), a very faint delicate crayon drawing of a nude figure; "Hebrew Maiden" (58), a panel study of a head; and "A Vision" (61), the heads drawn on toned paper. The exhibition as a whole is worth seeing.

Arts and Crafts Club.

UNDER this title the first exhibition of the club was held at the Modern Galleries in Bond-street. It consists of a number of small works, chiefly landscape studies, not for the most part of a very high degree of interest. Among those which are above the average are Mr. Jeffcock's two admirable sketches, "View of Runtun" (6) and "Farmstead near North Walsham" (11); we may mention also Mr. Pinhorn Wood's "Autumn" (25); Mr. Haddon's figure-study, "Sower, Segovia" (39); Mr. J. H. Haddon's "The Wind and Rain" (40); Haddon's "Old Houses by the Tagus" (43); Mr. S. Reid's "The Bu-

Bridge" (44); Mr. Hamilton Jackson's "The Old Bridge" (116) and "By the Sea" (187); Mr. Joseph Powell's "A Lane near Chichester" (126), a very fine landscape sketch; and Mr. Rawlence's "An Ilex Grove" (185), with old stone statues dimly seen among the mass of dark foliage. A pastel entitled "Dawn" (176), by Mr. Lionel Heath, showing a nude figure in a wood with the first streaks of sunlight behind the trees, is a good composition with a well-drawn figure. In Mr. T. Browne's "Jumping" (68) the drawing of the man in the act of jumping is clever and vigorous, but the endeavour to convey the idea of his jumping out of the picture by drawing one hand on the edge of the mount is a foolish piece of trickery unworthy of an artist.

At the Dutch Gallery in Bond-street is a collection of landscapes in oil by P. J. C. Gabriel, mostly good in composition but heavy and dull in colour. Among the exceptions is the small picture entitled "A Cornfield" (34), a very fine, little landscape; and the larger one hung beneath it, "Evening" (2), is an effective work showing an unusual scheme of colour. Among the best of the others are "Rainy Weather" (6); "Morning" (4); "A Stream" (5), good in composition but the foliage too black and loaded in effect; "Early Morning" (22); and "The Village Church" (7), a pretty landscape composition, only the church tower is not upright.

The President of the "A. A." "At Home," given by Mr. Guy Dawber, the President of the Architectural Association, at Tufton-street last Friday, was a new feature in the Architectural Association meetings (no doubt suggested by those recently given at the Institute), and was very successful. There was a large attendance of members, and a beautiful collection of drawings were hung round the walls, contributed by many members, older and younger. Among them were Mr. Spiers's drawings of the interior of St. Sophia, the opportunity for making which was obtained by the ruse of pretending to be the assistant of the Sultan's official photographer. Among the other contributors were Mr. Prentice, Mr. Horsley, Mr. A. H. Hart, Mr. Ernest George, Mr. Needham Wilson, Mr. Arnold Mitchell, etc., etc. There was some glee-singing and some solo-singing, also some pianoforte; but while a bell was rung for silence for the singing, we observed that no such signal was given for the pianoforte playing, which was seen but not heard amid general conversation. That is a kind of Philistinism which the Association, if it professes to be an artistic Society, ought to get rid of. We remember the time when everyone talked in drawing-rooms during a pianoforte piece, but in London drawing-rooms at the present day that is considered "bad form," and the Association is behind the age in countenancing it. It is degrading the art of music (and of playing) to make it a mere accompaniment to conversation.

ON Saturday last the French Academy des Beaux-Arts elected Mr. R. Phené Spiers as "Membre Correspondent" of the Institut, in place of the late Mr. Alfred Waterhouse. Mr. Spiers's French education in architecture, and his personal acquaintance with many eminent French architects, would render him no doubt a peculiarly desirable Honorary and Corresponding member from their point of view, while Mr. Spiers's English friends will be ready to testify that the Académie could not have elected any Englishman more learned in architecture.

#### THE ROYAL ACADEMY STUDENTS' WORK.

THE designs by the students of the Royal Academy have been, as usual, open to the public for inspection on the two days following last Saturday's award of the prizes. The subject set for the Gold Medal and Travelling Studentship in Architecture was "A British Embassy in a Foreign Capital"; a very good subject. The medal has been won by Mr. Leslie Wilkinson, for a design which is certainly the best in planning. In architectural treatment the exterior is perhaps a little too quiet and unassuming for the supposed class of building. The intention has perhaps been to render the English building a contrast to the more florid architecture which would probably be characteristic of a hotel for a German or French Embassy; it is an exceedingly plain square building with little decorative detail, except that the upper portion of the centre shows a classic colonnade behind which the wall is recessed. Presumably this is intended to be the residential portion, and is not shown in the plans, which show only the ground floor and first floor of the Embassy proper; the smaller rooms for business below, the large suite of entertaining rooms, planned with great dignity, on the first floor. The points in which the superiority of planning is shown are chiefly in the arrangement of the smaller rooms on the ground floor, and especially in knowing how to place the lavatory apartments, a small but important matter in which both the other competitors have failed. The windows of the entertaining rooms on the first floor hardly suggest, from their treatment, that they belong to so important a ceremonial suite. There is a powerful cornice carried round the building, of 6 ft. projection; in the perspective view the projection appears rather too great in proportion to the depth of the cornice. The exterior design of No. 175 seems to us on the whole more palatial in character and more suited to an Embassy than in the prize design; but taking plan and design together there is no doubt that Mr. Wilkinson rightly won the medal. He has been successful also in the "Set of Architectural Designs" (254), which seems rather to be a set of drawings of one design—for a garden pavilion, rather in the style of Wren, and very satisfactorily treated. No. 182 shows a good treatment of a similar subject. "Set of drawings of an Architectural Design" (151) is won by Mr. A. A. Carter with a very pretty set of drawings for a group of almshouses, treated in what may be called cottage style, with a perhaps rather exaggerated simplicity. We should be disposed to call the second prize design, for the same subject, by Mr. W. Harvey, a better building, but it has not quite so marked a character. Mr. W. Harvey also takes the 107. prize for "Original Composition in Ornament," shown in a plaster model which is a very good bit of work. The silver medal for measured architectural drawings is given to Mr. A. A. Carter for a very good set of drawings of the Hall of the Charterhouse; Mr. Brooker obtains a second prize for the same subject; he seems to be equally careful but his drawings are not nearly so attractive in method of execution. Two subjects in the architectural section have elicited no competition—"Perspective Drawing in Outline" (the subject given being the Roodloft of the Church of Bois-le-duc, in the South Kensington Museum), and "Architectural Design with Coloured Decoration," the subject given being "A Mosaic Pavement for the Hall of

a Fishmongers' Company." It seems surprising that so fascinating a subject should have attracted no one.

In a corner of Gallery IX., rather out of the way, is hung a collection of the drawings executed by the Architectural Travelling Student of 1905, Mr. Lionel U. Grace. These are of the highest excellence, and form a most varied and careful set of illustrations of many interesting buildings abroad chiefly Italian, including some which have not been much illustrated. We understand that Mr. Grace made also a good many measured plans, but that these have not been hung, though there is plenty of room for them on the walls; the members who manage these things at the Royal Academy apparently not having yet arrived at the perception that plans are of any importance in the illustration of architecture.

We have naturally felt bound, as usual, to notice the architectural work first, as belonging more especially to our province, though it is not the most important portion of the designs exhibited, inasmuch as the Royal Academy has never taken the same place in architectural education that it takes in regard to sculpture and painting; nor does it, as we all know too well, provide anything like the same opportunities for its illustration. The sculpture is, as usual, among the best work done, but the Council have confused the students by their misleading title of the subject—"Prometheus Bound to the Rock in the Presence of Force and Strength." Prometheus was bound by Vulcan (*Ἡφαίστος*) under the orders of Force and Strength (*Βία* and *Κράτος*); no mention being made of *Ἡφαίστος*, the competitors have all taken it that he was bound by the two personages mentioned, instead of by one only. There is not, however, anything this year comparable in interest and originality to Mr. Leonard Jennings's "Three Generations" of the year before last. Mr. Clapperton's group, which receives the prize, composes well from all points of view, but in this as in all the others the conception of the figures of Force and Strength is rather weak, and there is no conception of Prometheus at all adequate; it seems, in regard to this prize, a year of good modelling with no indication of genius. For the "Model of a Design"—in other words, sculpture on statuette scale, the beautiful subject has been set of "Jacob Wrestling with the Angel," and the numerous models contain many good suggestions. Mr. Macdonald's design, which gains the prize, is fine in bringing out the distinction between the heavenly and the earthly wrestler; the angel with upraised wings and in an attitude of assumed strength contrasting with the struggle of the mortal against him; this is a fine idea and would be worth working out on a life-size scale.

In the "Design in Monochrome for a Figure Picture," generally one of the least satisfactory classes of work, the first prize has not been awarded; a second prize is given to Miss Margaret Dovaston. The subject given was "The Death of Ananias," a subject with sufficient dramatic interest and scope for action to have been suggestive enough, one would have thought; but on this as on other occasions the sketches exhibited seem to indicate that the power of realising an incident in an effective and pictorial and yet natural manner is one of the last powers acquired by young painters; the designs are mostly either theatrical or commonplace. Miss Dovaston's composition is a very simple one, only two figures being prominent in it. No. 11 has more merit than the average. The want of grasp of composition is shown again in the Historical Painting competition; the most ambitious, the most difficult, and in general the least successful part of the students' work. There seems a difficulty in evolving any realisation of the story such as a spectator could accept as stage effects of probable; most of them are stage effects of a melodramatic order. As has happened in some previous years, the picture to which the prize has been awarded is the only one of the set which is at all acceptable as a rendering of the subject ("Ulysses Recognised by Euryclaea"); it is somewhat heated in colour, but it is a well composed picture and shows the incident in a manner in accordance with possibility, if not probability.

The subject for a cartoon of a draped



figure was "Grief," and the prize has been given, rightly, to the figure by Miss Kate Olver which most powerfully realised the idea to be expressed. She has illustrated it by the figure of a woman thrown prostrate on the ground—a figure very well drawn and giving the expression of an abandonment to utter grief. The competition is a good one however, as far as line and composition in a draped figure are concerned; No. 125 and No. 130 are both very able drawings, in point of design, but not strongly expressive of grief; No. 128 is also a good one. For the "Design for the Decoration of a Public Room" the rather vague subject "Commerce" was given—a subject which might be treated with almost infinite variety; most of the competitors have chosen to treat it as pulling bales about, which is the view, no doubt, that is most directly expressible in painting, though Mr. C. A. C. Oliver Lodge gets an Honourable Mention for an allegorical treatment, better in design than colour. The prize design, by Mr. J. H. Amschewitz, is rather large in scale in the figures, but probably the shape and dimensions of the space to be filled were given, and as this is of rather high and square proportions, the employment of figures on rather large scale may have been thought necessary in order to fill the upper part of the space. Mr. Amschewitz's design is very pleasing and harmonious in colour; as far as the decorative element of design is concerned, we have seen better ones than this, but it must be admitted that the proportions of the space given are difficult to treat, as far as composition is concerned.

What is gratifying in the exhibition is that the two landscape competitions have produced better results than usual. In the paintings for the Creswick prize—subject, "Willows and Weeds by a Stream," there is less than usual of the crude greens that often trouble our eyes; much more feeling for landscape colour; and the painting by Mr. Ernest Townsend, which gains the prize, is a good picture both in general effect and in careful painting of foreground detail. The result of the Turner gold medal is still better. "The Ebb-tide" is the subject, and the picture by Miss Alice Walford, to which the medal is awarded, has really little trace of the beginner about it; it is a beautiful landscape, quite worthy to be in the Academy's annual exhibition, where we shall hope to see it. Miss Walford gives a view over a flat country with a broad shallow river which, at ebb, has left a stretch of marshy country that would be covered at high tide; the foreground, a bank or dyke with long coarse grass, is very well painted, and the sky has a tender look of afternoon quiet. Several of the unsuccessful works are very meritorious, and there is far less than usual of those lurid and overwrought effects of light and colour which the name of Turner seems to have too often suggested to the competitors for this medal.

This year the studies of the Life Classes are exhibited in the water-colour room and in the black-and-white room, the latter containing the oil studies of the more advanced pupils. It is just a question whether studies of this kind are quite suitable to exhibit in a gallery to which the public have unrestricted access on these occasions; but it may be presumed that as a matter of fact no one does come to students' work exhibitions except those who are interested in art. These rooms show what an amount of really conscientious hard work is being done at the Academy in the study of the figure, more especially in the advanced studies in oils, some of which are of remarkable power both in regard to drawing and colour.

THE ROYAL SANITARY INSTITUTE.—At an examination in sanitary science as applied to buildings and public works, held in London on December 8 and 9, twenty-one candidates entered, and the following six candidates were awarded certificates:—C. A. Austin (Paddington), C. H. Comyn (Hyde Park); A. H. Dungey (Camberley); J. P. Larke (Lewisham); E. Middleton (Shepherd's Bush); J. Timson (Harrow-on-the-Hill).—At an examination in sanitary science as applied to buildings and public works, held in Manchester on December 1 and 2, four candidates entered, and the following two candidates were awarded certificates:—W. B. Clegg (Bradford); J. Turner (Matlock).

#### THE ARCHITECTURAL ASSOCIATION.

On the 2nd inst. Mr. E. F. Reynolds read a paper before the Architectural Association on "Turkish Architecture," the first half of which appeared in our last issue. We now give the remainder and some notes of the discussion which took place.

##### *The Mosque of Mohammed the Conqueror.*

The original mosque of Mohammed the Conqueror, the first to be built in Constantinople, had been shaken by the earthquakes of 300 years, and, in 1768, its almost entire rebuilding became necessary. The new mosque has little relation to the original design, for it follows the fully-developed model of the Ahmed Mosque. The scale is still very great, but the forms are tainted with the Rococo corruption. Every dome and cupola of the former splendour is present, but the spirit is almost gone, while the tasteless body remains. Turkish art was fast declining in its course, and was now moving only by the force of its fall.

The development of Turkish mosque-building—originally founded on S. Sophia, gradually evolved in experimental adaptations, such as the Bayezid Mosque, and arriving at independent maturity and progressive accomplishment in the mosques Shah-Zadeh, Suleiman, Ahmed, and Yeni Valideh—has thus been briefly reviewed, but only in general terms, and barely touching on many essential adaptations. Perhaps the best way to crystallise the generalities in more definite form will be to select one of these mosques as typical of the others, giving a more detailed description, and illustrating it with more complete measured drawings. For this purpose I propose to choose the Mosque Yeni Valideh, which I have already mentioned as summing up very completely the normal and regular characteristics of the fully-developed style.

The detailed plan shows several points more clearly than was possible on the smaller scale. One of the first points which would strike a practical architect is the great flights of steps up to the various entrances. The floor-level of the mosque and forecourt is raised about 10 ft. above the surrounding ground, and this is by no means unusual. A fine approach and base is thus given to the building, but I have failed to establish any more practical reason for the custom. The Turks, however, repeat vague tales as to vast cisterns beneath the floor, and the well-known cisterns beneath S. Sophia give point to their probability.

The forecourt is set out in accordance with the traditional method, so that its outer walls form a continuation of those of the mosque. The walls are 6 ft. 1½ in. thick, practically the same thickness as those of the mosque itself; and their massiveness is somewhat surprising when their comparatively small height is considered. The court forms an exact square, but the wider intercolumniation of the central entrances makes some of the bays rectangular and their cupolas oval in shape. A curious effect of the independent spacing of the forecourt and the mosque is that the windows in the western wall of the mosque, common also to the forecourt, often occur out of centre with the bays of one or the other. As in this case, the effect from the forecourt seems usually to have been considered more important, and the windows have been set out in relation to its bays—with the result that they occur irregularly in the mosque. On the plan it is startling to see the main arches coming so recklessly over window openings.

Another instance of the same kind occurs in the main north and south porches. These fill the spaces between the minarets and the great buttresses, and their three bays are set out quite independently of the internal divisions. At the east end of the mosque are two smaller entrances, that at the northeast being reserved for the exclusive use of the Sultan. Other external galleries fill up the remaining spaces between the buttresses; their only use seems to be the shelter and sleeping-place of horrible beggars and yet more loathsome lepers.

The setting-out of the mosque itself is largely controlled by the relation of the semidomes to the domes; the aisles are approximately half the width of the central square; and the width of the external galleries is about half the width of the aisles.

The repeated dimensions agree with almost absolute accuracy, the angles are set out with mathematical truth; and in all the plans which I have measured the same precision seems to have been observed.

The ritualistic fittings are few and simple. The Mecca-niche is placed in the centre, the eastern wall, and to the right is the pulpit for the Friday reading of the Koran. A *mastaba*, or platform, for those who chant the public prayers, is placed against one of the main piers, and low galleries run round the outer walls. These galleries are supported by light arcading, and are usual independent of the structure; but a broad gallery, extending across the west end, here supported by the piers, and forms an integral part of the building. The galleries increase the accommodation of the mosque for special festivals, and are also used by professors for teaching their classes, for all mosques are educational establishments on a very large scale.

The longitudinal section is taken on the main axis of the mosque and forecourt, and shows a complete section of the main dome with its arches and piers, the semidomes with their lesser semidomes and supporting arches, the western gallery and entrance, and a portion of the forecourt with its central fountain. It will be seen that the interior is of high proportions, and the scale may be appreciated by the size of the figure drawn in one of the doorways. The lower gallery is 50 ft. 7 in. from the floor, the galleries around the base of the dome is 51 ft. 3 in. from the floor, and the summit of the dome rises to about 132 ft. from the floor, or about 142 ft. from the ground. It should, of course, be remembered this mosque is one of the smallest of the greater mosques.

The walls, piers, and arches are constructed of limestone. Marble is used for the galleries, the *mastaba*, the pulpit, and the Mecca-niche, worked as masonry, and not as a veneer. The four main piers are covered with dark-blue diapered tiles up to the springing of the lower arches. The lower gallery marks the springing of the subsidiary apses and follows their curves on plan, and corbelled, built out beneath it, prepares for its reception on the square outline of the lower plan. The gallery itself is formed by the projection of a great corbelled cornice and the pathway is protected by an iron railing.

The subsidiary semidomes are closed over by low-proportioned arches, and the pendentives between them bring the plan to a true semicircle. The semidome above is not a continuation of the pendentives, and there is a distinct break of surface at the junction. The lower part of the semidome is buttressed externally and pierced with a range of windows, and a slight cornice above them marks a second break of surface. Above this cornice the semidome springs afresh, and is completed without further interruption. These changes from the form of a true semidome are unnoticeable from the floor below and they may be seen properly only on close inspection, and especially by observing their intersection against the backs of main arches. Their effect is to increase the spaciousness of the semidomes internally, and to give them additional importance externally, and they were doubtless introduced to counteract the foreshortening of perspective produced by the great height of the building. As may be expected, these refinements appear only in the later mosques.

The main dome is carried by four great arches, 7 ft. 7 in. wide, and its circular plan is produced by simple pendentives. A decorative cornice of stalactite corbelling is set above the pendentives, and its projection forms a gallery around the base of the dome. Earlier domes usually spring with a slightly-stilted curve immediately above the pendentives, having a range of windows and buttresses at the base. Here, however, the dome is raised on a definite drum, and the windows are buttresses are applied to it instead of to the dome. The builders seem to have been aiming at a greater effect of space and height, and the treatment bears out the suggestion, which I have made as to the semidomes. The wall of the drum is slightly inclined inwards, and pierced with twenty-four windows, and above them the inner surface of the dome is slightly projected on three courses of stalactite corbelling. The internal diameter of the dome is 53 ft. 6 in.



The drum of the dome is built of brick, plastered internally, and with its external buttresses covered with heavy sheets of cast-lead. The dome itself is also covered with lead externally, and internally its material is concealed beneath a coating of plaster or repeated whitewashing; but I have little doubt that it is also constructed of brick. The pendentives of the dome and its four great arches are built of stone. The semidomes are covered externally and internally as the dome, and are probably built of brick, while their subsidiary apses and pendentives are of stone. Brick was obviously used for the sake of its lightness and adaptability, and it was invariably concealed from sight. In early mosques the buttresses and windows of the dome and semidomes are occasionally built of stone and remain uncovered.

I could have wished to throw some light on the construction of domes such as this, and also on its relation to the construction of Byzantine domes, but I regret that I can give but little definite information. In the earlier domes the springing of the curve is considerably below the top of the buttresses, so that some of its possible thrust is absorbed by them; and, moreover, certain additional flying buttresses point to this intention. But in this mosque the curve of the dome springs from the top of a drum and above the buttresses, so that the principle of abutting any thrust is put out of the question. The only alternative is to regard the dome as constructed in such a way as to have no thrust, and whether this is effected by means of a system of bonding-stones or chains, or by some adjustment of the jointing, I can offer no opinion. Constant familiarity with domical construction has given Oriental builders certain methods which, to our inexperienced timidity, seem almost impossible, and these methods become the more mysterious and tantalising in that they are practically inaccessible to investigation.

The form of the dome is slightly pointed, but in some cases becomes practically spherical; the curves of the smaller cupolas are occasionally continued up to the apex by angular straight lines, as is customary in the domes of Cairo. The four main arches of the dome are pointed and stilted, and the arches of the subsidiary apses are depressed, and probably struck from four centres. The half-section looking toward Mecca shows the external galleries, which fill up the projection of the great buttresses, the internal gallery, and half of the Mecca-niche. The half-section toward the east shows the main walls rising to a constant cornice level, the drums of the cupolas and subsidiary semidomes emerging from the flat roof, the ranges of windows and buttresses to the semidomes, and finally the dome itself. Four octagonal minarets are built over the piers of the dome, and their weight materially assists in securing the main arches. The great buttresses are stepped up to the minarets, and an octagonal cupola is set on each step.

The sides of the mosques are the most conspicuous at close quarters, for the west end is screened by the forecourt, and at the east end is usually a garden. The lower parts of the sides are occupied by the porticoes and external galleries, and a great overhanging roof shelters the fountains of ablution below. Above this pent-roof the walls are arched in correspondence with the internal divisions, and crowned with a cornice which completes the square base of the whole building. Above this cornice the various domical forms fall within an approximately pyramidal outline, the minarets freeing themselves of all attachment, and soaring upwards high above the dome.

One of the most striking features of these mosques is the great number of their windows. All of them are small and of about the same size, and, on the inner and outer faces of the wall, they are filled with plates of plaster tracery, in which small rounds of glass are embedded. This principle of minutely subdividing the lighting areas is characteristic of the East, and is due to the need of tempering the dazzling sunlight; and the preference for a large number of small windows, scattered more or less equally throughout the building, completes the same idea on a larger scale.

The same traditional tendency is shown in the forecourt, where each bay has two openings, although only one story in height. The lower windows of the mosque and forecourt are square-headed, and have a

shallow architrave around them, and the upper windows have arched heads, the arches being formed with two segments at the springing and continued with straight lines to the apex.

The masonry is built of white limestone in fairly large blocks, the courses are more or less continuous and vary considerably in depth, and the joints are fine. Marble is introduced in the porticoes and galleries, the shafts being dark red, or veined with violet, and the balustrades are of some white variety. Discs of green and red marbles are inserted here and there in the masonry, and the voussiors of the arches are alternately pink and white. The entrance doors are usually built of marble masonry, and the alternation of colour in the arches is often carried down the jambs.

The roofs, including the domes, are everywhere covered with lead, and some such material was necessary to protect them from the violent thunderstorms which gather in the Black Sea and sweep suddenly over the city. The lead is cast in heavy sheets and applied with rolls, and the water drips from the edges without gutters.

A curious point may be noticed with regard to the great buttresses. As has already been said, these had always existed within the building, but in the Suleiman Mosque, with its increased scale and height, they appeared for the first time above the roofs. In the Suleiman Mosque only two of the main arches are open to semidomes, the other two being filled with tympanum walls, and accordingly the buttresses were built on the north and south only; and in the Ahmed Mosque, with its four semidomes, they extend on all four sides. Here, however, in the Yeni Valideh Mosque, they extend on the north, south, and west sides, but not on the east side. This variation is curious, for if the buttresses were necessary on any of the sides they are equally necessary on all. It can hardly be supposed that such great erections were built merely for effect, and it becomes an interesting question as to how they could have been dispensed with on the east side of this dome. The only reason for their omission which I can offer is that the buttresses block up certain windows in the semidomes, and that a complete range of windows was desired in the eastern semidome above the Mecca-niche; but, at the same time, this desire for the removal of the buttresses does not provide the means of doing so.

I should here like to make a statement as to the degree of accuracy represented by these measured drawings, for reproductions of them may possibly be used as documents of reference. The small-scale plans may be taken as perfectly correct so far as they go; that is to say, in all the main dimensions, the thicknesses of walls and the spacing of windows. In some cases I will not vouch for the accuracy of such details as the projection of steps, etc., and the non-structural fittings of the interior have been omitted. The small-scale sections are mere diagrams. The more detailed drawings of the Yeni Valideh Mosque may be taken as correct in all essentials, and also in such decorative detail as could be shown on a scale of 12 ft. to an inch. The building is remarkably accessible to measurement, for winding staircases in the great buttresses lead up to the flat roofs, the domes, and the internal galleries; and nothing could give a more vivid realisation of the scale and method of building than to climb among the buttresses and cupolas as though they were the peaks and crevasses of a mountain. The dome was measured up to the cornice of the drum, but above that level its height has been judged by observation and from distant photographs. Another point, however, was applicable from the coincidence that the second balcony of the minaret is practically on the same level as the summit of the dome, and the height of both may be taken as probably correct within a foot.

The minarets give more character to the mosques and to the whole City of Constantinople than any other single feature. The minaret is practically on the same level as the summit of the dome, and the height of both may be taken as probably correct within a foot.

Their primary use was to elevate the "muezzin," who summoned the faithful to prayer, so that his voice might be heard above the surrounding roofs, but the minarets grew quickly beyond this first necessity, and if the "muezzin" were to chant his call from the upper balconies of later minarets, his voice would be almost lost in the clouds. The minarets are also used for illumination, and on the nights of the great religious festivals their balconies glitter with thousands of lamps all over the city. The minarets consist of an enclosed winding staircase, which emerges at various levels on to balconies projected on stalactite corbelling. The construction is strong, and they rise to prodigious heights, but I have no dimensions of the largest instances. The minarets of the Yeni Valideh Mosque rise to about 240 ft. above the ground, but several in Constantinople must be considerably over 300 ft. in height. The roofs are steeply conical, framed with wood and covered with lead, and terminated with a finial bearing the crescent. The smaller minarets have two balconies, and none have more than three. The design of all the minarets is practically identical, the shafts being polygonal and slightly reduced in diameter above each balcony. It has been said that Turkish minarets are the ugliest form of a singularly beautiful feature; but I think they may claim to have that relative fitness which is the greater part of beauty. Although in themselves they may lack the rich outline of Cairene minarets, yet Cairene mosques have not that complexity of cupola and dome to which the severe elegance of the Turkish minaret acts as a necessary foil.

So far, little has been said as to the internal decoration and effect of these mosques. Many of them have lost much of their original splendour, and are now largely decorated with nothing more elaborate than whitewash. But even this harmless treatment is better than the horrible mixture of corrupt Saracenic and Rococo painting with which the modern Turk has desecrated some of the mosques. Painted decoration of a different character, however, was always an important and legitimate method of lending interest of colour to architectural form, and where a more permanent means of decoration was unavailable a system of painted pattern completed the intention of the original builders. Such decoration has usually been obliterated by subsequent whitewash, or only partially remains; but one great mosque—the Ahmed—has entirely retained its original painting, although restored to some extent. The upper parts of the walls are covered with diaper patterns of conventional foliage and flowers, and the arches and domes are bordered with running designs, and set with foliated discs at the crowns. The pattern is applied on a white ground, and the colours are chiefly blues and greens, brightened here and there with red; and the effect would doubtless be very beautiful if the brightness of the innumerable windows was still tempered by their original tracery. But modern glazing has here done its worst, and in the excessive light the gaiety of colour appears tawdry and even vulgar. In the Yeni Valideh Mosque traces of a very complete decoration may be detected under the whitewash of the semidomes, the designs being large in scale and constructed with interlaced arabesques. Little actual colour remains, however, save the alternate green-painted arch-stones and great circles of Arabic inscription in the pendentives and at the crown of the dome.

But if the perishable quality of paint has deprived the upper walls and domes of their decoration, the lower parts often still retain their more enduring tilework, and the glazed surfaces give a brilliance and lucency of colour which no paint could achieve. The earlier tiles are of a rich azure blue laid on a white ground, or conversely with some geometrical shapes or foliage with some granate flowers are the principal decorative motives. The fertility of design is amazing, and the combination of different effects most ingenious, while the prevailing blue and white gleams here and there with most effective touches of emerald green and red. A wider range of colour and pattern was used in later tiles, but with the widening of resource came a tendency to over-elaboration and ineffective cleverness. The tiles are fairly large, and the pattern seems to have been painted on large slabs,



afterwards cut up for the process of firing, for the joints often have no relation to the design. The tiles were imported, and their designs were obviously inspired by Persian influence. Such tiles were used for the partial decoration of the greater mosques, and especially for the enrichment of the Meccaniche, but the interiors of the smaller mosques and the *türbeks* or tombs were sometimes thus decorated completely. The mosque of Rustem Pacha is one of the finest earlier instances of this treatment, and the *türbek* of the Shah-Zadeh Mosque is a good example of the later work.

The essentially Oriental method of decoration is the application of colour and pattern to the flat constructive surfaces, and is opposed in principle to the Western method of light and shade by relief. S. Sophia is a pre-eminent instance of this Oriental method, and its marble plating and mosaic were represented in the Turkish mosques by tilework and painted decoration. Hence, carving was comparatively unimportant, and it was chiefly used for the enrichment of the ritual fittings, and was rarely applied to the main structure except in the form of stalactite work. This, however, is a large reservation, for such work was almost invariably employed to effect modifications of form. Thus, in the capitals, the change from circular or octagonal shaft to square springing is managed by some arrangement of stalactites, the corbelling of the subsidiary semidomes and minaret balconies is worked in courses of stalactite work, and the recesses of the niches and portals are covered over by deep heads of stalactite vaulting. Cornices, too, are frequently carved with a shallow version of the same work. Stalactite work may be defined as a horizontal and vertical series of arches, those of each course springing from the apices of those below, so that the general surface advances by degrees; but the original scale of the arches was gradually reduced until they became a mere sculptured mimicry, no longer arcuated, but corbelled in construction. This freedom from structural limitation allowed a complication of plan form and grouping which defies description, and sometimes almost defies analysis, and the later stalactite work may be regarded as the *tour-de-force* of that mathematical ingenuity which has always distinguished the Oriental mind. I can make no attempt here to inquire into the characteristics and development of stalactite vaulting, for so intricate a subject would need a whole paper to itself.

A somewhat rare application of carving occurs on a small *türbek* in the garden of the Mosque Shah-Zadeh. On each side of the entrance are two marble slabs, carved with a flowing geometrical pattern interwoven with foliage and flowers. The relief is low, and the chiselling most delicate, but, apart from its beauty, the treatment is interesting as being a carved version of the decorative motives characteristic of tilework.

The greatest richness of carving was lavished on the pulpits. The spandrels of the steep flight of steps were wrought with intricate geometrical devices, and the balustrades were pierced with similar patterns, while the platform at the top was covered with a canopy set on a fourfold arcade.

Another feature especially selected for enrichment of carving was the fountain in the forecourt, mainly, no doubt, because of its ritual significance, but with most happy architectural effect. The earlier fountains were often shaded by a pent-roof supported on shafts; but the single fountain was soon found inadequate, and later mosques have long ranges of washing-places under the external galleries, the fountains in the forecourt being retained as cisterns. These later fountains are usually octagonal, with engaged shafts at the angles carrying arches, and with the interspaces filled with bronze or marble grilles. The cistern is enclosed within this octagonal arcade, an outlet for the water being pierced through each side, and the whole is crowned with a crested stalactite cornice and covered with a cupola. The whole forecourt, with the central richness of the fountain, with the marble arcades and repeated cupolas of the surrounding cloister, with the foliage of cypresses and vines, form delightful places of cool shade and interwoven sunshine; and toward the east the towering walls of the mosque pile up to the countless domes.

All the carved work, except the corbelling

to the semidomes and minarets, was executed in marble, of a white or slightly-veined variety as a rule, but sometimes of a soft red marble for the capitals. The material encouraged great refinement of finish, both in scale and technique, a refinement which well accorded with the general precision of workmanship. It has already been said that the Turks employed a very fully-developed system of decorative detail at Brusa, and in the mosques of Constantinople the same system was used with hardly any further development, and often with greater reserve. The general tendency of carved decoration was toward a somewhat dry and mechanical manner, and much of the most beautiful work is to be found in the earlier mosques. Unlike Byzantine building, Byzantine decoration seems to have exercised no direct influence on Turkish art, and its decoration remained purely Saracenic until the final corruption with Rococo trivialities.

Thus the principal means of the internal decoration of the mosques were marble, tilework, and painted decoration, and remaining instances give a hint of their combined splendour of colour and pattern. The more purely architectonic qualities of the interiors were, in some degree, subordinate to the mode of decoration, and are more difficult to appraise. The arches are un moulded and the surfaces of the walls and domes are flat and unbroken, and if often they now look destitute and empty it is only by the loss of their essential decoration of colour. The dome, semidomes, and cupolas fill the interior with the interest of their curving modulations, but their combined complexity, borne entirely by the four great piers, is a typical instance of that Oriental ingenuity which, to the Western mind, sometimes seems fantastic and lacking in reasonable sobriety. Moreover, the mosques are challenged by the simpler and more familiar grandeur of their prototype, S. Sophia, and a supreme standard is thus created which no such series of buildings could endure. It would, perhaps, be wiser to withhold presumptuous judgment of an art born of a race and climate so different to our own, recognising that the prejudice of another ideal may prevent us from entirely sympathising with it, meanwhile enjoying those obvious qualities which we are able to appreciate.

Externally, the broad masonry of the walls has a certain masculine vigour and largeness of handling which contrasts with the softer grace and minute elaboration of other Saracenic schools, and the influence of a more northerly climate may be traced in the lack of applied colour and in the tendency toward effects of light and shade. But above the walls, which still retain something of the Oriental simplicity and reserve of surface, the cupolas and domes break into an almost bewildering complexity of form. The mosques of Cairo and elsewhere admit the picturesqueness of dome and minaret above the simple rectangle of the lower walls, but their freedom can hardly be compared with the exuberance of the Turkish mosque. Only one restraint was observed—the controlling outline of the whole group, but within that single limit Turkish architects seem to have vied with each other in erecting the most amazing phantasy of cupola and dome. I think that this emulation was conscious and deliberate, for, although each several part has its service of use, yet their combined aesthetic quality was intensified by the innumerable finials of the cupolas and by the development of the buttresses with miniature turrets. It may be said that in these astonishing congregations of domes may be seen the reflection of the grotesque humour of the north; but the Turks were no northern race, and the quality is hardly of grotesqueness. There may surely be no doubt that the same fantastic spirit of the East which produced the wonder of the stalactite vault wrought also these roofs of bubbling domes.

I feel that I have given but the roughest sketch of the full picture, although I have taxed your patience with a paper of inordinate length; but if I were to conclude here I should but barely have mentioned the most effective cause of the beauty of the mosques—I mean their setting in the landscape of the city. They usually crown some eminence above the Golden Horn, and the mosque itself is but the centre of a larger group. A garden is inclosed by screen-walls to the east, and the tombs of prince and

sultan rise their marble walls among the trees. Around the central group of forecourt, mosque, and garden is a vast enclosure, shaded with ancient trees and girdled by a wall, and entered by tall gate-houses and stately portals; while around the encircling wall again are set the libraries, schools, and the houses of charity. Thus from a distance, the mosque is seen rising from the red roofs of the city below, a harmony of assembled cupolas, its white walls and silver domes gleaming in the sun, the foliage of cypresses dark against its brightness; while, soaring above all, the slender minarets pierce the blue sky.

The lecture, which was illustrated by some excellent lantern views, was, owing to the partial failure of the lantern, not concluded until the usual time for adjourning the meetings of the Association.

The Chairman said they would all agree that they had had a unique and most interesting paper, and, although the hour was late he would call upon Mr. Spiers to say a few words.

Mr. R. Phené Spiers, in proposing a hearty vote of thanks to the lecturer, said it was nearly forty years since he visited Constantinople, and then he was there only three weeks, and, therefore, he had a vague notion only of the buildings he saw. Mr. Reynolds seemed to have been more fortunate than he (the speaker) was. He (Mr. Spiers) was prevented from doing much sketching in the streets on account of the small boys throwing stones; but he was, by a piece of luck, fortunate in getting permission to draw inside the church of S. Sophia. His companion, Mr. Brune, an old Grand Prix man, had strong letters of introduction to the French Ambassador, who tried to get permission from the Grand Vizier for them to sketch in S. Sophia, but he was told that it was impossible, and so the endeavour was given up. About a fortnight later, however, the Grand Vizier wrote to M. Brune to say that the Sultan's photographer had been commissioned to take a series of photographs for the great exhibition of Paris to be held in 1867, and the Grand Vizier said:—"Go and see if he can arrange to take you in." The photographer readily consented, and they went into S. Sophia as his assistants, though they set to work to make drawings, while the other man photographed. For three days they were there, and the dragomen sent to protect them maintained their right to remain in the mosque. That was good luck, for Mr. Henderson had been six months in getting permission. He desired to congratulate Mr. Reynolds, and to congratulate the members of the Association on the fact of which Mr. Reynolds complained at the beginning—i.e., that he could not find any information on the subject. That, of course, had led him to make personal observations, and nothing could be better than his remarks on the mosques and his descriptions of their variety of design not known before. It was specially interesting in that there was no account anything like what Mr. Reynolds had given them, and therefore they were most fortunate. The magnificence of S. Sophia was such that it dwarfed the other mosques in Constantinople, though by themselves they were very fine. He saw, while in Cairo, the mosque of Mohammed Ali, which was built about 1830, in imitation of one of the mosques at Constantinople, but badly built, and already falling to pieces. It had the usual great scheme of central and subsidiary domes, but what made it remarkable was the beauty of the ensemble. It was the general form of these buildings and their situation which gave them grandeur, both internally and externally, which the architectural detail did not afford. Mr. Reynolds' paper was full of thought and research, and he deserved their congratulations. It was well known to the members that the reader of the paper was his travelling studentship by a design for a Byzantine church, and he showed in that design that he had a complete knowledge of the principles which formed Byzantine architecture, and he showed that he had the power of realising them in his design. It was, therefore, no wonder that he went to Constantinople and selected the subject of mosques about which so little was known.

Mr. A. E. Henderson said he had great



pleasure in seconding the vote of thanks to Mr. Reynolds for his interesting and accurate description of the great mosques in Constantinople. He could amplify the difficulties Mr. Reynolds encountered in measuring and sketching, but he would confine his remarks to the paper. He agreed with Mr. Reynolds in his dislike to the four great circular piers in the mosque of Sultan Achmet. The bracketing out to support the impost to carry the arches looked weak in the extreme; besides, they made the scale of all the other architectural parts too small. This mosque had four minarets, one at each corner, and at the western angles of the cloistered court, and as at that date there were six minarets at Mecca, Sultan Achmet was compelled to add a seventh, otherwise his mosque would have been of greater importance than the holy mosque at Mecca. Mr. Reynolds seemed to think that the voices of the criers could not be heard from the lofty balconies of the minarets, but he (the speaker) had often listened to the four muezzins, calling from S. Sophia, and could hear them distinctly, even though a slight wind was blowing. S. Sophia keeps a staff of twenty, each man to call only once in the day. They are trained from youth for this purpose, and their voices in time penetrate far further than we Westerners have any idea of. As Mr. Reynolds said, there were only three ritualistic fittings in a Turkish mosque. The mihrab or niche, the minbar or Friday pulpit, and mastaba or raised tribune for the choir. The niche is a small recess in the centre of the Eastern wall, sufficient to take a prayer rug for the officiating priest. This gives the direction to Mecca—of course, in India, the mosques point westward, as all devout Moslems must pray towards the holy city. The Friday (or the Moslem Sunday) mid-day pulpit is a narrow flight of steps leading up to a small canopied platform. Ornament was as much lavished upon this fitting as upon the niche. If the mosque was an ancient church the officiating priest ascends and descends with sword in hand, showing that the building is theirs by conquest. All large mosques and Jewish tekkes have large colleges attached to them. The classes are held in the mosque from sunrise to about 9 or 9.30, when the day's teaching is over. The students reside in little rooms around picturesque cloistered courts. The tendency of the later mosque builders was for an increase in height rather than floor space, and the Yeni Valideh Mesra was the finest example of this type. It was built close to the edge of the Golden Horn, with warehouses round three sides of it, and now, unfortunately, shops had been built in front of it; but its cornice is still seen over the ugly modern buildings. Mr. Reynolds mentioned the smallness and number of windows used. If this were not so, a mosque interior would be unbearable on account of the sun's rays pouring in. So, to obviate this, small horizontal windows in thick walls, which permitted the beams to come through for only an hour or two at most, and this with a quickly moving path; then the outer glazing covered with cobwebs toned the strength down, and if the mosque had withstood the numerous earthquakes, it had a mosaic of jewelled glass for an inner window. He could not understand why our modern church architects did not adopt the double window for our churches; they kept the temperature within much more even; in summer it was cooler, and in winter warmer and less draughty, as the cold outer glass only chilled the air space between it and the inner glazing. Mr. Reynolds did not draw attention to the quantity of iron tie-beams used. There was hardly an arch turned in Stamboul without a single or double iron tie-beam. Iron rods and ties were built both horizontally and perpendicularly in all modern buildings, and there was every reason to expect that if the domes of these mosques were examined annulets of iron would be found encircling them, and in this way would only transmit dead weight to the walls and piers below. It would have been most interesting to have seen the development of Byzantine surface decoration in Turkish hands, but this could not be, as the Moslem was forbidden by his religion to portray the similitude of life, and, of course, the very motif of Byzantine decoration was the Virgin and Christ, and scenes from their lives. Coming from Europe this was most striking, and the beautiful

intertwining foliage and flowers took a long time to be a substitute for this. It was said that Sultan Suleiman sent for Persian tile manufacturers, their clay and glaze, and made a colony just outside the walls, where they set up their kilns and made the tiles. This was why the tiles fitted the architecture so admirably. While Suleiman was away from the city Rustem and Mehmet Pasha stole the workmen, and they made tiles for their mosques, instead of for their master; this was how the Suleimanch mosque had so few tiles upon its walls. There was a very great want in a Turkish mosque. Maybe we expected too much, as we compared it with a Christian church; but we should remember how simple the worship of the Turk was, how precisely he went through his devotions—in fact, as a regimental drill. He had no complicated ritual; he only needed an expansive floor space, and so we looked in vain for choir or chancel, storied canopies, and elaborate tombs, shrines, and statues. No; we see naught else but architecture and surface decoration, and this was only a frame at best for other things. A mosque could only be understood by seeing the concourse of devotees, closely packed together, going through their worship to Allah.

Mr. J. B. Fulton said that they had had a most interesting paper. He did not think that anyone else, not only in Great Britain but in the whole world, could have given them what they had had that evening, and their thanks, if he might say so, were really due to the Sultan for his permission for Mr. Reynolds to make his observations. The paper had revealed to them what was really a new style of architecture to us in England. It was a style we ought to know something about, for it carried on the Byzantine style of building, which was undoubtedly the finest that the world had yet produced. We had seen it, of course, adapted to modern requirements by, perhaps, the greatest master we have had, and that was Wren; yet Wren never achieved what these Turks had done—i.e., getting the wonderful constructive domes over huge floor spaces, giving the effect of being in the outer atmosphere. That was one of the principal points in Turkish architecture, i.e., the building up of these great spaces in such a wonderful way, which Mr. Reynolds had so well described. Of course, if the architecture was right, it was not only right as a building, but it was happy in its parts—and, as Mr. Reynolds had said, "the relative fitness was a greater part of beauty"—the fitness of the building for the purpose it was intended. There was no more picturesque place in the world than Constantinople; it was marvellously picturesque, as they would see from the photographs. As to the decoration of the buildings, it was a revelation to him. The delineation of the human figure was the highest development of art, and Michael Angelo never even descended to anything lower—only in one case did he do so, i.e., in the case of a tree. But the next thing was to study nature, and a flower was a beautiful form of nature. He had studied flowers and conventional flowers here, but he had been struck by the marvellous way in which the Turks saw nature and conventionalised it. He did not say that they had attained the height of beauty; that was left to some future ages; but he thought that, just as from their architecture we had many points to learn, so had we from their decoration. As Mr. Henderson had said, the Turks were prevented from using the human figure in art in the mosque because of their religious scruples, and so they took floral decoration and carried this to a very high point of excellence indeed.

The Chairman, in putting the vote of thanks to the meeting, again referred to the great value of the paper, and expressed regret that the lantern had behaved in such an eccentric manner.

The vote of thanks was very heartily agreed to.

Mr. Reynolds briefly replied, and thanked Mr. Fulton for the loan of drawings, and Mr. Fyfe for the loan of some photographs.

The Chairman announced that the next meeting will be held on the 15th inst., when Mr. W. H. Bidlake will read a paper on "Church Towers and Spires," illustrated with lantern views.

The meeting then terminated.

#### INTENTION IN ORNAMENT.\*

THE complexity of ideas and thought which underlie the expression of the modern artist is not to be denied. In whatever form the result may appear, and in every medium employed, there will be found the same departure from the abstract principles of beauty which were sufficient to satisfy the more simple attitude of the masters of a former time. The various revolutions in style which have taken place in recent years, and the enthusiasm expended, is sufficient evidence of the desire for a more direct utterance than the academic use of forms and features of the preceding and rejected fashions will allow. In every revival, however, the mistake of re-embodiment the matter rather than the spirit has been made; the result has often been characterised as meaningless, chiefly on account of the fact that the more readable portions of the design have nothing in relation to the contemporary life; that is, contained no reflection of the forms then in use as exemplified in clothing, manufacture, and other utilitarian and artistic expressions.

It is becoming more and more infrequent to witness the obsession of a past style carrying away an artist from his more direct expression. A certain number of the most able designers have endeavoured to revert to principles in which forms and ornament of purely abstract character have predominated; the result has been more a lack of warmth and interest; it has resulted even in a certain priggishness and complacency in the quality of design which has passed the bounds of austerity. This negative attitude of mind has insisted on the beauty and unashamedness of what I may call the nude, and we are left without a vestige of moulding, ornament, or trimming whatever, and we are asked to be witness to the emotional quality of the bare surface and the lack of orderliness and articulation which such efforts display. We have thus the two extremes—the academic use of old forms and features applied arbitrarily under conditions which are entirely opposed to those which assisted to evolve them; and, secondly, the attempt to ignore tradition altogether and be entirely original, with the results I have suggested. With such forces in opposition, and with the admitted sincerity of both, a certain compromise has inevitably resulted, just as we find in modern musical composition; "characteristic illustration of things which are interesting and attractive on other grounds than mere beauty of design or of texture," combined with the survival of forms which are not to be denied since they have been proved by a gradual evolution to be satisfactory, graceful, and harmonious by virtue of their logical basis and origin.

Again, the very varied and particular uses for which the modern building is now designed may even result in something analogous to the element of realism which has been so prevalent in the other arts. The quality of suitability for the purpose for which they are designed leads to the classification of edifices which in past times were almost entirely either ecclesiastical or residential. At a glance it is revealed to which of the two categories the majority of old buildings belong; but with many modern examples, with their infinite variety of purpose, it is hardly so clear. They might say, as the American poet, Whitman, "Do you see no further than this façade, this smooth and tolerant manner of me? I am not what you suppose; I am even more interesting than you suppose," or something to the same effect, with every justification. In the case of the modern building of the residential class, from the cottage to the town house, this veil of abstraction is legitimate enough. It would be ostentation of the most objectionable kind to insist on the individuality of the ordinary citizen, and the country or suburban palace is a retreat, in the design of which the personality of the owner is better unexpressed, save in the case of a royal or princely abode; but, in the many varieties of public and semi-public buildings which are now erected there is surely no need for such uniformity or negative qualities, and the purpose of these buildings might be expressed in many ways, both allegorically

\* Part of a paper read by Mr. E. A. Rickards before the Liverpool Architectural Society, December 4.



and literally, to stir the imagination and swell the pride of those who have common property in them. Though this result may be to some extent achieved by the more grandiose treatment of their larger and architectural masses, it is hardly to be expected that any literal expression can result from such features, which are purely abstract in their general form, whether they happen to belong to an opera house, court of justice, or a library, on a grand scale. One can imagine the same severity of architectural treatment underlying the design in each of these instances.

When it comes to the subordinate details, however, of either of such examples as these, there is at once an infinite possibility in the variety of design and treatment, much in the same way as the costume of a human being may express character, worldly position, and so forth. The evolution of the arrangement of our public buildings has brought about many distinct types of plan, so markedly different and so peculiar in each variety that it has become exceedingly difficult to break new ground when preparing a scheme for any additional work of a particular character. As far as interior design is concerned it must be admitted that a certain character in architectural treatment has often resulted from the very conditions imposed. The grouping of seats in a court-house, or the arrangement of orchestra and platform in a public hall, or the generally-accepted plan of a swimming bath, for instance, forms a basis from which may be evolved a class of design analogous in its principles to the classical examples of temples and amphitheatres or any building erected for a specific purpose. But I am more concerned with the plastic treatment of an exterior, where so much freedom of expression is possible, and where, with the aid of sculpture, deliberate and arbitrary methods might apply. I say deliberate as opposed to the Byzantine idea of letting the outward shape simply follow the lines of the interior, when sometimes ugliness is excused on the ground of truth. Let us have a due measure of expression of the interior by all means, but, following the example of Wren and other masters, let us clothe it with as much beauty as we can, and, in addition, let the purpose, as far as possible, be expressed in ornament wherever it happens to be used, for, after all, it is in the ornament that the story of a building can only be literally stated.

It has been pretty well proved that the present style of Renaissance which is universally adopted for public work is capable of the freest treatment, and especially lends itself to applied ornament. The many examples in Paris, from the Opera House to the quite recent buildings, are excellent proof of this. There is hardly any limit to the lengths to which the more accessory design of sculpture and ornament may not be taken, and yet be made to blend with the general design. We have passed beyond the academic copying of the classic examples, and old work no doubt in future is to be studied, not to be memorised and reproduced in whole or in parts, but with a view to extracting the logic underlying the design generally, and the intelligent application and form of accessory features which serve to bind together and render harmonious the various masses of the general composition. The same should certainly apply to a study of ornament, for we are hardly in the position of the Italians who so often set out to reproduce the Roman and Greek work in every detail, and were only saved from a direct copying by the strong individuality they hardly knew themselves to possess. It is impossible for the modern architect to approach a design in this simple spirit, any more than the informed artist, scientist, or whoever he may be, can work in a language he knows to be dead, or treat of a subject or theory which he is intelligent enough to understand has been absolutely disproved. Therefore, having gained technique and facility from an intelligent study of the past, he has all the wealth of suggestion which is to be derived from modern life and forms at his disposal to embody in the decoration of his design; just as in literature we have added to our vocabulary and expressions as the complexity of ideas has increased.

We have witnessed in London recently the erection of such important public works as

the new War Office, the new Sessions House, the Admiralty, and so forth. Yet, can it be said that any of these buildings bear any significance of the character of its purpose, or is there anything beyond a few allegorical figures suddenly introduced amongst the cold atmosphere of architectural forms, to attest the nature of the business for which it was constructed? Even these might easily apply to one building or to another for all the literal suggestion which they convey. Any national monument of such importance should surely be treated as a manifestation of the qualities and attributes of the institution for which it stands, and architecture and sculpture might well combine to glorify its dignity and power with all the means at their disposal. What a combination of allegory and realism might any of the above-mentioned subjects suggest; what reflection of incident and material could be effected, and how magnificently the forces within might be represented literally and symbolically; yet the abstract quality in the way such buildings are treated in these unimaginative and self-conscious times brings them all into line, and their monotony of conception and detail leaves them under the same heading of good form which has become our chief social characteristic.

#### TESTS OF OPEN DOMESTIC FIRE-GRATES.

At the request of H.M. Office of Works, the Coal Smoke Abatement Society conducted last week a series of tests of twenty-four open domestic firegrates which have been entered for competition by various manufacturers. The grates were fixed in twenty-four rooms on the second floor of the new Government buildings now being built at Westminster. The rooms extend around the four sides of one of the courtyards, and are of approximately equal area—about 300 sq. ft.—and each room has one window and one temporary door. In all cases the fireplace is near the middle of one of the side walls at right angles to the window-wall, and all the flues are carried up to the same height, probably 50 ft. or 60 ft. above the grates. Among the conditions to be observed by competitors, there are only two which are of general interest, namely, that the grates must be of the open type, and must not measure more than 20 in. in width across the front.

Four "points to be ascertained by these trials" were mentioned in the instructions to competitors—

- (1) Prevention of smoke.
- (2) Heating power.
- (3) Economy of fuel.
- (4) Suitability for office and household purposes.

The method of testing has been carefully considered by Sir Henry Tanner and the representatives appointed by the Coal Smoke Abatement Society. The fires are lit at 8 a.m., the quantities of wood and coal being weighed. Weighed quantities of coal are added when necessary during the day, and at the end of each day's test the fire is drawn and the unburnt cinders weighed, so that the weight can be deducted from that of the coal put on the fire during the day. Poking of the fire is not allowed, and competitors are not permitted to be present during the tests. The temperature of each room is recorded every half-hour, two thermometers being provided for the purpose, one being placed on a stand 6 ft. from the fire and level with it, and the other on one of the walls. On Wednesday the second of these was hung near the door of the room, and the first was placed at an angle of 45 deg. with the fire. We understand that on Tuesday the two thermometers were directly in front of the fire, the more distant one being hung on the opposite wall. The temperature of the corridor is recorded at the same time. In each room a ruled sheet of paper is hung up, on which the attendants record the temperatures, the amount of coal, etc., and the time at which the temperatures are taken and the fires replenished. Hygrometric tests are also made two or three times a day.

The smoke tests are made on the roof of the building. A length of flue-lining is fixed on the top of each flue, and each of these has a distinctive letter painted on it. The rooms below are numbered irregularly, and the smoke-observers on the roof do not know

to which room a particular flue belongs. Although it is, perhaps, too much to say that "no collusion is possible" between them and the attendants below, it may be granted that the utmost appears to have been done to prevent such collusion. Four observers are in constant attendance on the roof, each having charge of six flues. Each observer has a sheet, with squares, varying in tone from light to dark-grey, and has also six charts (one for each flue) ruled into squares, the vertical lines representing five-minute intervals and the horizontal lines representing the four or five hues shown on the smoke-diagram. An observation is made of the smoke from each flue every five minutes, and is recorded on the chart of that particular flue. Two observers are in charge of each station, and work in "shifts" throughout the day. It was originally intended to continue the tests for three days only, but, in order to eliminate as far as possible the personal equation, it has been decided to extend the test to four days, so that each observer will have charge of the four groups of flues, one group on each day.

The firegrates entered in the competition vary considerably, but we did not notice anything particularly novel. In width they range from 20 in. down to about 12 in. There are a number of the well-known type recommended by Dr. Teale; others are of the more modern kind without front bars; others, again, have a subsidiary-controlled flue extending from the body of the grate and passing up behind the firelump back to the main flue; about half-a-dozen have hot-air chambers of various kinds; there is one independent, open-fronted stove, standing quite clear of the chimney breast; one which may be called a half-stove; and one with two pairs of sliding-doors so that the combustion can be regulated at will.

It is obvious that grates of such different sizes and types will give different results. The highest corridor temperature on Wednesday was 46 deg. F., and the highest temperatures recorded in the rooms between 8 a.m. and 3 p.m. ranged from 52 deg. to 62 deg. F. near the door, and from 70 deg. to 90 deg. at a distance of 6 ft. from the fire, while the coal consumption for the seven hours ranged from 24 lb. to 44 lb. The smoke tests also showed considerable variation. These figures indicate that it will not be an easy matter to decide as to the respective merits of the different grates. We may add that the rather low room temperatures recorded appear to be due in part to the new and unfinished state of the building, the floors and ceilings being of rough concrete and the walls of unplastered brick.

While there can be no doubt that the tests are being carefully and fairly made, under conditions as equal in all cases as practicable, there must inevitably be some differences due to the varying positions of the rooms and to the courses of the flues and the positions of the chimneys. In one room, for example, there was distinct evidence of smoke. But it is better that the tests should be made simultaneously in different rooms, rather than on different days in the same room. There is one other point which may be mentioned, and that is with regard to the thermometers. We were not informed by the representatives of the Society whether these had been tested or not. As it is not uncommon for two thermometers placed side by side to give readings differing by one or two degrees, the thermometers used in the tests ought to be tested before the Society's report is issued. Probably this has already been done, but, if so, it will be well to state the fact in the report.

Whatever the result of the competition may be, the Coal Smoke Abatement Society deserves the thanks of the community for its efforts to abate a serious nuisance, and at the same time to reduce the enormous waste of coal in domestic firegrates.

**MEMORIAL TO JOHN KNOX, ST. GILES' CATHEDRAL, EDINBURGH.**—A statue of John Knox is to be placed in the Albany aisle of St. Giles' Cathedral. The architectural portion of the memorial will be about 18 ft. in height, and takes the form of a Gothic niche and canopy raised from the floor on a pedestal, and built against the wall. The statue itself is about 6 ft. high. Mr. Pittendrich Macgillivray, R.S.A., is the sculptor, and the total cost, including foundation and erection, is estimated at 1,400l.



### CONFERENCE ON SMOKE ABATEMENT

THIS week a Conference on Smoke Abatement, arranged by the Royal Sanitary Institute in conjunction with the Coal Smoke Abatement Society, is being held at the Royal Horticultural Society's Hall, Vincent-square, Westminster, and, in connexion with the Conference, there is an exhibition of smoke-abatement appliances. The exhibition was formally declared open by Sir Wm. Richmond on Tuesday night.

Sir Oliver Lodge, who was announced to have delivered a Presidential address, was, owing to illness, unable to be present, but sent some manuscript notes, which were read by Sir Wm. Richmond.

After remarking that the popular idea that coal smoke was a good disinfectant was wrong, since it contained much that was fatal to higher as well as to lower organisms, the author commented upon the large amounts of sulphurous acid present in the atmosphere of our cities, due to our barbarous methods of burning solid fuel. This acid when oxidised became oil of vitriol, a most destructive agent to living and other tissues. Sir Oliver Lodge then referred to the proposal that smoke and fog should be precipitated by electrification of the air, and pointed out that, while it was expensive to produce a fog, it would be still more costly to disperse it by the electrical method. This method of precipitation was only likely to prove useful for the disposition of valuable metallic and chemical fumes, the product of manufacturing processes. The right way of dealing with a town fog, according to the author, was not to produce it. The difference between town and country fog was described in detail, and it was shown that the greater density and capacity of the former was the chief cause of its greater permanence. The connexion between fog and the imperfect combustion of solid fuel was then illustrated, and the need for improved methods of burning fuel both for domestic and manufacturing purposes was insisted on. The author now passed on to consider the three requisites for an improved method of burning fuel, and stated that these were—(1) Purification of the fuel to be consumed; (2) proper means for effecting its complete combustion; and (3) utilisation of the heat due to this combustion without waste. These three essentials of a more satisfactory method of burning solid fuel were then dealt with by the author in detail, and it was shown that the gasification of the solid fuel, at the pit's mouth or in some central gas-producing plant, and transmission of the gas, as Mond or water-gas, to the localities where it was to be used for heating purposes, was the only method that satisfactorily solved all the difficulties of the problem. The common objections to gas-fires for household use were then disposed of by the author, and it was pointed out that when proper and adequate provision for carrying off the products of combustion was made gas-fires were less detrimental to health, and far more cleanly than coal fires. But the gas-fire, as ordinarily used, was unscientific, and gave in many cases just cause for complaint as to its healthiness. The remainder of Sir Oliver Lodge's paper dealt with the technical side of the combustion of solid fuel in steam boilers, and on this subject he gave it as his opinion that the steam boiler, even at its best, is an unsatisfactory appliance for converting the energy of coal into mechanical energy, and that in time the use of gaseous fuel and gas engines will oust the steam boiler and all forms of steam engine from our works and factories. The transmission of all the heat of the burning fuel through the plates of a steam boiler could never be realised, and the conditions which best favoured heat transmission were exactly those which favoured the production of smoke and flame in the furnace of the boiler. On this account the problem of the smokeless combustion of solid fuel in the case of steam boilers was more difficult than many had yet realised.

#### Is London Fog Inevitable?

Dr. W. N. Shaw followed with a paper on "Is London Fog Inevitable?" and remarked that no one would assert that there was anything physically impossible in the idea of dispensing with coal smoke, although there might be some who were of opinion that if there were to be fogs, in any case, the effort

necessary to keep them clean was not worth the trouble and expense. From the observations of Mr. Lempert during the winter of 1902-3, it appeared that, if his figures could be accepted, they had about 20 per cent. of London fogs to deal with absolutely, as the lawyers would say, and the remainder depended on physical processes which were not within their control. In so far as anyone's action in regard to the smoke question may depend upon the effect of smoke on the frequency or intensity of fog, it would appear from the evidence now possessed that the abolition of coal smoke would cut off 20 per cent. of fogs altogether, that it would add most materially to the power of the sun to dissipate fogs, and thus indirectly reduce their duration. The abolition of the dirt and the restoration of something like their natural heritage of daylight would be incidental advantages which were by no means unworthy of consideration.

On Wednesday Sir George Livesey presided over the conference, and in opening the proceedings remarked that there was hope for London, for the abatement of its smoke had begun. Gaseous firing, the gas engine, and the dynamo were potent agents for the diminution of smoke. Within the last ten or twelve years, by the introduction of the penny-in-the-slot meter, almost the whole of the wage-earning classes of London had been supplied with gas. Of the 834,000 customers of the Gas Light, the South Metropolitan, and the Commercial gas companies, 80 per cent. used gas stoves for cooking. Substitute coal for all this gas, and what would be the condition of London? The difficult task, however, on which the advocates of smoke abatement must concentrate their attention if they were to succeed was the domestic fire used for heating, and the main hope in this direction lay in smokeless solid fuel or gaseous fuel of some kind. The great desideratum for smoke abatement was cheap gaseous fuel. There were two difficulties in the way of this, one being the opposition of the London County Council to the gas companies' efforts to obtain Parliamentary sanction to reduce illuminating power, and the second being that the gas companies had not yet found the gaseous fuel suitable for the purpose. They wanted freedom to work in this latter direction, and the method of testing that came into force with the new year would give them a certain measure of freedom to start towards the goal of a cheap fuel gas.

#### The Abatement of Smoke from Private Houses.

Mr. H. A. Des Vœux, M.D., in a paper on this subject, said it was our prevailing national fault—conservatism—which had prevented us from facing the problem of coal smoke, a disgrace to our civilisation, and a slur on our intelligence. He thought it might be taken for granted that, in the majority of English houses, the cooking was their way. Broadly speaking, it might be said that there was no such thing as smokeless open coal fires, but that, under efficient conditions of management, there were vast differences in the smokiness of fires, that those which gave the greatest amount of heat for the least amount of coal consumed entitling the smallest amount of smoke, and that therefore efficient coal fires were to a certain extent smoke abaters. If we want our atmosphere absolutely cleared of smoke, we shall have to give up the use of crude bituminous coal and use some of its products, such as gas or electricity, or some smokeless fuel; and he believed that it was not the sanitarians who were going to lead the way, but a person much more useful and practical in serving the needs of mankind—i.e., the cook. It was she who had found out that a coal fire was essential in a house. But, unfortunately, smoke was still emitted from the kitchen chimney, for in all moderately large houses it was necessary to have a hot-water system as well, and in most houses the old coal range was lighted for this purpose. How, then, could the hot water be supplied? Eight years ago he installed a coke boiler, and each year he was more satisfied with it.

It had given a magnificent hot-water supply throughout the house at a temperature of about 170 deg. Fahr., and the supply had been so plentiful that he had been enabled to put on three hot-water radiators into passages. The cost of this system was from 1s. 3d. to 2s. a week, depending mostly on the price of coke. With a gas cooker and a coke boiler, the difficulties of a hot-water system and the warmth of the kitchen were surmounted. If this system were installed in all the houses in London, the greater part of the smoke from private houses would be prevented. As to the sitting and bed rooms, the problem was easier. He had a gas log fire in his consulting-room, an anthracite closed stove in his dining-room, an open coal fire (the Florence grate) in his morning-room, and gas fires in his bedrooms. With regard to gas fires in sitting and bed rooms, the greatest objections to them of which he was aware were the reputed drying of the atmosphere, and the sentimental objections that they were not so pleasant to look upon and that they could not be poked! To take the last first. Verily such a trivial objection ought not to stand in the way of a great sanitary improvement, and he wondered how often each of those present daily poked his fire! The second objection was a greater one, for there was no pleasanter sensation than the sight of a bright-burning coal fire when we enter a room cold and tired. But what about the same fire which the housemaid had allowed almost to go out, and buried the burning coals with 5 in. or 6 in. of fresh fuel! The first objection was a real one, if true. Personally, he found that if he burnt a gas fire in a room with no ventilation, a peculiar sensation of dryness was produced, but he had discovered that it is readily removed by opening the window an inch or two. This was therefore an advantage, and not a drawback; and there was certainly less draught in a room with a gas fire than a coal fire. With regard to cost, he would only say that he thought in his own house cooking by gas was slightly (10 per cent. or less) dearer than by coal; but that, like salt, it was not the amount that was consumed that costs the money, but the amount we waste. He gave some figures showing the enormous increase in the employment of gas stoves during the last ten years—figures which proved that it was the small consumers and poorer people who were using them more and more.

Other sources of heat were available for sitting-rooms: electric heaters, anthracite stoves open or closed, coke and other smokeless fuels. Of these, electric heaters were becoming more and more used, and, since the electric companies had wisely reduced their prices for current, he had no doubt that they would rapidly be introduced into houses; emitting no smoke and no fumes, they were bright and cheery, requiring only a switch to turn them on and off. They were ideal from the point of view of a sanitarian (except that they did not help in the ventilation of a room), and he wished them all success. Anthracite open fires were absolutely smokeless; they gave a great heat, they were efficient ventilators, but the fire was not so bright or quite so lively as a bituminous coal fire, and it was somewhat difficult to light. He did not believe that it was costly in burning, although the coal was dearer than ordinary coal. Closed stoves, mostly of French and German origin, burning anthracite were more and more used; they were alight night and day, need only be stoked once in twenty-four hours, were very economical (his cost was 3d. for twenty-four hours), but they were cheerless things, and in his opinion were best fitted for dining-rooms, which were only used at certain intervals of the day, or in halls or passages, where they were excellent. Oil stoves were cheap and economical, very useful in halls and passages, but not quite suitable for sitting and bed rooms. Hot-water and steam systems through a house were not common in England, but he thought that by reason of their economy and labour-saving advantages they would be more employed.

He wished to emphasise the fact that he had aimed at proving that the problem of a smoky atmosphere from house warming was not a hopeless one, that what he and a few others had done was to show one way, not all the ways. Our first great fight must be to insist on smokeless cooking, and fortunately



it was the easiest to obtain, because cook was already converted, and to get rid of the open coal cooker we have only to substitute an easily-managed coke boiler. Smokeless cooking would rid us of 600,000 dirty chimneys, and the effect would be so enormous that our proselytising would no longer be required. If we obtained this, smokeless heating would follow in due time, and for those who insist on having an open coal fire, it should be a *sine qua non* that only those grates are allowed which had already been tested by some public authority as to their efficiency. Not for many years would it be possible to eliminate entirely the open coal sitting-room fire.

He appealed to all those who were interested in public health, to those who delight in architecture and in art, to those who preach efficiency and economy, and to those who prize a clean house and a clean collar, to ponder over this question themselves. Do not let anyone consider that his or her little mite will not help. Every person who became a smoke abater in his own house became a centre from which information could be given to others, and small beginnings would lead to great endings. If public opinion could once be aroused to the grand results which would follow the cleansing of an atmosphere; if the inhabitants of the cities of England could be made to believe that the sun could once again pour his beneficent light and heat into the dark corners of our streets, he for one could not doubt that they would demand that steps should be taken to bring about this most desirable end, and terminate once and for all the murkiness and dulness of the atmosphere, which we all dread and deplore.

#### Coke as Domestic Fuel.

Sir Charles Cookson had prepared a paper on "Coke (charred coal) as Domestic Fuel," which was, in his absence, read by Dr. Mortimer. The author narrated his own experience of the use of coke as the only fuel in the seven grates in his own house at Chesham. When he first came to London from Egypt, disgusted at the contrast of the atmosphere, he determined not to contribute to the nuisance, and that the only way to abate smoke was not to create it, and that was to burn only smokeless fuel. He tried anthracite for a time, but soon took to coke on account of its greater cheapness as well as its far higher power of radiating heat. The initial difficulty which he found in the use of both these smokeless fuels was in lighting them, but he easily overcame that by putting under the grate an iron pipe connected with the gas service of the house, and perforated by air holes at the side so that the gas when lit reached the coke laid on the lower bars of the grate. The flow of gas was controlled by a Bunsen burner higher up in the pipe. It took about ten minutes to ignite the coke, and after that the gas was turned off, and the fire kept up for the rest of the day by coke alone. In this way he believed he had satisfactorily solved the question of the abolition of that large part of the smoke nuisance which arose from the domestic chimney.

#### Smoke Abatement in Leeds.

Professor J. B. Cohen (Leeds University) placed before the Conference the work of the Leeds Smoke Abatement Society. It was estimated that 4,000 tons of coal were daily consumed in Leeds, which, at  $\frac{1}{4}$  per cent., meant 20 tons of soot passing into the air. As to the remedies for the domestic hearth there was no doubt that the evil of smoke might be met if more attention were paid to the use of gas fire. From experiments he had made he was convinced that, with proper chimney draught, the alleged emission of noxious gases into a room was a myth. As to the emission of black smoke from factory chimneys the system of municipal smoke inspection was ridiculous, especially when one considered that the smoke inspector was generally a former fireman or stoker who was probably receiving not more than the wages of a skilled artisan. To meet the difficulty his Society had pressed for the inclusion of all factory chimneys in the Alkali Act, so as to place the whole matter of smoke in the hands of experts, just as the control of noxious fumes were under the careful supervision of the Government alkali inspectors. The Government departments had declined to receive a deputation on the subject, but,

nevertheless, they in the North were still convinced that these were the lines which were most conducive to the effective solution of the smoke problem.

#### The Acids of Smoke.

Dr. Samuel Rideal, in a paper on this subject, discussed the evil effects arising from the acid gases associated with all kinds of coal-smoke. He pointed out their injurious action on exposed fabrics and on building stones, and drew attention to Dolomite limestone in particular, of which Westminster Palace was built, as a stone which appeared to be most affected, owing to the solubility of the magnesium sulphate formed. Oolitic and Portland limestones, of which St. Paul's is built, he found contained little or no magnesium carbonate, and were far more durable in acid town air. A baryta wash seemed to be one of the best antidotes. With regard to iron, as in the case of Charing Cross station, also, they found that it rusted in the presence of sulphuric acid at a far greater rate than iron in a country railway-station. As they came nearer to London the sulphur in the iron increased. Twelve miles from London it amounted to about 3 per cent. of sulphate of iron in the oxide of iron, while in London itself the iron rust had a quantity of sulphate which was about 10 per cent. of the oxide of iron. The agitation within recent years in Parliament for the removal of the sulphur clauses from coal-gas Acts, elicited the fact that the amount of sulphur given from coal was a thousand times greater than from gas, which, in the opinion of the author, was a thousand times more important. He referred to the possibility of the elimination of the free sulphur from coke, which would remove the chief objection to its extended use, and pointed out that coke, being free from black, sooty, and oily particles, the gases contained therein were more diffusible, quickly become dissipated into the greater volume of air, and when condensed by rain, or by contact with cold surfaces, were more dilute and less harmful than the corresponding amount of acid produced from coal consumption.

#### Distribution of Producer-Gas.

Mr. A. S. E. Ackermann spoke as to "The Distribution of Producer-Gas as a Means of Alleviating the Smoke Nuisance." To combat the smoke fiend his proposal was that producer-gas should be distributed to houses for warming and cooking, and to factories for industrial purposes. Producer-gas was made from the cheapest coal, and could be produced even on a small scale for  $\frac{3}{4}$ d. per 1,000 cubic feet. Producer-gas was suitable for practically all purposes for which ordinary gas could be used, except that it would not do for illuminating. Any such scheme must necessarily be very costly in the case of London; but, while recognising that the cost of such a scheme would be very great, they must not forget what an extremely costly thing the fog was to London, and how far-reaching were its evil effects. The Hon. Rollo Russell estimated that the total cost of fogs in London was over 5,000,000. per annum, and so one year's cost would provide capital enough for a very large scheme.

#### Smoke Prevention and Coal Conservation.

Mr. Arthur J. Martin, in a paper on this subject, also advocated the use of gas in the way proposed by Mr. Ackermann, but was in favour of coal-gas being used because of the nuisance which would arise from the breaking-up of the streets if a new company was introduced. He suggested that gas should be generated at the pit's mouth, and conveyed to London in steel pipes at high pressure. A single line of 6-ft. pipe would bring from the Yorkshire coalfields a supply of gas equal in heating power to the whole of the coal burnt in the metropolis. The general substitution of gas for coal would do away with smoky fogs, not only without cost, but at a positive saving to the community. It would also relieve the streets from a large volume of slow and heavy traffic, and by supplying cheap fuel along the whole length of the pipe line would give facilities for the removal of manufacturing industries from the cities to the country.

Considerable discussion followed the papers. Mr. Aitken Berry observed that, at the new Government offices at Westminster, the

Office of Works had been making tests of grates, and they were convinced that at the present day grates could be supplied which could consume coal without a large production of smoke.

Mr. T. C. Horsfall referred to the Arnott grate which he had at use at his own house, and said he was prepared to pay all the costs of testing this grate, which was not patented.

Dr. Ormandy (Warrington) said that poor people had to take houses as they were, and therefore he thought the societies should try and get at the architectural societies and the builders' societies to get them to move in the matter.

Mr. T. G. Marsh (Manchester) deprecated trying to get the nuisance remedied by legislation, and urged that the way to get manufacturers to use smoke-prevention apparatus was to show that there was economy in doing so.

Mr. Karl Maskel pointed out that the effect of sulphuric acid on iron was not to be measured by the actual quantity which might be found in the iron, for its action was continual.

A resolution, moved by Mr. Des Vœux, to the effect that the London County Council be asked to seek powers to enforce smokeless methods of cooking in all new houses was rejected.

Mr. A. J. Martin moved a resolution to the effect that the Sanitary Institute and the Smoke Abatement Society be asked to join in a memorial to the Government setting forth the urgency of dealing with the question.

This was put to the meeting, and declared carried.

#### THE INSTITUTE OF SANITARY ENGINEERS.

In the unavoidable absence of Mr. J. A. Crothier, Professor E. G. Croker took the chair at the Holborn Restaurant on Wednesday night at the annual dinner of this Institute. Amongst those also present were Messrs. W. J. Dibden, W. E. Riley, Baldwin Latham, W. F. Smith, W. Whitaker, A. J. Martin, C. E. Butcher (Chairman of the Council), H. W. Hoskins (Hon. Secretary), etc.

Mr. R. Wright proposed the toast of the "Houses of Parliament," which was acknowledged by Mr. E. Bond, M.P.

Mr. Baldwin Latham, in submitting the toast of the "Institute of Sanitary Engineers," said that in his younger days they had no institution to assist them in their work. The only literature they had in those days were the reports of the General Board of Health. He was glad that that Institute had been established to assist the sanitary engineers, for what was to the interest of sanitary engineers was far more to the interests of the British public. The matters which they had discussed at their meetings were of the most useful character, and embraced such questions as those of combined drainage or separate drainage, which was a very vexed question on which thousands of pounds had been spent in law expenses. They had also considered whether iron or earthenware pipes should be used for house drainage; the sewage disposal in the case of towns, villages, and country houses; flood disposal; and the disposal of the waste of towns. He thought there was a great field open to them, for there was a vast difference between the sanitary conditions of the northern and southern portions of England. In the south they had much healthier populations, because they had more perfect systems for the disposal of sewage. It was for them to forward the principles of sanitary science, so that in future the north might be brought up to the standard of the south.

Mr. W. J. Dibden said that Mr. Baldwin Latham, in the few words he had addressed to them, had shown the scope of the Institute, and, as they were all members, it was needless for him to dilate on them further.

Mr. C. E. Butcher (Chairman of the Council) said the Association was fortunate in having an energetic body of gentlemen on their Council and as officers. He would specially mention Mr. Hoskins, their hon. secretary, who had done such good work since his appointment that the Institute was



rapidly extending its influence, which would be made apparent to all members on the publication of the transactions early in the new year. An institution which brought together a large number of gentlemen engaged in sanitary work in a private capacity, and the gentlemen in the service of various municipal authorities, was bound to have discussions which were of benefit to both branches of the profession. Their Institute with such a combination of members should, in the near future, bring influence to bear on the Government to appoint that much talked of and sorely needed Minister of Public Health. Last summer they had a successful meeting at Southampton, and next year the meeting would take place at Manchester. During the year seventy-four new members had been enrolled, forty-one of whom had been elected in the last six months. A number of gentlemen present in the engineering and architectural world had also joined the Institute as hon. members. At their recent London examination seventeen candidates presented themselves, while at Sheffield they had eight candidates. In conclusion, he thought the Institute was to be congratulated on having their chairman as their President for 1906, for he had already given an example of his good intentions.

Mr. W. J. Dibden next proposed the toast of "Kindred Associations," and mentioned that they had with them gentlemen associated with the Institution of Civil Engineers, the Royal Institute of British Architects, the Royal Sanitary Institute, and other associations.

Mr. W. Whitaker (late Chairman of the Council of the Royal Sanitary Institute) replied, and said there was room for a great many societies. He thought the sanitary engineers were right in having their own society, for they would be able to assist themselves, and also assist other societies.

Mr. J. Farley proposed the toast of "The Visitors."

Mr. W. E. Riley responded, and said that when the present King was attacked with typhoid fever his first conscious words were: "If I were not a prince I would try to be a plumber." Subsequently he (the speaker) was telling this tale to a shop-keeper, and the shop-keeper said: "If I were not a shop-keeper I would be a sanitarian." If they put their minds back and remembered the state of sanitation which existed thirty years ago, and then saw the modern scientific interpretation of the word sanitation, they ought to be exceedingly grateful that such societies as theirs had been organised, and were flourishing.

Mr. Riviere also responded to the toast. The toasts of "The Press" and "The Chairman" were also drunk.

PAYMENT OF DISTRICT SURVEYORS BY SALARIES.

The Building Act Committee of the London County Council reported as follows at the meeting of the Council on Tuesday:—

The Council, on December 8, 1903, referred it to a report whether it was advisable that the Council should exercise the powers conferred upon it by sect. 158 of the London Building Act, 1894, to pay fixed salaries to district surveyors instead of remuneration as at present by fees, and in regard being had to the statutory responsibility of the district surveyors for the stability of buildings, being in no way lessened. For some time prior to the passing of this reference by the Council, and subsequently, we have given most anxious consideration to the question of the payment of salaries to district surveyors, and in the London Building Acts (Amendment) Bill, 1905, provisions were inserted with the object of facilitating the introduction of a proper system of payment by salaries. These provisions, with other parts of the bill, withdrawn, and we have, therefore, since considered whether the Council could advantageously exercise the powers conferred upon it by sect. 158 of the London Building Act, 1894.

It does not appear to us to be necessary to dwell at any length upon the desirableness of substituting salaries for the present system of payment by fees. But it is, of course, very important to consider carefully whether the change can be effected without detriment to the public interests. As regards the first point we would, however, state that in the districts just outside London, and also throughout the country, the officials entrusted with the supervision of building operations are remunerated by salaries paid direct by public authorities and not by fees paid by the persons whose work has to be supervised by them. We are strongly of opinion that the existence in London of a class of public officials remunerated by fees paid by the public is an anomaly, and that any proposals for substituting a system of payment by salaries would be in accord with public

As regards the question of practicability we think that before reaching the conclusion we have arrived at, it may be convenient to indicate briefly the position of district surveyors under the London Building Act. For the purposes of the administration of the London Building Acts, London is divided into districts, to each of which is appointed a district surveyor, whose duty it is to see that the provisions of the Acts are complied with, and in cases where there is any breach of such provisions to take proceedings in respect thereof, or to notify the Council if the provisions so contravened relate to any matter with which he is not authorised to deal.

Broadly speaking, it is unnecessary for a person erecting or altering a building to make any application to the Council so long as he complies with the provisions of the London Building Acts, but in many cases the Council has a discretionary power to allow some departure from the strict provisions of the Acts.

The district surveyors are remunerated for their services by fees paid by the builders according to a fixed scale laid down in the third schedule of the London Building Act, 1894. In dangerous structure cases the Council, who may employ any competent surveyor, but as a matter of practice employ the district surveyor, pays his fee and recovers it from the owner of the property, and in certain cases the Council also pays a fee to district surveyors for special services performed.

Section 158 of the Act of 1894 provides that "the Council may at any time by order cause such fixed salary as they may determine to be paid to any district surveyor by way of remuneration instead of fees, so that the amount of such remuneration be not less than the amount of the average of the fees for the last seven completed years preceding such determination, and thereupon the fees which would have been payable to such district surveyor in pursuance of this Act shall be paid to the Council and carried to the credit of the County Fund." Section 160 of the Act of 1894 provides that "the Council may at any time by order cause such fixed salary as they may determine to be paid to any district surveyor by way of remuneration instead of fees, so that the amount of such remuneration be not less than the amount of the average of the fees for the last seven completed years preceding such determination, and thereupon the fees which would have been payable to such district surveyor in pursuance of this Act shall be paid to the Council and carried to the credit of the County Fund."

Section 160 of the Act of 1894 provides that "the Council may at any time by order cause such fixed salary as they may determine to be paid to any district surveyor by way of remuneration instead of fees, so that the amount of such remuneration be not less than the amount of the average of the fees for the last seven completed years preceding such determination, and thereupon the fees which would have been payable to such district surveyor in pursuance of this Act shall be paid to the Council and carried to the credit of the County Fund."

Gross fees for whole county.		Gross fees for the district of Penge which by the Local Government Act, 1892, was constituted an urban district council.	
1898	240 12 8	240 12 8	
1899	50 28 1 4	610 7 9	
1900	51 203 0 2	682 12 7	
1901	52 114 1 2	520 0 0	
1902	49 450 17 9	128 0 0	
1903	52 635 13 0		
1904	52 631 15 6		

Total gross receipts for 7 years ended 31st December, 1904, excluding Penge 357,069 11 1 2,430 14 10

Average of receipts for 7 years ended 1904, excluding Penge 355,238 16 3

It will be seen that the fees show an upward tendency, and that on these figures there would be a balance in favour of the Council of about £2,000, if the Council determined to proceed under sect. 158 of the Act and pay district surveyors by salaries.

If it should be necessary for the purposes of such determination to calculate the salaries from the fees received during the seven years ending December 31, 1905, there is no reason to anticipate that when the figures for 1905 are available they will show any decrease on the figures for 1904, or that there will be any diminution in the estimated balance in favour of the Council.

It will be seen, therefore, that it is possible for the Council to at once determine that district surveyors shall be paid by salary at an early date without involving any charge on the rates. We do not, however, think that this alone would be sufficient, as the work of a district might greatly increase or decrease after the salary for the district had been fixed. Moreover, the present remuneration of the district surveyors ranging from about £2,000 to £200. The conditions of service of the district surveyors also vary; some are wholly unrestricted as to private practice, some are prohibited from practising in their own districts, but may practise elsewhere and others (those appointed by the Council) are prohibited from taking any private practice whatever. The Council has for years past, as opportunities have occurred, sought to make the district surveyors uniform in value and to make the district surveyors by salaries. We therefore think that if the Council should determine to pay district surveyors by salaries, it should at the same time lay down the time when such future arrangements of districts should be made, and we have accordingly drawn up what we consider to be a model form of a division of scheme. This scheme provides for the division of London into three districts, each district council to elect a surveyor, of one or more county surveyors, as far as possible, of one or more county electoral divisions. We suggest that for salaries of these districts a salary of £800 a year net, for eleven districts a salary of £500 a year net, for the remaining six districts a salary of £500 a year net should be paid to the district surveyor,

and that in each case the expense of the necessary clerical and professional assistance required by the district surveyor, and the office expenses, should be borne by the Council.

The total estimated cost of the scheme is about £40,250, and as the fees received during the year ended December 31, 1904, amounted to nearly £5,000, there would be, if it were possible to adopt the scheme in its entirety on a certain date, a very substantial margin to secure the Council against loss by shrinkage of fees, etc. There are, however, at the present moment, fifty-seven district surveyors' districts, seven of which are vacant, and the scheme could not be put into operation at once without involving the compulsory retirement of seventeen district surveyors, and thereby entailing the payment of a large amount of compensation.

We are of opinion, however, that if the Council proceeds at once to exercise the powers it possesses under sect. 158 of the London Building Act, 1894, many of the present district surveyors will be prepared to co-operate with the Council with a view to facilitating the speedy adoption, and ensuring the success, of the model scheme, or a scheme similar to it in all essential respects.

We would point out that the question of the payment of district surveyors by salaries was considered by the Council on June 17, 1899, and July 1, 1900, and that the Building Act Committee at that time reported as follows:—

"The plan was adopted of paying district surveyors a fixed salary, but the Council, in the fees for the previous three years (and this, it appears from the Act, must be the basis for such payment), we think that injustice might be done to a district surveyor in whose district building operations were increasing, because although extra work would devolve upon him, the Council would be receiving the increased fees. The system would be equally unsatisfactory in the case of a district where the fees might fall either from diminished building operations, or from a cause which may be suggested, viz., that a salaried district surveyor might not be so anxious to recover the fees as at present."

We have very carefully considered the reasons which led the Council in 1890 to decide to continue the system of payment by fees, and we are of opinion that the first, which was based on the probability of the amount of work in any given district varying from time to time, will be adequately met by the adoption of a model scheme such as we have suggested. As to the possibility of loss of fees it has to be remembered that the conditions of service have largely changed since 1890, and we do not fear that district surveyors will, if paid salaries, be less anxious than they are at present to recover the fees due from builders.

There are two further points to which we would draw attention. First, as to the collection of the fees payable to district surveyors, this we think could be most conveniently and economically performed by the district surveyors. In the second place, the duties which they will be required to perform under the London Building Acts (Amendment) Act, 1905, will be payable to the district surveyors, whether district surveyors are paid in future by salaries or continue to receive their remuneration as at present from the fees paid by builders. The greater part of the fees payable under this Act will, however, cease when existing buildings have been dealt with. Moreover, we anticipate that if the Council adopt the model scheme suggested, it will be possible to arrange for district surveyors appointed in the future to accept a fixed salary to cover all services performed by them under any of the Building Acts.

There are at the present moment seven districts vacant, and, owing to some of the present district surveyors being of an advanced age, it is not unlikely that more vacancies will occur in the near future. Some of the vacant districts have been vacant for a considerable time, and it is extremely desirable that permanent arrangements should be made for their supervision without further delay. The present time is therefore an opportune one for the Council to deal with the matter, and such a favourable opportunity is not likely to occur again in the near future. For financial reasons it would be most convenient that the change, if adopted, should take effect as from April 1, 1906, as there will be a great deal of work in connexion with the detail arrangements which will have to be made if the Council shall decide to pay district surveyors by salaries, it is most desirable that the matter should be dealt with by the Council, if possible, before the recess. We have been in communication with the Finance Committee on the subject, and as soon as they are prepared to report we will submit definite recommendations to the Council.

We would add that we are advised that the responsibility of the district surveyors will be in no way altered, or their status affected, if the Council shall decide to pay them by salaries.

In the meantime, in view of the importance of the matter and in order to enable our proposals to be easily understood, we have caused a cartoon "plan, showing the existing districts, to be exhibited in the Council chamber, and also a map showing the districts as proposed in the model scheme.

The matter was not discussed at Tuesday's meeting.

PUBLIC BATHS, GOOLE.—Major E. Hind, V.D., laid the foundation-stone of new public baths at Goole on the 6th inst. The plans for the baths have been prepared by Mr. E. H. Barber, Surveyor to the Goole Urban Council, and the estimated cost of the complete building is £3,000. The scheme includes a swimming bath, contained in a room 86 ft. long by 46 ft. wide, with dressing boxes and galleries, shower, and soap baths. The swimming bath is 75 ft. long by 30 ft. wide, the depth ranging from 3 ft. to 6 ft. There are also three private slipper baths, and the baths will be complete with offices, store-rooms, laundry, calorifier, and boiler-house.





### THE SURVEYORS' INSTITUTION: VALUATIONS FOR MORTGAGE.

An ordinary general meeting of the Surveyors' Institution was held on Monday, at No. 12, Great George-street, Westminster, S.W., when Mr. J. J. Done read a paper on "Valuations for Mortgage." He said that the subject entered largely into the work of a surveyor, and he was inclined to think that more valuations were made for the purpose of mortgage than for any other, and the enormous building development of large towns would probably soon come to an end without the facilities for borrowing that were offered by banks, corporation trustees, and private individuals. But, irrespective of building development, the thousand and one exigencies of our complex business life require a never-ending stream of advances of money, which could be raised most easily, most cheaply, and most securely, by permanent or temporary mortgages. Looking back at the last twenty-five years his experience had been that, on the whole, money placed out on mortgage had paid its owners as well, and had been as secure and as easy to get in when required, as any security that could be named. When the enormous amount advanced on mortgage was considered, and when the remunerative rate of interest was taken into account, the occasional losses were negligible, and left a wide margin to the credit of mortgages, and justified the returning popularity of this form of security. The author then dealt at length with the question of the valuation of the surveyor, and said that where a valuer was directly employed by the lender (which he might be, although paid by the borrower, and even in the first place instructed by the borrower) he must use reasonable care and skill, and, above all, act with a single eye to the interest of the lender; but that, when his valuation was prepared without reference to any particular lender, and was used without his being brought into communication with the lender, it was necessary to prove actual fraud, as defined in *Derry v. Peek*. He had stated that the valuer must act in the interest of the lender only. He had in his mind cases where valuers had been held liable for their valuations in which it had been shown that the valuer employed was so employed by the borrower, acted in the interest of the borrower, and apparently regarded himself as the agent of the borrower. Probably nothing so warped and distorted a man's judgment as this pernicious practice of trying to serve two masters, and more than one valuer had had to pay dearly for it. Having thus dealt with the responsibility which a valuer had to face before he entered upon a valuation for a mortgage, the author considered the general principles that apply to valuations made for mortgage purposes. He asked to what extent, if at all, did the principles of valuing for a mortgage differ from any other valuation? It was obvious, in the first place, that the position of a mortgagee differed from that of a purchaser. The latter took the property for better or worse, but a mortgagee had no benefit from any increase in the value after lending his money; but, on the other hand, if the security greatly depreciated, he might be unable to realise as much as he had lent. Everyone who bought and sold knew that from unforeseen causes, or defect of judgment, some things did better than others, and in the general run of buying and selling, the unexpectedly good might be set off against the unexpectedly bad. That was an average that a mortgagee could not strike. He had no "unexpectedly good," but he might have an "unexpectedly bad." Again, a purchaser could nurse or improve the property, attend to its proper management, and exercise in many ways a fostering care; but a mortgagee could not interfere with the management (except as afterwards mentioned) short of giving a notice to pay off, and, in the worst event, taking the property into his own hands. Even when he had done that he remained a mortgagee only, until such time as he had acquired a possessory title, and might be ousted at any time by the owner of the equity if the latter demanded the property and was ready to pay up all interest and other proper expenses which the mortgagee had incurred. It might, therefore, be some long time before a mortgagee had that security of tenure which was the essence of proper and thrifty management. He had,

however, certain rights which went far to protect him. The author then quoted from Fisher's "Law of Mortgage," fifth edition, in order to define the position of the mortgagee. Proceeding, he said that when he came to realise, a mortgagee had not only to consider his principal money, but there were probably accumulations of interest, and there were the expenses of sale and conveyance and other legal expenses; and it was well to bear in mind that, as a very general rule, when a mortgagor got into difficulties, he had bled the property for all it was worth before the crisis came. Ought the value to take these circumstances into account? He submitted not. With great deference, he submitted that the value was called upon to value the property as it stood. As to the valuation he said he took it that, when they made their valuations, they had first of all to consider, in Vice-Chancellor Bacon's words, what would a prudent man do in his own case? Looking at the property, whatever it might be, with the eye of an expert, seeing advantages and defects which the ordinary buyer would not consider, they had to ask themselves whether the property was a readily marketable one, whether the market was likely to improve or the reverse, whether its intrinsic merits were of such a nature that, even if the market went against it, patience and care would enable it to recover itself, or whether it was of such a nature that to become derelict meant irretrievable ruin. In short, they had to look at every side, weigh contingencies and probabilities, giving to each its due proportion and perspective, and exercising the best judgment they could; remembering that in other things than war it was the unexpected that always happened. A valuer who could prepare the designs, write out the specification, and take out the quantities for a house, and who was constantly verifying his values by buying and selling, was obviously at an advantage as compared with one whose only knowledge of house property consisted in buying and selling. There were many details of construction, which the one would know how to appreciate or depreciate, but which by the other might be passed over. The author then dealt with the settlement of the rent of land, and said that rent, or rather revenue, was no doubt, in the case of land, the main factor on which to build a calculation, but in the case of London warehouse property, if that were taken without qualification, it would sometimes lead to rather incongruous results. In the case of many City properties the ground rents were so high as to be practically a mortgage in themselves. These properties should be treated with caution. To say the least of it, they were not trustees' securities. An enormous amount of money was advanced every year on suburban house property. It was not perhaps wise to hazard such a generalisation, but he strongly suspected that the majority, perhaps the large majority, of suburban houses had a mortgage on them. Rent must not always be regarded as an entirely reliable basis. They all knew the builder, who, in order to get as much on mortgage as he could, put a higher rent in his tenant's agreement than he actually received. Houses beyond the limits of the suburbs were not so easy to deal with. There, any estimate of first cost was liable to be a fallacious guide to value. It was easy to spend a thousand pounds, or any other sum, on a house in some pleasant country place; but what the value would be when it was built was a widely different question. Isolated properties of this kind, even when accessible to a man engaged in business in some not far distant town, were liable to great vicissitudes. They would sometimes stand empty for months, or even years, and, generally speaking, a tenant had to be attracted by a low rent. Many a house that cost 2,000*l.* to build was worth in the market one-half that sum when finished.

The author dealt with several other securities, and referred, also, to one or two legal decisions.

THE CARPENTERS' COMPANY'S SCHOOL, AT STRATFORD.—After an existence of eighteen years, the Stratford Institute, managed and supported by the Carpenters' Company, is about to be closed. The decision of the Court of Assistants to close the school is the sequel to the Education Act, which requires local authorities to provide secondary education.

### THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, S.W., Sir E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Finsbury Borough Council 1,412*l.* for paving works; Hackney Borough Council 1,200*l.* for electric light installation; the Royal Borough of Kensington 16,250*l.* for dust destructor and mortuary; and Stoke Newington Borough Council 16,925*l.* for electric light installation.

**New Bills.**—The Council approved of the following Bills being introduced in the next session of Parliament:—London County Buildings Bill, London County Council (General Powers) Bill, and the London County Council (Tramways and Improvements) Bill.

**County Hall.**—The Parliamentary Committee submitted a report dealing with the London County Buildings Bill, which is to empower the Council to acquire lands for the purpose of building thereon new offices, and also of constructing an embankment wall and embankment on the foreshore of the river, the object being to reclaim the foreshore for this purpose.

It was agreed to proceed with the Bill.

**Suggested Museum.**—In regard to the General Powers Bill,

Sir Melville Beachcroft moved, and Mr. Hunt seconded, that that portion of the Bill which enables the Council to provide and maintain buildings for the accommodation, exhibition, and presentation of works of art and objects of historical, antiquarian, or other public interest, should be omitted.

The amendment was defeated.

**Electricity in Bulk.**—The report of the joint committee of the Parliamentary and Highways Committee, and also of the Finance Committee, on the proposal to introduce a Bill in the coming session for power to supply electricity in bulk, both within and without the county, was then discussed at length.

Lord Welby, speaking as the chairman of the Finance Committee, said he felt that he had no alternative but to vote against the proposal, because of the conviction he had as to the financial lines the Council ought to follow. He was jealous of the credit of the Council, and he could only come to one conclusion, and that was that the Council was in danger of overstraining its credit. The commitments of the Council had been growing very largely lately, and in the improvements in Westminster and Holborn to the Strand no less a sum than 9,000,000*l.* was involved. It was true that within a certain time the recoupment of this improvement would cover the interest on the money, but at the present time, and for some years to come, the burden rested upon the ratepayers, and the same remark applied to the Council's other undertakings, such as the tramways, Rotherhithe tunnel, the County Hall, and, perhaps, also the Port of London. In addition to that, the figures before the Finance Committee pointed to a serious rise in the education rate.

Mr. W. W. Bruce said, in view of the fact that within the next two or three years the Council would have to raise some 20,000,000*l.* by way of loan, there should be no doubt as to the financial advantages of the scheme. He, therefore, thought it would be better to leave the bulk supply of electricity in the hands of the authorised undertakers.

Mr. Allan Baker contended that, considering the need of London in the matter of the supply of electricity, it was incumbent that the London County Council should come in and undertake the duty.

After further discussion, the recommendation of the joint committee to proceed with the Bill was carried on a division by sixty-six votes to thirty-eight.

**Common Lodging-houses.—Precautionary Measures Against Fire.**—The Public Health Committee reported as follows:—

"Having regard to the recent occurrence of a fire at a common lodging house in Glasgow, resulting in serious loss of life, we think the Council will desire to be informed of the measures which have been taken with a view to minimising the risk of such a fatality at any of the common lodging-houses in the county of London. In the administration of the law relating to common lodging-houses in London we were impressed some years ago by the danger to the owners in the event of a fire breaking out at some of the premises, and this was one of the considerations which led us to recommend the Council to apply to







## Sealing.

**Leamham.**—That the seal of the Council be affixed to a duplicate of the deed of covenant in connection with the application of Mr. H. L. Leamham, on behalf of Mr. C. Walker, under Part V. of the Act, in respect of a building on the south side of Duncon-road, Forest-hill.—Agreed.

**Proposal of Projecting One-story Shops at Nos. 431 to 451 (odd numbers only), Edgware-road.**

**Paddington, North.**—One-story shops in front of Nos. 431 and 433, Edgware-road, Paddington (Messrs. Gardiner & Theobald for Messrs. Matthews & Sons, Ltd.).—Refused.

**Paddington, North.**—One-story shops in front of Nos. 435 and 437, Edgware-road, Paddington (Messrs. Gardiner & Theobald for Meux's Brewery Company, Ltd.).—Refused.

**Paddington, North.**—One-story shops in front of Nos. 439 to 451 (odd numbers only), Edgware-road, Paddington, to abut also upon Maida-hill West (Messrs. Boehmer & Gibbs for Mr. W. Birch).—Refused.

The recommendations marked † are contrary to the views of the local authority.

## THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

The fourth meeting of the session was held at No. 18, Tufton-street, S.W., on Wednesday, December 6, Mr. E. W. M. Macnott being in the chair, when Mr. W. A. Forsyth read a paper on "The Construction of the Jerry-Builder," of which the following is an abstract:—

The lecturer first pointed out that the flood of small suburban property, laid out in the most chaotic lines, arises from the present travelling facilities, combined with the rebuilding of congested urban areas, and the same sentiment of the middle-class Englishman.

The term jerry-builder may be defined as the builder of unsubstantial or temporary structures. He himself may emphatically declare another claim, however, that of permanence; but atmospheric nature finds him wanting, and here our real quarrel begins. His whole aim being, like that of many worthier people, to make money, he shapes his undertakings with that idea. First, therefore, the architect's place is taken by the auctioneer's clerk, who turns out any lands required by local authority. The proprietor of the land lays it out with no regard for open space or breathing room, and leads the way to the formation of unhealthy districts, where peace and quiet cannot be found.

This is the virgin soil of Nature violated. At all times, and now surely some control is needed upon the efforts of those two ardent self-seekers.

Playful fancy appears in the naming of roads and houses. The "avenue" is barren of trees; "gardens" is but warranted by a few window-boxes; while the saplings lining the footway give an accepted meaning to "grove." The jerry-builder aims to build at the smallest cost, and then to let or sell rapidly. The house is the sufferer from his efforts to catch the eye of the tasteless. Here, the favourite resources consist of carved stone caps to the bay-window, the lines of which chatter as no neighbour ever did;lintels shaped as arches, and thin deal beams commemorating the timber age of old. The importations from Sweden decide all external detail, and the colours and papers, a price quaintly conceded to the tenant, compare to the inferno.

As the painter clears his pots from the house the grand lady glorifies this triumph of building by suspending new lace curtains in the windows, suggesting social tone to the neighbours, and toning down the excess of light in the room. Cause and effect are here mingled, but we must hold the builder responsible for such misdoings.

Time, weather, and the district steam-roller all play their part on the unseasoned materials, until we have the usual story to tell. It is remarkable that such uniformity of size should be found in the houses we are considering. No variation is made to meet the needs of large or small families, and no convenient extension is possible. It is astonishing how rapidly these houses let, and how the people imagine vain things, believing, very generally, that theirs is a well-built place. This, in spite of the nursery rhymes and music lessons which come gratis through the walls, or the picturesque appearance of the opposite sister house, accidentally provided with the window glass.

Another curious fact is the wastefulness and hide-bound tradition practised by the jerry-builder. Rooms are too high and cut about in shape. The upper floor is never taken into the roof, windows are too large, and passages and stairs out of all proportion to the rooms. In fact, the jerry-builder is perverse, and persists in a well-used type of some forty years old, lest he should suffer financial ruin by diverging from it. Now, is it not possible to rescue the perpetrator of these deeds? Though heathen, he is, in a sense, a man of enterprise, and sometimes of common sense, and, if approached peacefully, will lend patient ear to the gospel of the architect. But the creed of the latter should be preached from the basis of economy, and the need of meeting the developed and advancing tastes of the public. Further, it should be shown that such a change does not necessarily mean increased cost.

Of methods other than this moral suasion comes first the control of the local authority. Estates should not be laid out at haphazard, but on a grouped and convenient lay-out. The provision of open spaces, sites for public buildings of the future, all should be considered. The enhanced surroundings will induce the builder to better things. At all events, and without wishing to raise any side issues, no plans should be considered by a local authority unless prepared by a qualified architect.

Our next step is to remove certain of the existing by-laws, and to add a few more clauses tending to the improvement of materials. The jerry-builder deals in cast-offs, and he should be led to put in timbers of a less sappy growth, and joinery of a more seasoned quality than the finished article just unshipped from the Baltic. This will all help to the health and peace of mind of the occupant, and the lasting and saleable value of his property.

The architect is our next agent. The want of expert knowledge deplored by Ruskin is surely dispelled now in these days of architectural education.

Now, let the architect hold out the olive branch to the jerry-builder (not forgetting his co-sinner, the land speculator), and show him the error of his ways.

The architect, being in touch with current ideas, will point out the wastefulness in certain aspects of the jerry-builder's design, and so educate him.

The illustrated press may also prove a great and useful agent in our missionary work.

Summarising these suggestions we have:—

Firstly—Authoritative control in the development of a district.

Secondly—By-laws framed to ensure durable and substantial work.

Thirdly—The attention of architects to small speculative work; and lastly, the judicious help of the Press.

In effect, therefore, we desire better building, and architecture will follow.

The Chairman then read a long and interesting letter from Mr. Voysey, contending that more control was not desirable, and advocating greater freedom from restrictive by-laws. Hope lay in architects doing their work more thoroughly and conscientiously.\*

Mr. A. Taylor, in opening the discussion, thought that the jerry-builder was but the outcome of people's wishes and habits. Other speakers brought forward the evils of the leasing system, and the possibilities of co-operative living and housing.

Mr. Waldram pointed out that urban councils here were often not composed of the right kind of men. He mentioned a recent development in the north-west of small property, cleverly planned and laid out, and the influence this had had on later development in the district.

Mr. Max Clarke, after suggesting that the younger men should practice public speaking at these meetings, fell foul of the "flat" system. Like other speakers, he upheld the need for more, rather than less, power of control.

Mr. Ellis Marsland, summing up the discussion, was doubtful whether to bless or curse the jerry-builder, and began by blessing. Like the latest paper, he supplies a long-felt want. Faults he has certainly, but he is a creature of circumstances; the public,

\*But what has that to do with the control of the jerry-builder?—Ed.

the ground landlord, and the mortgagor all control him. The public must be educated, then better work must come.

Mr. Forsyth's few remarks in reply referred to the good standard being set up by the London County Council buildings. Good building was the essential and first need.

The Chairman announced that the next paper would be on "The Houses of Parliament," for which the loan of many original drawings and studies had been secured.

## ENGINEERING SOCIETIES.

**SOCIETY OF ENGINEERS.**—The fifty-first annual general meeting of the Society of Engineers was held on Monday, the 11th inst., at the offices of the Society, 17, Victoria-street, Westminster. The chair was occupied by Mr. Nicholas J. West, President. The following gentlemen were duly elected by ballot as the Council and officers for 1906, viz.:—As President—Mr. Maurice Wilson; as Vice-Presidents—Messrs. Richard St. George Moore, Joseph William Wilson, and William Henry Holtum; as ordinary members of Council—Messrs. John Aird, Joseph Bernays, Alexander Graham Drury, George Abraham Goodwin, George Green, Edward John Silcock, Diogo Andrew Symons, and Francis George Bloyd; as Honorary Secretary and Treasurer—Mr. David Butler Butler; as Honorary Auditor—Mr. Samuel Wood, F.C.A. The President announced that Lord Rayleigh, Chairman of the National Physical Laboratory, and Sir Alexander Binnie, President of the Institution of Civil Engineers, had been elected by the Council as honorary members of the Society, thus filling the vacancies created in the list of honorary members by the deaths of Sir Lowthian Bell and Mr. James Mansergh. The President announced that the following premiums had been awarded by the Council for papers read during the past session, viz.:—The President's gold medal to Mr. Sherard Cowper-Coles for his paper on "The Metallic Preservation and Ornamentation of Iron and Steel Surfaces"; the Bessemer premium of books to Mr. Ernest Romney Matthews for his paper on "The Parade Extension Works at Bridlington"; a Laurence's premium of books to Mr. Benjamin Laurence Bradley for his paper on "The Grindelford Stone Quarries and their Working"; and a Society's premium of books to Mr. William Pollard Digby for his paper on "Statistics of British and American Rolling Stock."

## BOOKS RECEIVED.

A MANUAL OF CARPENTRY AND JOINERY. By J. W. Riley. (Macmillan & Co. 6s.)

ECCLIESIA ANTICUA: The History of an Ancient Church (St. Michaels, Lillithgow). By the Rev. John Fergusson. (Oliver & Boyd.)

THE LONDON BUILDING ACTS: 1894 to 1905. By Bernard Dicksee, F.R.I.B.A. Second Edition. (E. Stanford. 7s. 6d.)

## Correspondence.

## "STANDARDISING" BILLS OF QUANTITIES.

SIR,—The committee appointed some three years ago by the Council of Civil Engineers to consider the advisability of standardising various kinds of iron and steel sections, have recently published their report. The original scope of the inquiry was subsequently extended to embrace tests for materials, and, in fact, most of the appliances and matters occurring in the ordinary routine of a civil engineer's practice. The committee were supported by the kindred societies, and no one who has read their report, or had occasion to use its publications, can possibly fail to appreciate the success which has attended the inquiry. Possibly their standard specification for Portland cement is the best known of their publications to those connected with the building business.

If it is possible for one society to arrive at a satisfactory basis on points upon which there must have been a wide diversity of ideas and opinions, surely it should be possible for another?

I question if there is any other profession whose members run more on their own



individual lines or in grooves they have cut out for themselves than the present-day quantity surveyors. It is only necessary to take up two sets of quantities prepared by different surveyors to see how items occurring in almost every bill are differently treated or described.

Some time ago this was very much emphasised in a case which came under my notice, where two London surveyors, both of standing and repute, prepared the bills for identical blocks of buildings in a large scheme. Under such conditions one would naturally expect to be able readily to compare most of the principal items. The actual result, however, was that not half of the items could be compared without referring to different parts of the bills, and going through a series of additions and deductings.

To be able to arrive at some understanding and to lay down some uniform and standard system—as to the different stages at which excavations should be measured, the depths of trenches to which planking and strutting should be taken, whether glazed brick facings should be measured on the girth line, or an allowance made at internal angles; how the eaves of slating should be given, what preparatory labours on stonework should be measured, what extra labours should be given on ordinary sashes and frames, which drillings in steel constructional work should be given as done in position, besides the definition of the stereotyped clause of "attendance on all trades in all trades," of the meaning of the letters "P.C." and too many items, clauses, and phrases always occurring in bills of quantities—ought, and should, be possible.

I have no intention of implying that all these matters are not generally treated in a careful and practicable way by surveyors, but my plea is for the adoption of some standard and recognised system readily understandable by all those into whose hands our work is placed.

To relegate each trade to a small committee composed of, say, five members, preferably with representatives from the Surveyors' Institution and the newly-formed, but apparently rather vigorous, Association of Quantity Surveyors, and for each committee to submit its report to a council composed of the whole of the gentlemen engaged on the committees, would form one way in which a solution of the matter might be accomplished.

Perhaps, sir, if you can find space to insert this letter it may be the means of eliciting the views of others on a subject which appears to me to be worthy the consideration of the profession.

HENRY RILEY.

#### "PAINTERS' ARCHITECTURE."

SIR,—In your friendly notice of my recent articles in the *Art Journal*, you accuse me of two misdeeds—an error of observation, and the use of a non-existent word. I must plead guilty on both counts. The temple in the background of Raphael's "Marriage of the Virgin" is, as you point out, a polygon of sixteen sides, not of twelve, so that in calling it by the name which I inadvertently coined (I refrain from repeating the solecism) I committed an offence against fact, as well as against language, and must be content to take the blame for both.

Thanking you for pointing this out, I am, yours faithfully,

PAUL WATERHOUSE.

#### PRESTON HIGHER GRADE SCHOOL COMPETITION.

SIR,—A protest is contemplated in reference to this award. Any competitor desirous of being associated with the same may have a copy upon application to—

G. H. WILLOUGHBY,  
3, York-street, Manchester: or  
EDGAR WOOD & SELLERS,  
78, Cross-street, Manchester.

#### WANTED—A FIRE-RESISTING STONE.

SIR,—I shall feel obliged if any reader could inform me of any stone which will resist close contact with fire without fracturing.

CLERE DE WORKS.  
\* \* \* We insert our correspondent's inquiry, but we fear he will not find what he asks for.—Ed.

#### A QUESTION OF CONSTRUCTION.

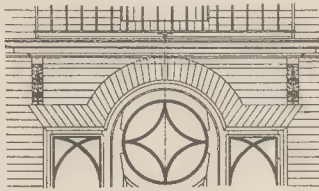
SIR,—In the current issue of the *Builder* there is a detail elevation and section of Wood Green Almshouses.

Over the front door is shown a curious piece of brickwork, being a combination of two quite flat

arches with only one skew back to each, and the middle part is a semicircular arch.

Will you kindly explain how this is supported? What prevents the whole thing falling down when the centring is removed?

Is it a bit of truly constructed brickwork or a



freak? I send you a rough sketch of the part referred to, and would much like to know your opinion about it.

\* \* \* The brickwork is certainly not a stable construction in itself, as shown. Perhaps Mr. Cross would give an explanation.—Ed.

#### THE TRIBUNAL OF APPEAL UNDER THE LONDON BUILDING ACT:

KENNARD v. LONDON COUNTY COUNCIL.

ON Thursday in last week the Tribunal of Appeal sat at the Surveyors' Institution, Great George-street, to hear an appeal made by Col. E. H. Kennard, under sect. 19 of the London Building Act, against the condition imposed by the London County Council to their sanction, dated October 10, to the formation or laying out of new streets for carriage traffic in continuation of Fernhill-street and Brixham-street, North Woolwich. Mr. Courthorne Munro appeared for the appellant, and Mr. Cunningham Glen for the London County Council.

Mr. Glen objected that the appellant had no appeal under the section. It appeared that an application was made by the appellant to the Council on November 19, 1904, on which the Council made an Order sanctioning the formation and laying out of these streets, subject to certain conditions imposed. The appeal was made against that Order, but subsequently a correspondence took place in which the solicitors for the appellant asked the Council to modify the conditions. As the result of this correspondence the Council passed another Order on October 10, 1905, modifying the conditions. The appellant now appealed on the Order of October 10, but he submitted that there could be no appeal against an Order modifying a previous Order.

In answer to Mr. Hudson, Mr. Glen said the County Council did not cancel the first Order, but they rescinded the resolution. The Council was bound to make an Order within two months of the application.

Mr. Hudson having examined the notice given to the appellant on October 10, 1905, said the terms of the Council's resolution were to rescind the resolution of December 19, and then to sanction the laying out of new streets, as shown by the plans, etc., dated November 23, 1904. So far as he could see, therefore, the only sanction they had cancelled was the former Order.

Mr. Glen argued that it was merely a rescinding of the resolution for the making of a fresh Order, but the new Order was to read together with the previous Order. If it was anything else, then it was *ultra vires*. An Order was made once and for all, and it must stand, and could not be subsequently modified without the consent of the applicant.

Mr. Hudson said that on the face of it it seemed the mistake was made in rescinding the former resolution. The Council could only act by resolution, and that was communicated to the applicant.

Mr. Glen said it was true they had rescinded a resolution, but they had done nothing more. He said that the County Council instruct you that there is no power to rescind a former resolution.

Mr. Glen: They cannot rescind an Order; they can modify it.

Mr. Glen, in support of his contention that this was not a new application, read the correspondence between the parties, from which it appeared that the Council imposed the condition that land on the appellant's estate should be left unbuild upon, so as to form a street 40 ft. wide. As the applicant had had part of the estate taken compulsorily by the Dock Company, he had not sufficient land to enable this to be done, and the result of the correspondence was that the Council, by their sanction dated October 10, 1905, modified the condition so as to allow only 30 ft. at one end of the estate to be unbuild upon.

Mr. Munro said the position of the applicant

was this. He asked the Council what was least they would do with, and when he found that he would not agree, but said he would go to appeal. His client never said, "Will you take this?"

After some further legal argument the Board deliberated, and the Chairman announced that the Board had decided that there was an appeal, and the case must go on on its merits.

Mr. Glen said it was a matter affecting the practice of the Council, and he must ask the case to be stated on the point of law.

Mr. Hudson said he took it that it was a case in which the County Council would appeal against Mr. Glen said that was so.

The further consideration of the case was then adjourned.

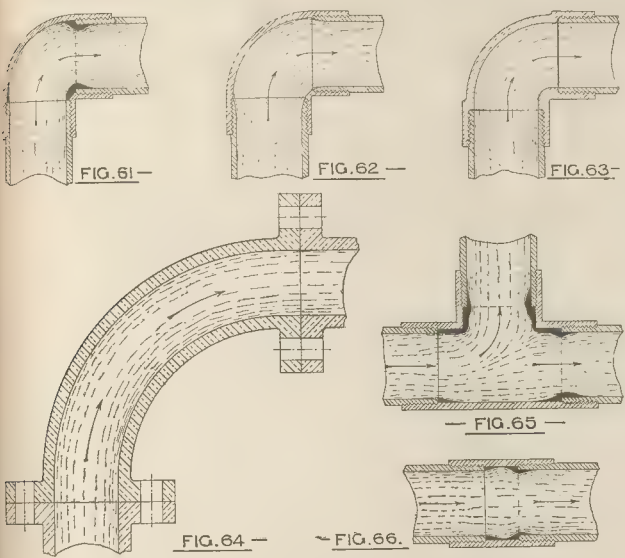
After the hearing of the case on Thursday it was understood that a meeting of the parties to place with a view to a settlement, and in the circumstances the case was adjourned *sine die*.

#### ISOLATION HOSPITAL, ROTHERHAM.

ON the 7th inst. a new isolation hospital was opened on the north-west side of Badley Mole lane, at Rotherham, by the Mayor. The building has been erected from the designs of the architect, Mr. Joseph Platts, of Rotherham, the Corporation architect, by the contractor Messrs. Wm. Thornton & Son. The clerk works was Mr. A. T. Ripley. The cost of the land, buildings, and furniture has amounted to 19,285l., and the hospital consists of the following buildings:—Administrative block, scarlet fever typhoid fever, and diphtheria pavilions, observation block, porter's lodge, and a block containing laundry, mortuary, ambulance shed, engine and boiler-rooms, disinfecting-rooms, and discharge rooms. The administrative block contains accommodation for the medical and nursing staff and for servants. It has been built sufficiently large to allow for the future expansion of the hospital.

On the ground floor are the medical offices, office, dispensary, bacteriological laboratory, sitting-room for the matron, dining and recreation-rooms for nurses, kitchen, scullery, storerooms, and pantries. On the first floor are fifteen bedrooms (each fitted with lavatory and cold water), bath-room, and linen closet. Separate staircases are provided for nurses and maids. The corridors and passages are heated by hot-water coils, and the building is lit throughout by electricity from the Corporation Electrical Works. Telephones connect this block with each of the wards as well as with the National Telephone Exchange. The different wards are arranged on the pavilion system, and each has frontage to the south-east. There are four wards, each with equal accommodation for males and females. There are glass-covered verandahs in front. Attached to each block is kitchen, bath-room, stores, and linen cupboard, sink and lavatory. The wards are heated by double coal fires with ascending flues, hot air chambers are found at the back of each stove.

Ventilation is by grids and shafts in the ceiling and extracts on the ridges. Hopper-top openings are provided to each window, and the window can be opened by sashes above and below. Fresh air inlets are under each bed. The floor of the wards is of polished rich wood, and the walls of the other rooms are finished in cement and granite. The inside walls are lined to a height of 4 ft. with Keene's cement. The junction with the floor forms a curve to avoid the lodgment of dust. Above the dado the lining is of Robinson's cement. All the splay to the windows have rounded finings, and the angles with the ceiling are curved. Apertures are provided in the walls at the ends of the wards, through which soiled linen and coats can be passed, thus obviating the necessity for the porter to enter the wards. The scarlet fever block consists of two wards of eight beds each with a floor space of 156 super. feet and 2106 cubic feet per bed. There are two small wards, each containing one bed and having separate entrances. These are for the accommodation of special cases which is desirable to keep apart from the others. The diphtheria block has a similar arrangement to the scarlet fever block, but the main wards only accommodate six beds in each. One of the wards is fitted up for use as an operating-room, cases where the operation of tracheotomy requires to be performed. The typhoid fever block is similar in dimensions, accommodation, and arrangement to the diphtheria block. The observation block contains two wards of two beds each. The laundry block comprises a wash-house, fitted up for use as a machine, mangle, wringer, and blower, centrifugal drying machine, drying closet, and other up-to-date appliances. There is also a mangling-room. Part of the block contains the steam disinfecter, which is fixed in the wall between two rooms into one of which infected clothing is brought, and from the other the clothing is removed after passing through the disinfecter. At one end of the block are the ambulance shed and stables, and at the other is the discharge block and the mortuary. The discharge block consists of three rooms,



Illustrations to Student's Column.

central one containing a bath. The mortuary is so arranged that the friends of the deceased can view the body through a glass partition. The porter's lodge is erected near to the entrance to the hospital.

The Student's Column.

STEAM BOILERS AND PIPES.—XXIV. THE FLOW OF STEAM (continued).

IN preceding articles it has been shown that the weight of steam delivered through pipes varies with the length of the conduit, and that the reduction of discharge is proportionately greater in small pipes than in large pipes owing to the increase of frictional resistance as the diameter is reduced, and that, apart from theoretical considerations, there are practical reasons for further reduction in the carrying capacity of steam pipes, this further diminution being also inversely proportional to the diameter of the pipes. As pipes of small diameter are far more liable than larger pipes to be partially choked in the manner indicated, it is only reasonable that suitable compensation should be made when pipes are used that are liable to corrosion, and that cannot be kept free from water.

It must be also borne in mind that the ends of wrought-iron pipes as fitted are rarely of the full diameter, owing to the contraction of area caused by the use of the wheel cutter. Hence we see that the weight of steam discharged through small pipes is liable to be very seriously reduced by causes which are well known to practical engineers, but are not recognised by mathematical formulae. In point of fact, it would be impossible to devise any equation expressing the various obstacles to flow that result from differences of material, design, and workmanship.

Fortunately, an easy means of making allowance for such causes of diminished flow is provided by the excess of the "commercial" over the "nominal" internal diameters of wrought-iron and cast-iron pipes, and the inverse proportion of such excess to the nominal diameter.

Although, as we pointed out last week, there is no standard internal diameter for steam pipes, it is probable that the ratio of nominal to commercial measurement does not vary to any considerable extent in the pipes of different makers, and for the purpose of indicating the difference in a general way we give in Table XXVIII. the nominal and actual internal diameters of wrought-iron steam tubes as made (A) by Messrs. John

Russell & Co., and (B) Messrs. J. E. & S. Spencer, and (C) the corresponding American standard diameters.

TABLE XXVIII.—SIZES OF SOME WROUGHT-IRON STEAM TUBES.

Internal Diameter (Inches).		External Diameter (Inches).			
Nominal Bore.		Actual or "Commercial" Bore.			
Fractions.	Decimals.	(A) John Russell & Co.	(B) J. E. & S. Spencer.	(C) American Standard.	British Stand. rd.
1	0.125	0.198	0.167	0.27	0.406
1	0.25	0.323	0.32	0.364	0.531
1	0.375	0.455	0.393	0.494	0.657
1	0.5	0.587	0.536	0.623	0.843
1	0.75	0.774	0.774	0.824	1.062
1	1	1.023	0.992	1.048	1.343
1	1.25	1.335	1.274	1.384	1.687
1	1.5	1.522	1.401	1.611	1.906
1	1.75	1.678	1.678	—	2.156
2	2	1.951	1.991	2.067	2.375
2	2.25	2.201	2.233	2.168	2.625
2	2.5	2.576	2.576	—	3
2	2.75	2.826	2.826	3.067	3.25
3	3	3.076	3.076	3.345	3.5
3	3.5	3.576	3.576	4.026	4
4	4	3.951	4.076	4.026	4.5
4	4.5	4.536	4.5	4.536	5
5	5	5.036	5	5.036	5.5
5	5.5	5.536	5.5	5.536	6
6	6	6.036	6	6.036	6.5

From this table it is clear that the progressive increase from large down to small diameters has the effect of compensating in a suitable manner, and probably to a sufficient extent, for the obstructions to flow in the smaller sizes.

In the United States, where wrought-iron pipes are made to a universal standard of diameter, various tables have been calculated upon actual pipe dimensions for the discharge of steam and for the equalisation of pipe areas. One or two of these tables have been reprinted in books published in this country, but the figures do not apply to British pipes. We do not consider it good practice to borrow data in this manner, and, as remarked in connexion with Table XXVII., it is better to await the settlement of a British standard before calculating upon "commercial" diameters.

Therefore, for the present, we have been content to present in Table XXVII. the discharges of steam for pipes of clearly-defined sizes, and now give in Table XXIX. the comparative values of pipes upon a similar basis.

If the "commercial" diameters were taken into account some of the smaller sizes would possess somewhat greater values than those shown by the table, while the values for other

sizes would be less than those in the table, the figures varying in accordance with the unknown standards of different makers.

Consequently, under existing circumstances, data such as those in Tables XXVII. and XXIX. are far more reliable than data copied from American books and not applicable to British-made pipes.

The Resistance of Fittings and Valves.

The reduction of flow through bends and elbows is due (1) to change of direction of the steam, (2) to friction against the sides of the fitting, and (3) to eddies caused by enlargements and contractions. We do not refer here to square elbows, as such fittings should never be used under any circumstances whatsoever, and we cannot imagine why they are still offered for sale.

(1) The loss of head, with consequent reduction of discharge, for change of direction varies with the curvature of a bend, and the most recent experiments appear to indicate that a curve with the radius of 25 diameters offers less resistance than any other curve, a bend with this curvature being equivalent to a piece of straight pipe having the length of about 3/4 diameters. This, of course, refers only to loss by change of direction.

(2) The loss due to friction against the interior surface of a bend or elbow is the same as that obtaining in the case of a straight pipe of equal length and diameter, and with an interior surface of similar character.

(3) The loss due to eddies applies to any bend or elbow having an internal diameter greater than that of the pipe to which it is connected, thus causing enlargement of area, and applies also to any bend or elbow screwed upon a pipe whose end forms a shoulder, causing contraction of area. The

usual form of wrought-iron bend, being simply a curved piece of pipe, causes no enlargement of area, and the only source of loss in respect of the third cause is that due to the connecting sockets.

The greatest loss from this cause occurs in the case of an elbow fitted as shown in Fig. 61. By cutting away the shoulder, as in Fig. 62, the loss can be reduced to a minimum, but this is a refinement of rare occurrence in pipe work. If the fittings were made so that the pipes could be screwed into sockets, as in Fig. 63, there would be no loss from enlargement and contraction of area. The same remark applies also to flanged bends and elbows (see Fig. 64).

The reduction of flow through the outlet of a right-angled tee-piece with ordinary screwed connexions is at least 50 per cent. greater than that in an elbow, owing to enlargement and contraction at the three points of connexion. Fig. 65 illustrates the action in an ordinary tee-piece, which is a fitting of the most undesirable form. The first, second, and third causes of loss apply to all tee-pieces, the influence of the third cause varying with the manner in which the joints are made (see Figs. 61 to 64).

The second and third causes of loss apply to sockets and couplings, the extent of



TABLE XXIX.—PIPE EQUALISATION TABLE. FOR PROPORTIONING THE DIAMETERS OF MAIN AND BRANCH STREAM PIPES.  
(Based upon the diameters stated in the horizontal and vertical lines.)

Dia.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	12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enlargement and contraction depending upon the character of the joints employed. Fig. 66 indicates approximately the effect of an ordinary socket upon the flow of steam. As a general rule, it may be said that the average resistance in a straight-through socket coupling is about one-fifth of that in a round elbow.

The resistance caused by valves varies, according to the details of the design, from 50 per cent. to 150 per cent. more than the resistance offered by a round elbow.

Although the effect of any given fitting upon the quantity of steam delivered can be calculated with substantial accuracy, it would be out of the question for any architect or engineer to determine the resistance of every bend, elbow, tee-piece, coupling, and valve in an extensive system of pipes. The labour involved by a long series of calculations would be out of all proportion to the utility of the information obtained. For and practical purpose, it is quite sufficient to take as data certain equivalent lengths of straight pipe to represent the average resistance offered to the flow of steam by the different kinds of fittings commonly employed.

**Round Elbows.**—Practical experience and experimental investigation show that in an ordinary screwed round elbow of 90 deg. the loss of head due to change of direction is the same as the loss in a straight pipe of the same nominal diameter, and with a length equal to about 40 diameters.

The loss due to friction in an elbow can be disregarded if, in measuring the pipe line, allowance be made for the length of each fitting.

The loss due to enlargement and contraction of area in an ordinary screwed elbow is represented by an equivalent length of straight pipe about 60 diameters long.

Thus the total loss due to an ordinary screwed elbow may be stated at 100 diameters.

But if the shoulders of the connected pipes are carefully reamed out, as shown in Fig. 62, the loss from the third cause can be reduced to the equivalent of about 10 diameters, making the total loss for the elbow equal to 50 diameters only.

Further, if flanged or other flush joints are used, and if the internal area of the elbow is the same as that of the connected pipes, the loss of head from the third cause is reduced to zero, and the total loss for the elbow becomes 40 diameters.

*Bends.*—For an ordinary screwed bend with a radius of 2·5 diameters the equivalent for loss by change of direction is 3·4 diameters, say, 4 diameters. For a similar bend of less favourable radius the equivalent may be averaged at 10 diameters.

The loss by friction can be disregarded, on the understanding that all fittings are measured in the length of the pipe line.

As wrought-iron bends have the same area as the connected pipes, no losses arise from

the third cause, and the total loss for an ordinary screwed bend may be regarded as ranging from 4 diameters to 10 diameters. These values apply equally to flanged pipe bends.

*Tee-pieces.*—For ordinary screwed tee-pieces the loss due to change of direction through the outlet is greater than that in a round elbow, and may be averaged at 60 diameters.

The loss by friction can be disregarded as before, subject to due allowance being made for length in the pipe measurements.

The loss arising from enlargement and contraction of area in wrought-iron tees is probably not less than the equivalent of 100 diameters when the pipe ends are left square.

Using these values the total loss for a tee-piece equals 150 diameters.

But when the shoulders are reamed off, as in Fig. 62, the loss from the third cause is reduced to about 15 diameters, making the total loss equivalent to 75 diameters.

For flanged tees with internal area the same as that of the connected pipes the third portion of the loss is eliminated, and the total loss is equal to about 60 diameters.

**Sockets and Couplings.**—In the case of sockets and screwed couplings there is some loss from enlargement and contraction of area, the value ranging from 10 diameters to 20 diameters according to the finish of the pipe-fitter's work.

**Valves.**—The design of valves varies so greatly that it would be difficult to state values that are even approximately reliable for different types. For the purpose of general guidance in settling the proportions of pipe systems, the resistance of full-way valves may be taken at 100 diameters for screwed pipe, or 40 diameters for flanged pipe, and the resistance of globe valves at 200 diameters for screwed pipe, or 60 diameters for flanged pipe.

*Erratum.*—In examples (31) and (33) read 400 ft. for 100 ft., and in example (32) read 100 ft. for 400 ft. This only applies to the statements of data, the calculations being printed correctly.

## OBITUARY.

Mr. EATON.—The death is announced of Mr. John Eaton, C.B., senior member of the firm of Messrs. John Eaton, Sons & Cantrell, of Stamford-street, Ashton-under-Lyne, architects. Mr. Eaton was elected a Fellow of the Royal Institute of British Architects in 1882, and was elected a Vice-President of the Manchester Society of Architects for the session 1904-5. Having served as a pupil in his father's office he became an assistant of Mr. J. H. Cantrell, and was afterwards the principal architectural works carried out by the firm are the following, in chronological order:—School buildings for the Dukinfield School Board, at a cost of nearly 9,000*l.* for the structure; the Conservative Club, Mottram-road, Stalybridge;

the Church Inn, Millbrook, Stalybridge, Swales Brewery Company, Ltd.; business premises in Warrington-street, Ashton-under-Lyne; and enlargement, with improvements, of the St. Mary's Church Schools, Droylsden; drill-hall and headquarters of the 3rd Volunteer Battalion of the Lancashire Fusiliers in Cransall, Salford (1889); the Miners' Arms, alterations, etc., of the Welcome Home in Bolton; the Ashton-under-Lyne club premises, Stalybridge; the gun store and ammunition headquarters in Manchester; stables, etc., at Droylsden; Abercrombie, for Colonel J. E. Mellor; bachelors' and post-office premises at Dukinfield for the Bank; the nurses' home, Ashton-under-Lyne; the Union Guardians, at a cost of about 6,500 £, and the Queen's Hotel, Hyde. Two years ago he laid down a system of water-mains for Ashton and its suburbs, and in 1898 he won the first premium with his designs for the Dukinfield Town Hall, Messrs. John Eaton & Sons were the architects of the Conservative Club, Dukinfield, in the late Louis XIV. style, 1872-3; and of the Heginbottom Technical Schools, School of Art, and Free Library, Ashton-under-Lyne, after the early English style, erected in 1880-1. Mr. Eaton, who resided at Stradsworth, Tame-road, was a borough magistrate, and as Colonel of the 3rd Volunteer Battalion of the Manchester Regiment received the Volunteer Decoration.

Mr. GREEN.—Mr. James Green died December 5 at his residence in Prince of Wales road, Kensington. He was a member of the firm of Messrs. Weatherall & Green, of Chancery lane, surveyors, valuers, auctioneers, and agents, and during many years past enjoyed extensive practice. His services were employed in several cases on behalf of the Crown, London County Council, and various public and private bodies, in respect of valuations and arbitrations, and he frequently acted as umpire or expert in controversial proceedings under statutory enactments relating to the acquisition or valuation of landed property.



## GENERAL BUILDING NEWS.

**CHURCH, LIDGET GREEN, BRADFORD.**—The new Church of St. Wilfred's, at Lidget Green, occupies a site opposite the mission church in Clayton-road. The architect is Mr. Temple Moore, of London. Rectangular in shape, the building has three main entrances, one being in the centre of the west end, and side entrances with porches at the north and south corners. The aisles are divided from the nave by pillars and arches, and the roof is plain and of circular form. The total cost, exclusive of furniture and the site, is about 9,000.

**CHURCH, BEN RHYDDING.**—The new church of St. John the Evangelist, at Ben Rhydding, at present consists of nave and chancel, which, together with the site, have cost 3,320. Accommodation has been provided for about 300 persons, and the building is from the plans of Mr. H. S. Chorley (Donnan & Chorley, Leeds). The builders are Messrs. Deben Brothers, Leeds.

**PARISH CHURCH, GLASGOW.**—On the 2nd inst. Lord Provost Bland laid the memorial stone of the new St. Paul's Parish Church, which is in course of erection on a site in North John-street, Glasgow. The design is that of Mr. John McIntyre, architect, Edinburgh. The building consists of a suite of two halls with a side entrance from Little Hamilton-street and Margaret-street, and a church comprising nave and side aisles with a gallery at the east end of the nave. Accommodation is provided for 950 worshippers. The principal entrance to the church is from John-street at the north end of the building and leads to the north aisle, thence entering from Little Hamilton-street stair and a vestibule underneath the tower at the corner of John-street and Little Hamilton-street. Cloak-room accommodation has been provided for both sexes. The vestry, session-house, and other rooms are entered from Margaret-street. The church, which is in the Renaissance style, is being built of red freestone. The contractors are Messrs. Ebenezer McKerran & Son; joiners, Messrs. John Baxter & Son; ironwork, Mr. John Mundy; plumbers, Messrs. Muir & Son; plasterer, Mr. John Quarrier, and heating, Messrs. Steel & Steven. Mr. W. M. Scott is master of works. The cost of the building will be about 10,000.

**BAPTIST CHURCH, SHOOTERS' HILL.**—The opening services in connexion with the new Baptist Church in Shooters' Hill-road took place recently. The building, which occupies a corner site at the junction of Marlborough-lane, is perpendicular in style, the exterior being faced with red bricks and white stone dressings. At the corner rises a square tower, 60 ft. high, with battered angle buttresses, terminating in carved pinnacles. The main gable contains a traceried window; below this projects the ground floor entrance porch, on the east side of which is the tower, containing one gallery staircase, and on the west side the turret with a second staircase. On the ground floor side entrance is the entrance to the tower. The seating on the ground floor is circular in plan, the total accommodation, including the galleries, is for 800 persons. The roof, which is carried on four columns with arches between, is of pitch pine, and is also the open traceried gallery front. Under the pulpit is the marble baptistry, access to which is by a side entrance in the church. The seating on the choir vestries at the rear. Deacons and minister's vestries are also provided. The architects, whose design was selected in competition, are Mr. Samuel S. Dottridge, of Blackheath, and Mr. W. J. Walford, of Leadenhall House, E.C.4, and Messrs. Patman & Fotheringham, of Theobald's-road, W.C.4, have been the contractors for the work.

**CONGREGATIONAL CHURCH, LLANTWIT MAJOR.**—Services in connexion with the re-opening, after rebuilding, of Ebenezer Congregational Church, Llantwit Major, have just been held. The new building is of stone quarried upon the site, and has a dressing of St. Aldhelm stone. The roof is covered with lead. The total accommodation in the body of the building is for 270 persons, including sixty in a gallery at the west end. There is a vestry at the back, and a heating chamber in the basement. The heating apparatus, which is on the low-pressure hot-water system, has been erected out by Messrs. J. G. Proger & Sons, of Cardiff. The contractor was Mr. J. E. Chatterton, of Llantwit Major. The architects were Messrs. Cook & Edwards, of Bridgend.

**BAPTIST CHURCH, PLYMOUTH.**—The memorial stone of the new Baptist Church, to be erected at Salisbury-road, Plymouth, has just been laid. Mr. P. A. Wible is the architect.

**STANTON SCHOOL.**—Mr. Frank Wills has made designs for the school, to accommodate about 300, which Sir W. H. Wills will erect at his own cost and present to the governors of the school.

**BOARD SCHOOL, EDINBURGH.**—Warrant was granted in the Edinburgh Dean of Guild Court, on the 30th ult., to the Edinburgh School Board, for the erection of a new school at Upper Gilmore-place, which will be known as the Gilmore-place school. A site embracing 5,500 sq. yds. has been obtained, and the building is designed to

accommodate 1,486 pupils. The school will consist of three floors, the lower one of which will be devoted entirely to the infant department, and the two upper to the juvenile department. In addition to the twenty-six classrooms there will be a workshop and combined cookery-room and laundry. A large central hall is provided for each of the departments, and each has a gallery. There will be three playgrounds—one for boys, one for girls, and one for infants. Mr. J. A. Carfrae is the architect, and the following are the names of the contractors:—Messrs. James Millar & Sons, mason and joiner work; J. A. McIntosh, plaster work; Redpath, Brown, & Co., iron work; P. Knox & Sons, plumber work; William Anderson & Son, slater work; A. Hutton & Son, painter work; A. Cunningham & Co., glazier work; and A. Bowman, granolithic work. It is estimated that the total cost of the school, apart from the site, will amount to about 20,148.

**PROPOSED SECONDARY SCHOOL, POOLE.**—Mr. C. A. Bligh Livesey, architect, has prepared the plans, specifications, and estimate for the proposed new secondary school to be erected on a site at Seldown, Poole. The buildings are to provide accommodation for 200 scholars, of whom 60 will be in the pupil teachers' centre, and 140 in the secondary school. The architect's estimate is 6,350, which includes boundary walls and fences.

**ISOLATION HOSPITAL FOR HARROGATE, KNARESBOROUGH.**—On the 28th ult. the new isolation hospital, which has been erected at Knareborough, was opened. Twenty-four acres of land were purchased at Thwaite Hill, Knareborough, and invitations were issued to architects to compete with plans for the new buildings, and the designs of Mr. G. H. Stanger, of Wolverhampton, were accepted, but Mr. Stanger did not live to see the completion of the work, and since his death his partner, Mr. Arthur W. Worrall, has supervised the operations. The various blocks of buildings are situated over some 83 acres of site. The buildings are of local stone, and the cost will be about 25,000. From the main road a carriage drive leads past a porter's lodge to the administrative block, on the ground floor of which are the matron's and nurses' sitting-rooms, doctor's-room, and dispensary, kitchen, scullery, and store-rooms, the bedroom and bath-rooms being on two upper floors. The hospital proper is divided into four pavilions. The scarlet fever block contains twenty beds, and the typhoid block twelve beds, each pavilion having two general wards and two single-bed wards for private patients. The diphtheria block has eight beds in two general wards. The fourth pavilion, containing eight beds, is for doubtful cases. Altogether there is accommodation for nearly sixty patients. All the pavilions are within easy reach of the administrative blocks. Their general internal arrangements are similar. They are so situated as to obtain a maximum amount of sunlight, and windows are placed close to the angles in order to increase this advantage. All the windows and fanlights can be opened. The wards are heated by Shorland's stoves and grates, supplemented by steam radiators, the steam being generated in two large Cornish boilers. Outlets for vitiated air are provided at ceiling level in all wards and rooms. The corners of the walls are rounded, the floors of the wards are laid with oak blocks and other floors with terrazzo paving; and inverted incandescent gas burners are used for illumination. Amongst the subsidiary buildings are the discharge block, which is fitted with bath-room, and the laundry and disinfecting block. The contractors are:—Bricklayer and mason's work by Messrs. Simpson & Sons, Harrogate; joiners by Mr. J. W. Rudd, Harrogate; plumbing and glazing by Mr. G. Thompson, Leeds; plastering by Messrs. Fortune & Calverley, Harrogate; slating by Mr. W. Shepherd, Harrogate; ironwork by Messrs. Atkinson, Harrogate; painting by Messrs. J. Morley & Son, Knareborough; and the engineering, including heating, hot-water supplies, laundry machinery, etc., by Messrs. Lea & Warren, Kettering.

Messrs. Shorland Bros. supplied the ward stoves and grates; the terrazzo floor was executed by Messrs. Diespeker. Messrs. Bayliss, Jones, & Sons, Harrogate, supplied the barbed Bayliss boundary fencing; and Mr. Steinthal, Bradford, the electric bell. The laying-out of grounds and planting were done by Mr. Lister Kershaw, of Brighouse.

**ASSEMBLY HALL, DEBENHAM.**—The Foresters' Hall at Debenham was opened recently. The principal entrance to the new building is from the street, up a flight of Portland stone steps into an open vestibule; thence into the Crush Hall, about 18 ft. by 14 ft., which is fitted up with a ticket-office at the far end. This hall will also form a committee-room when so required. The main hall, which is lighted by twenty windows and ventilated by Boyle's patent exhaust air pump ventilators, is about 60 ft. long by 38 ft. wide, access being through the two doors from the crush hall. The hall has four double emergency exits, besides the ordinary doors. At one end is a stage and at a higher level is the balcony in horse-shoe shape, with rising tiers of seats, access

to which is had by staircases on either side. Behind the balcony rises a large gallery, fitted up with tiers of seats. The architect was Mr. Raymond C. Wrench, of Ipswich and Felixstowe; Mr. Allen Hudson, of Ipswich, being clerk of works. The stonework to the front elevation has been executed by Mr. E. Saunderson, of Ipswich, with Mr. W. E. Willett as carver. The contractor for the main building was Mr. H. Gooding, of Debenham, the constructional ironwork being supplied by Messrs. Cocksedge & Co., Ipswich; the heating apparatus, fire-escape stairs, and main seating by Messrs. Wrench & Sons, Ipswich; the gas work and fittings by the Ipswich Gaslight Company, and the main stairs by Mr. Thwaites, of Ipswich.

**CHURCH HALL, THROCKLEY, NORTHUMBERLAND.**—A new church hall has been erected at Throckley by the Methodist community. The new premises are built of stone and comprise a lecture-hall to seat 150, with a class room at one side which can be thrown into the hall by means of a partition and gives additional accommodation for twenty persons. At the back of the hall is a speakers' ante-room, cloak-room, and lavatory, all connected to the existing church by a corridor. The minister's and steward's vestries have also been remodelled. The front windows are filled in with leaded glazing from the studio of Mr. Baguley. The heating is on the low pressure system, carried out by Messrs. Dinning & Cooke, plumbing work by Mr. Ernest Byles, of Newcastle, and the painting and glazing by Mr. M. J. Rutter, of Lemington, and the contract for the work has been executed by Messrs. Brown & Bell, of Newcastle, from designs by Mr. J. Walton Taylor, architect, Newcastle.

**FIRE-STATION, BIRMINGHAM.**—A new fire-station is in course of erection at Bordesley-green, Birmingham. Covering an area of 1,888 sq. yds., the cost of the site was 783, and, inclusive of furniture, the cost of the building will be 9,500. Mr. John Price, the City Surveyor, prepared the plans for the work.

**FIRE-STATION, SUTTON, NEAR BIRMINGHAM.**—On the 1st inst. the new fire-station, built to the right of the new town hall in course of erection at Sutton Coldfield, was opened. The building is Renaissance in style, and the front is of local sandstone facing bricks and Bath stone dressings. The entrance is from Upper Littleton-road, facing Anchorage-road. The engine-room is 36 ft. by 30 ft., giving accommodation for three machines. Over this room is a recreation-room for the use of the firemen, with sliding pole communication with the machine-room. At the back is the harness-room and stabling for four horses. Between the fire-station and the town hall is a campanile, 60 ft. high to the top of the parapet, with a four-faced clock, 54 ft. from the ground. This campanile answers the double purpose of an air-ventilating shaft and hose-drying tower. The fire-station and the town hall will cost over 10,000, of which sum the former building will involve some 2,000. The architect is Mr. A. R. Mayton, and the builders Messrs. T. Elvin & Sons, of Handsworth.

**THEATRE, SUNDERLAND.**—The Sunderland Building Committee have approved of an amended plan by Mr. Hope for a theatre in Crowtree-road, South-street, and West-street. It is proposed to pull down the present block of property, and erect on the site a theatre and six lock-up shops, the building to be 83 ft. in height from the footpath to the eaves. The stalls will accommodate 180 adults, the pit 450, circle and boxes 700, and the gallery 800.

**STOCKPORT WORKHOUSE INFIRMARY.**—Mr. G. N. Andrew, Chairman of the Stockport Board of Guardians, opened the new workhouse infirmary at Stepping Hill on the 7th inst. The buildings will afford accommodation for 340 patients, a home for thirty-six nurses, and housing for twenty-four officials and servants. The administrative block and a large waiting hall occupy the central position; there are on each side of the main corridor two pavilions, each for men and women, having three floors, and at the end exercise verandahs and escape staircases. The cost is estimated at 130, per bed. Mr. W. H. Ward, Birmingham, was the architect.

**QUEEN VICTORIA MEMORIAL SCHOOL, DUNBLANE.**—Sketch plans of the Queen Victoria Memorial School at Dunblane have been approved. Working plans and measurements will be ready by March 1, when tenders will be advertised for. The plans show accommodation for 194 boys, and the school will be built on ground extending to between thirty and forty acres at the Drums of Kippendavie, about a mile north-east of Dunblane. The building will be brick faced, but with a stone front. Mr. J. A. Campbell, of Glasgow, is the architect.

**BUILDING IN BIRMINGHAM.**—The generally-depressed condition of the building trade is reflected in the annual report just issued by the Birmingham City Surveyor, which shows that building operations have been considerably less active during the year under review than has been the case for the past five years. The total number of plans submitted to the Corporation for approval was only 1,061, as compared with 1,563



in the previous year, and 2,252 in 1902-3. In houses and shops alone there has been a decrease since last year of 385, and of 1,088 as contrasted with 1902. In all some 1,400 buildings have been completed during the year, but they largely represent an inheritance from the previous year, when the plans were adopted and building operations in the majority of cases commenced. There has been no diminution, however, in the amount of work which devolves upon this important department of the Corporation. With the object of safeguarding the public, over 1,100 notices had been served, in addition to which nearly two thousand inspections have been made under the Factory and Workshops Act, while ninety-nine notices had been served requiring additional means of escape in case of fire. Attention has also been devoted to the theatres and music-halls with a similar object. The most important work carried on during the year has been the commencement and partial completion of the works designed to relieve the Rea main sewer, which for many years past has been subject to overcharging through the admission of excessive volumes of storm-water. The storm-water sewer in Lady-pool-road has also been extended along Brighton-road so as to prevent the flooding of building land, and important works of a similar nature have been carried out in other parts of the city. The department has had 269 miles of declared highways under its control, entailing a large expenditure in repairs, scavenging, etc. During the year 20,564 loads of snow have been removed, the work providing occupation for a large number of unemployed. Attention has also been given to a large number of other matters, such as street naming, house numbering, tree pruning, the provision of seats, lamps, and public conveniences.—*Birmingham Post.*

**CLUB PAVILION, GLASGOW.**—A new pavilion has been erected in the Kilmarnock road for the Whitesails Club. The building comprises two stories. The cost, including furnishing, is estimated at 2,500*l.*, and the architects are Messrs. Watson & Salmond, of Glasgow.

#### SANITARY AND ENGINEERING NEWS.

**SEWAGE SCHEME, WORCESTER.**—The sewage disposal works in course of construction upon the west bank of the Severn, at Worcester, are to be completed by the end of next year. The scheme consists in intercepting the sewage in two disintegrating tanks, then discharging it by means of rotating distributors through filters, afterwards transmitting it through land to the river. At present Messrs. Beesley are doing the sewers leading up to the disposal works—and the other part of the work is being done under the supervision of the City Engineer, Messrs. Beesley's proportion of the work being estimated to cost 17,000*l.* to 18,000*l.*, and the Corporation's share 60,000*l.* or 70,000*l.* Messrs. Vale, of Stourport, Messrs. Brasier, of Bromsgrove, and the Neville Engineering Company, Worcester, are the contractors, and the remainder of the work is done by the Corporation, which employs 100 to 200 men. The contract work is in charge of Mr. Road, and Mr. Stuart Cairk has charge of the administrative work.

#### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Mr. Val Myer has entered into partnership with Mr. W. Fair, architect, of 14, South-square, Gray's Inn. The practice will in future be carried on at 39, Fumival-street, Holborn, E.C., under the style of "Fair & Myer."—Mr. John Cowan has resigned the managing directorship of the Stirling Boiler Co., Ltd., of Motherwell, and 25, Victoria-street, Westminster. The directors have appointed Mr. E. G. Constantine, A.M.Inst.C.E., of Manchester, to be managing director, and he will enter upon his duties at Motherwell on January 1 next. Mr. Cowan still retains his interest in the company, and will continue to be chairman of the directors.

**MEMORIAL WINDOW, STRETTON SUGWAS.**—At the Church of St. Mary Magdalene, Stretton Sugwas, near Hereford, on the 4th inst., the Bishop of Hereford unveiled an east window erected to the memory of the late Rev. Preb. Ashley. The work was executed by Messrs. James Powell & Sons, London.

**COAL PRODUCTION.**—We recently (October 28) gave some statistics relating to the output and export of coal in regard to this country, as shown by the returns from mines and quarries, but the coal tables just published as a Parliamentary paper contain very interesting figures in reference to foreign production. The total coal production of the world is given as 790 million tons of 2,240 lb., exclusive of lignite, this figure being the same as in the returns last year. To this gigantic total this country contributes 232,428,000 tons, and the United States 314,563,000 tons, or the United Kingdom nearly a third and the United States rather over a third, but in this country this bears the proportion of nearly 54 tons per head of the population, as against under 4 tons in the United States. We, in company with Germany, have

produced a record amount of coal in 1904, France, Belgium, and the United States showing a slightly diminished output. The average value of coal produced is lowest in the United States, 68, 7d., as against 7s. 8d. in this country, 8s. 7d., in Germany, 10s. 4d., in Belgium, 11s. 3d., in France. The consumption of coal in this country seems nearly stationary as compared with the two previous years, but Germany shows a large increase, as also to a less degree France. For locomotives the railway companies use 1,445,354 tons in this country, the tables showing a small increase since 1902. We dealt with the exports from this country in our former Note, but it is interesting to observe that our import is only 3,000 tons, whilst Germany imports 7,975,000 tons, exporting 21,601,000 tons; the United States imports 1,621,000 tons, exporting 8,574,000 tons; the excess of exports from this country being 65,819,000 tons, as compared with 13,656,000 tons in Germany, and 6,953,000 tons in the United States.

**NEW WORKHOUSE AND INFIRMARY, WORMWOOD SCRUBS.**—We omitted in describing this building in our last, to give the name of the general contractor, but Thomas Beesley, of Birmingham, in the printed record sent to us a list of the firms employed was given, the name of the general contractor being omitted there; hence our oversight.

**THE CROYDON ACCIDENT.**—Dr. T. Jackson, coroner for Croydon, held an inquiry on the 8th inst. as to the cause of death of a foreman bricklayer named Howard, who was killed when he was killed on Tuesday last week by the collapse of a wall on the site of the new Variety Theatre at Croydon, for the construction of which Mr. Wallis, of Balham, is the contractor. Nine other persons were injured in the accident. The wall which fell was a part of the old building erected in 1894, and had been erected in a building in the new theatre. The jury, after deliberating half an hour, returned a verdict of accidental death, with a rider that the majority of them regretted that more precautions in the way of shoring up were not taken.

**SCHOOL BOARD ARCHITECT, DUNDEE.**—The duties and emoluments of Mr. James H. Langlands, Dundee School Board architect, have for some time engaged the consideration of the Board. A special committee deputed to deal with the matter deliberated upon it, and in the end drafted the following minute for presentation to the Board:—(1) That the existing arrangement with Mr. James H. Langlands should cease on December 31, current, and that a new architect be appointed to the Board during their pleasure for the erection of new schools and additions or alterations to existing schools exceeding in estimated cost the sum of 500*l.*, at a rate of commission on the cost of the building exclusive of the cost of the ground and the school furniture, in the case of new schools, of 5 per cent., and for alterations or additions as aforesaid of 3 per cent. (2) That a measurer be appointed for the Board to prepare schedules of quantities for all new schools and extensive alterations as aforesaid, and to measure up all such work and any work that may be specially assigned to him under the instructions of the Board, on its completion, at a commission of 1 per cent. on the total cost of the work, including the preparation and issue of schedules. This fee, it is stipulated, shall not be included in the schedules issued to contractors, and a statement thereof shall be submitted and paid direct by the Board. (3) That a separate clerk of works be appointed, to give his whole time to the service of the Board. (4) That the new arrangement be brought into operation on January 1, 1906.

**ACADÉMIE DES INSCRIPTIONS ET DES BELLES LETTRES.**—Mr. Arthur Evans, keeper of the Ashmolean Museum, Oxford, and Mr. Barclay Head, keeper of the Department of Coins and Medals, British Museum, have been elected corresponding members of this Académie.

**REPAYING OF LINCOLN'S INN-FIELDS.**—A deputation from Lincoln's Inn-fields attended the meeting of the Holborn Town Council on Wednesday for the purpose of presenting a petition to the Mayor and Corporation requesting the repaving of the roadway with "saler material" in place of the noisy granite "settes" of ancient date and very uneven surface. The deputation consisted of representatives of various firms having premises in Lincoln's Inn-fields. Mr. G. Lawrence Stewart (Messrs. Lee & Pembrerton) referred to the extreme desirability of the request of the petition, which he complied with, as the noise made by the heavy traffic on the roadway was very great, and most disturbing to the many professional firms occupying offices in the locality. The petition was received by the Council and unanimously referred to the Streets Committee for consideration.

**AVENUE THURPES.**—Mr. H. H. Wick, at Bow-street, has granted an order for the taking down of the external walls of the theatre fronting Northumberland-avenue, Victoria-embankment, and Brewer's-lane, and adjoining No. 23, Craven-street, and of portions of the internal walls and of

the roofs over the stage and auditorium which rendered defective by the recent catastrophe. The Charing-cross railway station. The summit was taken out at the instance of the London County Council, under the Dangerous Structures Act. At the time of the accident the theatre was being re-constructed by Messrs. Patmore, Fotheringham, for Mr. Cyril Maude, under directions and superintendence of Mr. Detlev Blow. It was originally built in 1881-2, after F. Fowler's plans and designs, by Messrs. Kirk & Randall, who used corn-grit and bottom-bed from the Corsham Down quarries for the stone-work. The late Metropolitan Board of Works had first required that the new buildings in Northumberland-land-avenue and the near vicinity should be faced with Portland stone.

**A NEW ROAD, WEST MIDDLESEX.**—A syndicate of promoters will seek for Parliamentary power to enable them to supplant the narrow main road through Brentford to Hounslow with a new road 100 ft. wide. The proposed line of route begins from the high road near New railway station, and making a detour of the north of Brentford crosses the river Brent and Hounslow road, and so continues by Syon Hill to a junction near Spring-grove, Isleworth, with the high road westwards. The scheme provides for a widening of the main road between Pears' Fountain and Hounslow, and for obtaining sufficient land to secure recompense out of the enhanced value of property along the new road.

**NEW YORK SUBWAY.**—The first year of operation of the New York subway was completed in October, and from the report on the year's working we learn that the total number of passengers amounted to 106,000,000 during the period, making an average of 300,000 passengers per day. As the elevated railways of the city carried about 717,000 passengers a day, the grand total is over 1,000,000 passengers a day on the two systems. One serious objection to the subway, which has not been without effect upon the summer traffic, is the excessively high temperature developed in hot weather. This condition is stated to be due partly to the heat given off by the electric motors of the trains, and partly to the constant application of the car brakes. The heat thus produced is quite welcome in cold weather, but during the summer months it renders the subway almost unbearable. The engineers fully realize the importance of making provision for dispersing the excess of heat, and we understand that they are now engaged in preparing a scheme of mechanical ventilation, which, it is hoped, will furnish an effective remedy for the one serious defect of the new underground railway.

**PRIVATE BILLS FOR NEXT SESSION.**—The number of Private Bills to be introduced in the course of the ensuing session of Parliament, any of which the plans, etc., have been formally deposited in the Private Bill Office, amounts to 222. Of that total thirty-four sets relate to railways, twelve to tramways, sixty-two to miscellaneous projects, and 114 to provisions for electrical lighting, gas, water, and other undertakings. The total last year amounted to 224 sets of plans.

#### Legal.

##### ACTION BY A BUILDER.

The hearing of the case of Cooper v. Lamin commenced before Mr. Justice Channell, sitting without a jury, in the King's Bench Division on the 7th inst., an action by the plaintiff, Henry Cooper, a builder, against the defendant, the building owner, to recover 430*l.* 18s. 2d. certified as due to him by the defendant's architect.

Mr. Duke, K.C., and Mr. Norman Cross appeared for the plaintiff, and Mr. English, Harrison, K.C., and Mr. G. A. Scott for the defendant.

Mr. Duke, in opening the case, said that the defendant's answer to the claim was that there was no such contract as alleged, and that the architect had no power to certify as he had done. That was the first question for decision. The defendant set up a counterclaim in which he alleged that as part of the consideration of his employing the plaintiff as his builder the plaintiff should grant him a right of way across an adjoining plot of land. Plaintiff said in answer to that that he was not satisfied it was an enforceable contract, although he admitted that he did promise to grant the right of way, and that he refused to grant it. Those were the matters in dispute, and under an order of June last they had been directed to be tried before all other questions in the action. The position was, as follows:—In the early part of 1902 defendant bought a plot of land at Maidenhead, which was a middle plot, between other plots in which he owned a Mr. Nicholson. 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negotiation. It was then that the plaintiff was asked whether he would grant the right of way if he was employed to carry out the building operations for the defendant. Plaintiff said that if he was in a position to do so he would. Messrs. Davy & Salter prepared a specification and a bill of quantities. That was in November, 1902, and the plaintiff was asked to tender. The form of tender was material. His lordship would see that what the builder tendering was required to do was "to undertake to execute the works required to be done in erecting the above-mentioned residence, stable, and greenhouse, to the true intent and meaning of the plans, specifications, and conditions of contract as prepared by you"—that was to say, the architect, "for the undermentioned sums," and then the tenderor had to deal with the three items separately. The plans were in existence when the tenders were issued in the beginning of 1903. The conditions of the contract were on a printed form in common use in the architects' business. These conditions were shown to the defendant, and the plaintiff was familiar with them.

Mr. English Harrison: My case is that they were never shown to the defendant at all.

Mr. Duke replied that he should call evidence as to that. The plaintiff was one of four persons invited to tender. His tender was too high, but the defendant did not want the work. He agreed that it was better, if possible, to employ the plaintiff, and asked him to reconsider the amount of his tender. Plaintiff did so, and reduced it. Defendant had made a note on it that it was the amended tender of the plaintiff, so that that was a document well in the defendant's knowledge. The defendant was the defendant, because he prepared a list of them. Defendant then authorised the architect to employ the plaintiff, and he employed him on the terms of his tender, and he made it clear to the defendant that the thing would be carried out by a further document. Thereupon, at the beginning of February 1903, the architect authorised the plaintiff to begin work on the house and conservatory, but he reserved the question whether the work on the stable should proceed or not, because the matter of the right of way had not then been settled. On March 6 the architect called on the plaintiff to sign the agreement, which was the document referred to in the tender, and the plaintiff signed it and the architect verified it with his signature as representing the defendant. The work went on, and from time to time the architect gave certificates for the money which became due under the terms of the contract.

In answer to his lordship, Mr. English Harrison stated that what they wanted was to understand that. There was a question as to defective work, but that was not the question. He should go to an arbitrator. They would not trouble his lordship with that.

Mr. Duke, continuing, said that the defendant paid on the interim certificates of the architect up to £1,200, or about three-fifths of the total amount of the contract work. The matter was completed in the summer of 1903, and the defendant went into occupation of the house and conservatory. In December defendant got some alternative plans for the stables, and in 1904 he got other estimates and plans for other things, but in the following March he had some disagreement with the architect. Plaintiff then sent in the account for the balance of the sum due to him to the architect, and the latter sent it on to the defendant on April 14, and certified it as being correct. On April 16 the defendant called on the plaintiff and entered into an exasperating conversation about other matters. Defendant asked plaintiff why he had not granted him the right of way, and said that his belief was that he was not going to grant it. Plaintiff had only about two days before got the conveyance of his land, and told the defendant so, and said, "Will you find anybody in Maidenhead to say that I won't stand by my word?" Defendant went away in a huff, and then a letter was written by the plaintiff which defendant construed as a refusal by him to grant the right of way. As soon as the plaintiff made a claim for payment on the architect's certificate defendant launched his counter-claim about the right of way.

The plaintiff was then called and gave evidence generally bearing out the statement of counsel.

Then the hearing was resumed on Monday Mr. Duke, addressing his lordship, said that if he would give Mr. English Harrison and himself a few minutes they might be able to shorten the case a good deal.

His lordship assented to this, and after a consultation between counsel and the parties, Mr. Duke stated that it would not be necessary to occupy his lordship's time further with the dispute. He thought the case was settled, although it might be that they would want the judge's order. If so, perhaps his lordship would allow it to be on the terms as drawn up.

His lordship agreed to this.

Mr. English Harrison said that the defendant made no charge against the plaintiff's competence as a builder or against his personal integrity.

#### ACTION BY THE SILICATE PAINT COMPANY AGAINST PAINTER AND DECORATOR.

The case of *In re the Silicate Paint Company—J. B. Orr & Co., Ltd., v. Smith* came before Mr. Justice Warrington in the Chancery Division on the 12th inst.

Mr. Bowden, K.C., and Mr. Sebastian appeared for the plaintiff, and Mr. George Cave, K.C., and Mr. Stokes for the defendant.

Mr. Bowden, in opening the case, said the plaintiffs claimed damages from the defendant for the alleged wrongful passing off of another paint as and for the plaintiffs' paint. The plaintiffs were the owners of a paint called "Duresco," which that name formed part. One of the chief merits of the plaintiffs' paint was that it could be washed and was very durable. The reputation and value of the plaintiffs' paint was admitted. Mr. Smith, the defendant, was a painter and decorator of some standing in Bury, in Lancashire, and he had been a customer of the plaintiffs for many years. The plaintiffs had reason to believe that it was not an uncommon thing where a specification required "Duresco" paint to be supplied and used that the parties tendering and contracting for the work had substituted inferior paint without any knowledge on the part of the employers. The plaintiffs had already obtained a verdict against persons who supplied inferior paint for "Duresco," and in the present case, they complained of an inferior paint called "Freskel," which defendant had supplied in two specific cases. The first case related to the work done by the defendant in the summer of 1904 at the Hall of the Society of Textile Operators in Bury. A specification was prepared in that case which provided that "Duresco" should be used. He should call the President of the Society, who would say that they attached importance to "Duresco" being used because they had had previous experience of it, and found it a very good paint. The defendant substituted "Freskel," and his defence was that he had permission to do so. The plaintiffs had reason to think that their paint was not being used, and they sent down to the hall where the work was being done, and applied the water test, and they found that "Freskel" had been used instead of "Duresco." In this matter the short point would be whether the defendant had permission, as he alleged, to substitute "Freskel." The defendant said in his affidavit that his foreman obtained such permission. The other complaint related to some work done by the defendant at the Technical Schools at Bury for the Corporation. In that matter the specification specified that "Duresco" should be used, and the defendant contracted to do the work in compliance with the specification. The Corporation Surveyor and borough inspector had charge of the work, and defendant said that they had authority to use "Freskel." If that was right it would put an end to the plaintiffs' case. Apparently "Freskel" was used because it was cheaper than "Duresco," and because it was a little further, but it was not nearly so durable, as it could be washed off. The plaintiffs therefore claimed the relief usually granted in a "passing-off action."

Mr. William Nabb, President of the Society of Textile Operatives, examined, said he never assented to the substitution of "Freskel" for "Duresco." He had no power to do so. He did not know it was being substituted until the plaintiffs' representatives visited the building.

Cross-examined.

He had never called on the defendant to do the work over again, and no correspondence had passed between the society and the defendant before the action to his knowledge. They had intended to write, but hearing that the plaintiff company were going to take action they thought it was quite enough.

Mr. John Duckworth, secretary of the Textile Operative Society, gave similar evidence.

Mr. A. W. Bradley, Surveyor of the Borough Corporation, examined, said that when he found that "Freskel" was being substituted in the Technical Schools he wrote to the defendant that "Duresco" was specified, and that they must have it. Subsequently he said that he was not made for who told him that the change was not made for the sake of cheapness, and spoke of the good qualities of "Freskel," and mentioned work he had been doing at the Conservative Club. Witness went to the Conservative Club to examine the work, and saw Mr. Smith there, but he gave him no permission to substitute anything for "Duresco." He then instructed Mr. Faraday, the borough building inspector, to have one room done with "Freskel" and one with "Duresco," so as to make a comparison before any further work was done. This was done, but Mr. Faraday must have misunderstood his instructions, because the whole of the work was concluded, "Freskel" being used, without his being notified. He had intended to examine the two rooms before giving instructions how the remainder of the work should be done.

Cross-examined.

In his opinion "Freskel" was the more artistic

of the two. He told Mr. Faraday that he did not dislike the appearance of the walls. He did not think that there was any intention on the part of the defendant to deceive him.

Mr. John Faraday, examined, said he saw the work in progress at the Technical Schools, and asked what was being put on the walls. He was told that it was "Freskel." He replied that it ought to have been "Duresco." He did not remember giving any permission to use "Freskel," but presumed that he had not ordered the work to be stopped. The school had to be opened on a certain date, and he did not want the job delayed.

This being the plaintiffs' case evidence was given by Mr. Robert Smith, who said that there was no difference in cost in the two articles. On his first visit to the work he found that "Freskel" was being used. His foreman gave him a satisfactory explanation. After that he had nothing personally to do with the work. Subsequently he had a conversation with Mr. Nabb and Mr. Duckworth, but could not say whether anything was said about the use of "Freskel." He had no intention of deceiving anyone, and it made no farthing difference to his profit whether one paint was used or the other.

Cross-examined.

He had personally very little to do with this work. He thought it was of very small importance whether "Freskel" or "Duresco" was used on the work, one being as good as the other. He usually left it to his foreman to see that the materials used were according to specification. In this case the foreman told him that he had authority to use "Freskel."

Mr. Thos. Shepherd, the defendant's foreman, gave evidence as to having a conversation with Mr. Duckworth while the scaffolding was being put up in the hall of the Society of Textile Operatives. Mr. Duckworth asked him what they were doing the Technical Schools with, and what it would cost. Witness told him that it was "Freskel," and that the cost was about the same as "Duresco." Mr. Duckworth said he liked it very much, and it was immaterial to him what was put on so long as it would look as well and be as durable.

In the result his lordship, in giving judgment, said he believed the evidence of the last witness. He saw no case of passing off, and therefore entered judgment for the defendant with costs.

#### PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.\*

21,233 of 1904.—F. N. REAVEL: *Manufacture of Artificial Stone.*

This relates to the manufacture of artificial stone, and consists in mixing Portland cement with fine gravel, which may consist of either crushed granite, slag, crushed stone, or other similar substance. After the material has been crushed so that it would pass a mesh, say, of three-eighths of an inch, it is delivered into a bunker, through which passes the conveyor which takes the gravel to the top of a vertical cylindrical tube.

24,459 of 1904.—A. W. ADAMS: *Door Springs and Checks.*

This relates to a door-closing device and comprises a pivot formed with cams, a pair of levers pivoted in the casing, and a spring exerting pressure between the ends of said levers.

29,615 of 1904.—W. J. GEORGE: *Sinks and the like.*

This relates to sinks and the like formed with inwardly sloping top edges, the same at front and back, and overlapping the body part of the sink or the like, and consists of an oblong or other suitable washer fixed round the outlet.

5,898 of 1905.—J. REED AND A. H. SUTTON: *Ball or Float Valve to Facilitate Repairs.*

This relates to a horizontally acting ball or float valve, and consists of the provision on the valve barrel of open hook-like lugs, and on the ball lever two journals or trunnions, by which journals or trunnions the ball lever is hooked to the valve barrel, the said levers being suspended in the lugs.

18,026 of 1905.—J. TYLER & SONS, LTD., and T. H. APPERLEY: *Overflow to Lavatory Basins, Sinks, Baths, and the like.*

This relates to overflows for lavatory basins, sinks, baths, and the like, having open topped overflow passages, and consists in the employment of a grid hinged to a locking bracket furnished with a screw threaded bolt for attachment to the back of the basin, sink, bath, or the like.

2,363 of 1905.—C. H. OAKES, JR., J. OAKES, G. R. OAKES, C. H. OAKES, JR., and T. SEARSON: *Carriers for Pipes, and the like.*

This relates to a carrier for transporting sanitary pipes, and the like, comprising a trough-shaped bed, preferably lined with suitable material, and mounted on a frame supported on wheels, arms

\*All these applications are in the stage when opposition to the grant of Patents upon them can be made.



projecting out at right angles to the frame being provided at one end.

12,871 of 1905.—C. A. JARVIS and E. B. WATSON: Apparatus for Supplying Measured Quantities of Liquid Disinfectant to Flushing Cisterns.

This relates to an apparatus for delivering measured quantities of liquid disinfectant to flushing cisterns, and comprises a reservoir having a depending measure, which latter is alternately put in communication with said reservoir and with the flushing cistern, a slidable rod or spindle passing vertically through, and guided by the lid and cap respectively, of the reservoir and the measuring vessel, a valve on said spindle to shut off communication between the reservoir and measuring vessel, the lower end of the spindle being for a sufficient length shaped so as to permit the flow of disinfectant from the measuring vessel into the flushing cistern when the valve shuts off communication with the reservoir, and a spring to normally retain the spindle and valve on their raised position.

14,270 of 1905.—P. P. WYGASCH and S. MEYER: Press for Moulding Artificial Stone Blocks.

This relates to a press for moulding artificial stone blocks, and consists in the movable knives being mounted in groups upon common spindles on opposite sides of the box, rack bars engaging said spindles, and having their toothed portions facing one another in mesh, with a pinion actuated by a crank shaft.

14,693 of 1905.—S. R. DRESSER: Means for Stopping Leaky Bell and Spigot Pipe Joints.

This relates to means for stopping leaky bell and spigot joints, and is characterised by a clamping packing ring, preferably of square or diamond shape, having a central aperture to engage the spigot end of a pipe section, and on one face a packing recess surrounding said aperture, the other face being bored out to form inner and outer flanges connected at intervals by webs, the said ring being formed in two parts, having overlapping portions, with registering bolt-holes and interlocking studs and recesses eccentric thereto, and bolt-holes in each part between the registering bolt-holes, a second ring formed of the parts carrying a central aperture to engage the exterior of the bell end of a pipe section, and also having registering bolt-holes with intermediate bolt-holes, one of the overlapping portions of each part having lateral webs, between which the overlapping portions of the other part fit, a packing ring for the packing recess of the former ring, together with clamping nuts and bolts for connecting the two rings.

#### SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

December 4.—By FAYRE, COOPER, & Co. Calendon-road,—34 and 36, Clifton-st., n.t. 38½ yrs., g.r. 12½, w.r. 12½, 4s. ....	5455
By TAYLOR, LOVEGROVE, & Co. Anerley.—Selby-rd., f.g. rents 20½, reversion in 60 yrs. ....	460
By HARRIS SMYTH (at Brighton). Hurstpierpoint, etc., Sussex.—One-sixth share of Lock's Estate and Povey's Farm, 180 a. 3 r. 15 p. 1, and c., y.r. 507½, 11s. ....	1,200
Dec. 6.—By CHINNOCK, GAINSWORTHY, & Co. City.—4, Goddard-st. (s.), area 430 ft. l., y.r. 40½, 4s. ....	2,400
By BUTLEY, SON, & VINE. Holborn.—22, Red Lion-st. (s.), f.g. w.r. 213½, 4s. Bethnal Green.—107 and 109, Coventry-st., 3 and 4, Coventry-pl., area 1,400 ft. l., w.r. 65½, 4s. ....	2,000
Holloway.—2, 4, 6, and 8, Everleigh-st., n.t. 57½ yrs., g.r. 12½, 12s., y.r. 107½, 4s. ....	1,050
Haverlock Hill.—14 and 16, Adenhill-rd., n.t. 84 yrs., g.r. 11½, y.r. 90½, 4s. ....	700
By FREDK. WARMAN. Holloway.—67, Windsor-rd., n.t. 47 yrs., g.r. 6½, 10s., c.r. 80½, 4s. ....	610
129 and 128, St. John's-rd., n.t. 65 yrs., g.r. 15½, y.r. 76½, 4s. ....	645
Fulham.—Purcell-cres., etc., f.g. rents 130½, 2s. 6d., reversion in 63 yrs. ....	2,800
Stratford.—9, Temple Mill-la., f.g. w.r. 24½, 14s. Bowes Park.—36 and 38, Russell-rd., n.t. 76 yrs., g.r. 12½, w.r. 65½, 4s. ....	370
Tottenham.—417 and 419, West Green-rd., n.t. 61½ yrs., g.r. 15½, w.r. 72½, 10s. ....	300
By J. & W. JOHNSON & Co. (at Masons' Hall Tavern). Kingsland.—Boley-rd., The "Fox" p.h. n.t. 10 yrs., y.r. 120½ (with goodwill) ....	650
December 6.—By CARTWRIGHT & ETCHES. Fimbo.—70, Grosvenor-rd., n.t. 28 yrs., g.r. 9½, y.r. 60½, 4s. ....	475
By POSTER & CRAYDEN. Holborn.—25, Devonshire-st. (business premises), area 1,040 ft. l., 7½, and 7 and 7½, Boswell-st. (business premises), area 2,900 ft. l., 44½, 7½, and 40½, p. ....	2,030
Acton.—13 to 26 (even), Richards-cottages, n.t. w.r. 104½, 4s. ....	950
Ealing.—1, 2, and 3, Green Man-rd. (s.), n.t. 75½ yrs., g.r. 4½, 10s., c.r. 300½, 4s. ....	5,985
By WM. HOLMES. Hendon.—Sunny-gdns., "Lothryan," n.t. 49½, 4s. ....	780
By NORRIS & HADLEY. Reversion to equity of redemption of 107 to 113 (odd), Eign-st., and 331, Shindler-rd., Paddington, n.t. 75 yrs., g.r. 50½, y.r. 355½, life aged 68 ..... 360	

By MARK, LIEHL, & SON.

Battersea.—348 to 351 (odd), Queen's-rd., n.t. 72½ yrs., g.r. 26½, y.r. 225½, 4s. ....	22,475
Peckham.—72, Bellingham-rd., n.t. 71 yrs., g.r. 4½, 10s., c.r. 35½, 4s. ....	320
Plumstead, Kent.—2, 4, 6, and 8, Palmerston-rd., l. w.r. 53½, 4s. ....	900
Woolwich, Kent.—3, Woodville-rd., l. y.r. 25½, 4s. ....	350

December 7.—By FULLER & FULLER.

Wood Green.—Lordship-la., a corner plot of freehold land ..... 150	
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By HOPKINS & Co.

Holloway.—103, Lady Margaret-rd., n.t. 63 yrs., g.r. 8½, 10s., c.r. 55½, 4s. ....	525
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Hackney.—214, 218, 218, and 222, Wick-rd., l. w.r. 110½, 12s. ....	1,055
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Camberwell.—28, Chiswell-st., and yard and stabling, etc., f.g. 60½, 4s. ....	450
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Stepney.—31 and 33, Samuel-st., o. w.r. 46½, 10s. Catford.—59, Holbeach-rd., f. c.r. 32½, 4s. ....	425
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Tooting.—11, Deice-rd., n.t. 53½ yrs., g.r. 8½, y.r. 40½, also 1 to 5, Garra-rd., n.t. 56 yrs., g.r. 15½, w.r. 127½, 8s. ....	1,010
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32, Deice-rd., n.t. 63 yrs., g.r. 6½, 10s., y.r. 36½, 4s. ....	380
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Kennington.—24, and 1 to 9, Lyric-pl., area 2,200 ft. l., w.r. 169½, 4s. ....	1,280
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231, 238, and 236, Kennington-rd., and 1 & 2, 3, Chester-news, held subject to life aged 85, y.r. 102½, 4s., with policies for 1,500½ ..... 1,320	
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By S. WALKER & SON.

Paddington.—34, Wadlock-rd., n.t. 57½ yrs., g.r. 7½, c.r. 45½, 4s. ....	380
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Tottenham.—3, 10, and 12, Osman-rd., n.t. 71 yrs., g.r. 14½, w.r. 63½, 4s. ....	280
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By DANIEL WATNEY & SONS.

City.—12, 14, and 16, Bishopsgate-st. Within, area 1,820 ft. l., building lease for 80 yrs., let at per annum ..... 2,100	
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December 8.—By GEO. HEAD & Co. Highgate.—Milledale, f.g. 144, 10s., reversion in 5½ yrs. .... 1,700	
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By MAY & ROWDEN.

Regent-street.—13, 13A, and 13B, Great Marlborough-st. (building site), area 4,587 ft. l. .... 18,500	
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By ROBERTSON.

Wimbledon.—14, 15, and 18, Trinity-rd., f., y.r. 105½, 4s. .... 1,605	
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Contractions used in these lists.—F.g. for freehold ground-rent; l.g. for leasehold ground-rent; g.r. for improved ground-rent; g.c. for ground-rent; f. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gas. for garden; yd. for yard; g. for grove; h.h. for butcher's shop; pub. for public-house; o. for office; s. for shops; ck. for court.

#### TO CORRESPONDENTS.

J. B. B. & Son (amounts should have been stated). NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications, and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless they are specially asked for them.

Letters or communications (beyond news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

#### MEETINGS.

FRIDAY, DECEMBER 15.

Architectural Association.—Mr. W. H. Bidlake on "Church Towers and Spires," illustrated with lantern views. 7.30 p.m.

Institution of Mechanical Engineers.—(1) Adjourned discussion on the Seventh Report to the Alloy Research Committee on the "Properties of a Series of Iron-Nickel-Manganese-Carbon Alloys," by Dr. H. C. H. Carpenter, Mr. R. A. Hadfield (member), and Mr. Percy Longmuir; (2) paper to be read and discussed (if time permits), "Behaviour of Material of Construction Under Pure Shear," by Mr. E. G. Rod. 8 p.m.

Junior Institution of Engineers (the Westminster Palace Hotel).—Paper on "Electrical Motors for Power Transmission Work," by Professor J. L. Morris, M.I.E.E. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. E. E. Mann, B.Sc., on "Tests of Steel Illumination in Westminster." 8 p.m.

SATURDAY, DECEMBER 16.

Junior Institution of Engineers.—Visit to the Electrical Engineering Works of Messrs. Johnson & Phillips, Old Chatham. 10 a.m.

MONDAY, DECEMBER 18.

Royal Institute of British Architects.—Messrs. Alexander Gasson and A. J. Dix on "Stained Glass." 8 p.m.  
Society of Arts (Cantor Lecture).—Dr. J. A. Fleming on "The Measurement of High Frequency Currents and Electric Waves."—IV. 8 p.m.

TUESDAY, DECEMBER 19.

Architectural Association. Camera and Cyclic Club. Mr. Francis Bond, M.A., on "Bay Design in the English Medieval Churches." 7.30 p.m.  
Institution of Civil Engineers.—Mr. H. A. Mayor on "Heat-Economy in Factories." 8 p.m.

WEDNESDAY, DECEMBER 20.

Builders' Foremen and Clerks of Works' Institution.—Annual Meeting of the Directors. 7 p.m.  
Society of Arts.—Mr. C. L. Burdick on "The Astograph Method of Distributing Colour." 8 p.m.  
Edinburgh Architectural Association.—Mr. W. Findlay on "Electric Lighting and Wiring." 8 p.m.  
Institution of Civil Engineers.—Students' visit to inspect the works in progress for the extension to Easton of the City and South London Railway. (Assemble at the site of the King's Cross Station, close to the Great Northern Hotel.) 2.30 p.m.

SATURDAY, DECEMBER 23.

Edinburgh Architectural Association.—Associate Annual Dinner.

#### PRICES CURRENT OF MATERIALS.

\* \* Our aim in this list is to give, as far as possible, the average price of materials, not specially the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.	£ s. d.
Hard Stocks.....	1 7 0 per 1000 alongside, in river.
Rough Stocks and	
Strainers.....	1 4 0 " " "
Facing Stocks.....	2 0 0 " " "
Shippers.....	2 0 0 " " "
Flations.....	1 5 6 " " at railway depôt.
Red Wire Cords.....	11 0 0 " " "
Best Fareham Red	3 12 0 " " "
Best Red Pressed	
Embon Facing.....	5 0 0 " " "
Best Blue Pressed	
Staffordshire.....	4 1 0 " " "
Do. Bullnose.....	4 6 6 " " "
Best Stourbridge	
Fire Bricks.....	3 15 6 " " "
GLAZED BRICKS.	
Best White and	
Ivory Glazed	
Stretchers.....	12 0 0 " " "
Headers.....	11 0 0 " " "
Quoins, Bullnose,	
and Flats.....	16 0 0 " " "
Double Stretchers	19 0 0 " " "
Double Headers.....	16 0 0 " " "
One Side and two	
Ends.....	19 0 0 " " "
Two Sides and one	
End.....	20 0 0 " " "
Slays.....	
Berrett, Squints.....	20 0 0 " " "
Best Dipped Salt	
Glazed Stretch-	
ers, and Header.....	12 0 0 " " "
Glazed Bullnose,	
and Flats.....	14 0 0 " " "
Double Stretchers	15 0 0 " " "
Double Headers.....	14 0 0 " " "
One Side and two	
Ends.....	15 0 0 " " "
Two Sides and one	
End.....	15 0 0 " " "
Slays.....	
ferred, Squints.....	14 0 0 " " "
Second Quality	
Glazed Stretch-	
ers, and Header.....	2 0 0 " " less than best.
Thames and Pit Sand.....	s. d.
Thames Ballast.....	5 3 " " "
Best Portland Cement.....	26 0 per ton.
Best Ground Blue Lias Lime 19 0 " " "	
NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.	
Grey Stone Lime.....	11s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at sty. dpt.	
STONE.	
BATH STONE—delivered on road wag- s. d.	
ons, Paddington Depôt.....	1 6½ per ft. cube.
Do. do. delivered on road wagons,	
Nine Elms Depôt.....	1 2½ " " "
PORTLAND STONE (20 ft. average)	
Brown White, delivered on road	
wagons, Paddington Depôt, Nine	
Elms Depôt, or Fimlico Wharf.....	2 1 " " "
White Bashed, delivered on road	
wagons, Paddington Depôt, Nine	
Elms Depôt, or Fimlico Wharf.....	2 2½ " " "
s. d.	
Anchester in blocks.....	1 10 per ft. cube, del. d. 1½ depôt.
Beor.....	1 6 " " "
Greenhall.....	1 10 " " "
Darley Dale in blocks.....	2 4 " " "
Red Corsehall.....	2 2 " " "
Cloesburn Red Freestones 2 0 " " "	
Red Maunsfield.....	2 4 " " "
YORK STONE—Robin Hood Quality.	
Scrapped random blocks 2 10 " " "	
6 in. sawn two sides land-	
ings to sizes (under	
40 ft. super).....	2 3 per ft. super.
6 in. rubbed two sides	
ditto, ditto.....	2 6 " " "
3 in. sawn two sides slabs	
(random sizes).....	0 11½ " " "
2 in. to 2½ in. sawn one	
side, ditto.....	0 11½ " " "
1½ in. to 2 in. ditto, ditto 0 6 " " "	

## STONE (continued).

Hard York—	6	At per standard.
Sampled random blocks, 3	0	per ft. cube, deld. rly. depôt.
6 in. sawn two sides land-	2	6 per ft. super., "
ing to sizes (under		
4 ft. super.)	3	0 "
6 in. rubbed two sides	3	0 "
ditto	3	0 "
3 in. sawn two sides slabs	1	2 "
(random sizes)	1	2 "
5 in. self-faced random	0	5 "
slabs	0	5 "

Hopton Wood (Hard Bed) in blocks	2	0	per ft. cube, deld.
" " " 6 in. sawn both	2	7	per ft. super. deld.
sides landings	2	7	per ft. super. deld.
" " " 3 in. sawn both	1	0	per ft. super. deld.
sides random	1	0	per ft. super. deld.
" " " 2 in. do.	0	84	per ft. super. deld.

## SLATES.

1 in. In.	2	s. d.
20x10 best blue Bangor	13	2
20x12 " "	13	7
20x10 first quality	13	0
20x12 " "	13	0
18x8 " "	7	5
20x10 best blue Port-	12	6
madoc	6	12
18x8 " "	6	12
20x10 best Eureka un-	15	17
fading green	15	17
20x12 " "	13	5
20x10 " "	13	5
18x8 " "	10	5
20x10 permanent green	11	12
18x10 " "	12	6
18x8 " "	6	12

## TILES.

Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz.
Best Browley tiles	50	0	per 1000
Do. Ornamental tiles	52	6	per doz.
Hip and Valley tiles	4	0	per doz.
Best Rainbow red, brown, or	57	6	per 1000
brindled do. (Edwards)	60	0	per doz.
Do. Ornamental do.	60	0	per doz.
Hip tiles	4	0	per doz.
Valley tiles	3	0	per doz.
Best Red or Mottled Stafford	51	9	per 1000
shire do. (Peakes)	54	6	per doz.
Do. Ornamental do.	54	6	per doz.
Hip tiles	4	0	per doz.
Valley tiles	3	0	per doz.
Best "Rosemary" brand	48	0	per 1000
plain tiles	50	0	per doz.
Do. Ornamental tiles	52	6	per doz.
Hip tiles	4	0	per doz.
Valley tiles	3	0	per doz.
Best "Hartshill" brand	47	6	per 1000
plain tiles, sand-faced	50	0	per doz.
Do. pressed	47	6	per doz.
Do. Ornamental do.	50	0	per doz.
Hip tiles	4	0	per doz.
Valley tiles	3	0	per doz.

## WOOD.

Building Wood.		At per standard.		
Deals: best 3 in. by 11 in. and 4 in.	13	10	0	s. d.
by 9 in. and 11 in.	13	0	0	15 0 0
Deals: best 3 in. by 7 in.	13	0	0	14 0 0
Battens: best 2 1/2 in. by 7 in. and				
8 in. and 3 in. by 7 in. and 8 in.	11	0	0	12 0 0
Battens: best 2 1/2 in. by 6 in. and 3 in.	10	0	0	less than
				7 in. and 8 in.
Deals: seconds	10	0	0	less than best.
Battens: seconds	10	0	0	0 0 0
Do. 3 in. by 4 in. and 2 in. by 6 in.	9	0	0	10 0 0
Do. 2 in. by 4 in. and 3 in. by 5 in.	8	0	0	9 10 0
Foreign Sawed Boards—				
1 in. and 1 1/2 in. by 7 in.	0	10	0	more than
battens.				battens.
3 in.	1	0	0	
Nimber: best middling Danzig	4	10	0	per load of 50 ft.
or Memel (average specification)	4	10	0	5 0 0
Seconds	4	0	0	4 10 0
Small timber (8 in. to 10 in.)	3	12	6	3 15 0
Small timber (6 in. to 8 in.)	3	0	0	3 10 0
Swedish balks	2	10	0	3 0 0
Pitch-pine timber (30 ft. average)	3	5	0	3 15 0

## JOISTS' WOOD.

White Sea: first yellow deals,	24	0	0	per 1000
3 in. by 11 in.	24	0	0	per 1000
3 in. by 9 in.	23	0	0	per 1000
Battens, 2 1/2 in. and 3 in. by 7 in.	16	10	0	per 1000
Second yellow deals, 3 in. by	18	10	0	per 1000
11 in.	18	10	0	per 1000
Battens, 2 1/2 in. and 3 in. by 7 in.	17	10	0	per 1000
Third yellow deals, 3 in. by 11 in.	13	10	0	per 1000
and 3 in.	13	10	0	per 1000
Battens, 2 1/2 in. and 3 in. by 7 in.	11	0	0	per 1000
Arboring: first yellow deals,	21	0	0	per 1000
3 in. by 11 in.	18	10	0	per 1000
Do. 3 in. by 9 in.	18	10	0	per 1000
Battens	13	10	0	per 1000
Second yellow deals, 3 in. by 11 in.	16	10	0	per 1000
Do. 3 in. by 9 in.	16	10	0	per 1000
Battens	11	0	0	per 1000
Third yellow deals, 3 in. by	13	10	0	per 1000
11 in.	13	10	0	per 1000
Do. 3 in. by 9 in.	13	10	0	per 1000
Battens	11	0	0	per 1000
Wharfedale and Petersburg				
First white deals, 3 in. by 11 in.	14	10	0	per 1000
Do. 3 in. by 9 in.	13	10	0	per 1000
Battens	11	0	0	per 1000
Second white deals, 3 in. by 11 in.	13	10	0	per 1000
Do. 3 in. by 9 in.	13	10	0	per 1000
Battens	11	0	0	per 1000
Pitch-pine deals	16	10	0	per 1000
Yellow-pine—first, regular sizes	44	0	0	per 1000
Odents	32	0	0	per 1000
Second regular sizes	33	0	0	per 1000
Yellow-pine—odents	28	0	0	per 1000
Kauri Planks, per ft. cube.	0	3	6	per 1000

## WOOD (continued).

JOISTERS' WOOD (continued).		At per standard.	
		£ s. d.	£ s. d.
Danish and Swedish Oak Logs—			
Large, per ft. cube	0	8	0
Small	0	2	6
Walnut Oak Logs, per ft. cube.	0	5	0
Dry Wainscot Oak, per ft. sup. as	0	5	0
inch.	0	0	8
3 in. do. do	0	0	7
Dry Mahogany—Honduras, Ta-			
baco, per ft. super. as inch	0	0	9
Selected, Figury, per ft. super.	0	1	6
as inch	0	1	6
Dry Walnut, American, per ft.			
super. as inch	0	10	0
Teak, per load	17	0	0
American Whitewood Planks,			
per ft. cube	0	4	0
Prepared Flooring, etc.			
1 in. by 7 in. yellow, planed and		Per square.	
shot	0	13	6
1 in. by 7 in. yellow, planed and			
matched	0	14	0
1 1/2 in. by 7 in. yellow, planed and			
matched	0	16	0
1 in. by 7 in. white, planed and			
matched	0	12	0
1 1/2 in. by 7 in. white, planed and			
matched	0	13	6
1 3/4 in. by 7 in. white, planed and			
matched	0	15	0
1 1/2 in. by 7 in. yellow, matched			
and beaded or V-jointed ribs	0	11	0
1 in. by 7 in.	0	10	0
1 in. by 7 in. white	0	11	0
1 in. by 7 in.	0	13	9
6 in. at 6d. to 8d. per square less than 7 in.			

## JOISTS, GIRDERS, &amp;c.

	In London, or delivered			
	Railway Vans, per ton			
Rolled Steel Joists, ordinary	£	s.	d.	...
sections	6	5	0	7 0 0
Compound Girders, ordinary	7	15	0	...
sections	7	15	0	8 15 0
Steel Compound Stanchions	9	7	6	10 17 6
Angles, Tees, and Channels, ordinary sections	7	15	0	8 15 0
Fitch Plates	8	0	0	8 10 0
Cast Iron Columns and Stanchions including ordinary patterns	6	17	6	8 0 0
	METALS.			
	Per ton in London			

## METALS.

Common Bars	8	0	0	8	10	0
Staffordshire Crown Bars, good	8	10	0	0	0	0
Merchant quality	8	10	0	0	0	0
Staffordshire "Marked Bars"	10	0	0	0	0	0
Mild Steel Bars	8	15	0	0	0	0
Hoop Iron, bass price	9	5	0	0	0	0
"Galvanised	17	0	0	0	0	0
(* And upwards, according to size and gauge.)						
Sheet Iron, Black	9	10	0	0	0	0
Ordinary sizes to 20 g.	9	10	0	0	0	0
" " 20 g.	10	10	0	0	0	0
" " 24 g.	12	0	0	0	0	0
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes, 6 ft. by 2 ft. to	14	0	0	0	0	0
3 ft. to 20 g.	14	0	0	0	0	0
Ordinary sizes to 20 g.	15	0	0	0	0	0
" " 20 g.	15	0	0	0	0	0
" " 24 g.	17	0	0	0	0	0
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	17	0	0	0	0	0
" " 20 g.	17	0	0	0	0	0
" " 24 g.	19	0	0	0	0	0
Galvanised Corrugated Sheet—						
Ordinary sizes to 20 g.	13	10	0	0	0	0
" " 20 g. and 24 g.	14	0	0	0	0	0
" " 24 g.	15	5	0	0	0	0
Best Soft Steel Sheets, 3 ft. by 2 ft.	11	10	0	0	0	0
to 4 ft. by 20 g. and thicker	12	10	0	0	0	0
Best Soft Steel Sheets, 22 g. & 24 g.	13	10	0	0	0	0
" " 22 g. and 24 g.	14	0	0	0	0	0
Cut Nails, 3 in. to 6 in.	9	10	0	0	15	0
(Under 3 in., usual trade extras.)						

## LEAD, &amp;c.

LEAD—Sheet, English, 3lb. and up.	20	0	0	..	s. d.
Pipe in coils	20	10	0	0	..
Soil pipe	23	0	0	0	..
Compo pipe	23	0	0	0	..
ZINC—Sheet—					
Vassilou Montagne	ton 33	0	0	0	..
Silesian	32	15	0	0	..
COPPER—					
Strong Sheet	per lb.	0	1	0	..
Thin	..	0	1	1	..
Copper nails	..	0	1	1	..
BRASS—					
Strong Sheet	..	0	0	11	..
Thin	..	0	1	1	..
Tin—English Ingots	..	0	1	6	..
SOLDER—Plumbers'	..	0	7	4	..
Timmen's	..	0	6	1	..
Blowpipe	..	0	10	1	..

## ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	24d.	per ft. delivered.
" fourths	24d.	"
21 oz. thirds	34d.	"
" fourths	34d.	"
26 oz. thirds	44d.	"
" fourths	44d.	"
32 oz. thirds	54d.	"
" fourths	54d.	"
Fluted Sheet, 15 oz.	34d.	"
" 21 oz.	44d.	"
4 Hartley's Rolled Plate	24d.	"
" 32	24d.	"
Figured and Oxford Rolled	4d.	"
Oceanic	51d.	"

## OILS, &amp;c.

Raw Linseed Oil in pipes	per gallon	0	1	8	s. d.
" " in barrels	per gallon	0	1	8	s. d.
" " in drums	per gallon	0	1	11	s. d.
Boiled " in pipes	per gallon	0	1	10	s. d.
" " in barrels	per gallon	0	1	11	s. d.
" " in drums	per gallon	0	2	10	s. d.
Turpentine in barrels	per gallon	0	4	0	s. d.
" in drums	per gallon	0	4	0	s. d.

## OILS, &amp;c. (continued).

Genuine Ground English White Lead	per ton	22	10	0	s. d.
Red Lead, Dry	per ton	21	0	0	s. d.
Best Linseed Oil Putty	per cwt.	0	8	6	s. d.
Stockholm Tar	per barrel	1	12	0	s. d.

## VARNISHES, &amp;c.

Fine Pale Oak Varnish	£ s. d.
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 18 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	0 10 0
Eggshell Flattening Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 10 0
Knott's	0 10 0
French and Brush Polish	0 10 0

## TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 20s. per annum.  
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## TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday. We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100c, unless in some exceptional cases and for special reasons.  
\* Denotes accepted. † Denotes provisionally accepted.

BEDFORD.—For 316 lineal yds. of 18-in. diameter pipe sewer, etc., in Elstow-road, for the Town Council, Mr. N. Greenhields, Borough Surveyor, Town Hall, Bedford.  
J. Jackson ..... £661 H. G. Willmot, Rush-  
F. Kay ..... 647 den\* 2626  
[Borough Engineer's estimate, 4227.]

BIRTLEY FELL.—For roads, footpaths, foundations, etc., for Smallpox Isolation Hospital, for Chester-le-Street Urban District Council. Mr. J. H. Mole, Surveyor, Chester-le-Street. Quantities by Surveyor:—  
E. R. Davison £666 0 0 J. Oakes ..... £535 0 0  
Thompson & Son 650 12 2 F. W. Jefferson ..... £21 0 0  
L. Dobling ..... 802 4 5 J. M. Wright ..... £18 10 8  
W. Arnell ..... 558 0 0 J. Lant ..... 494 10 0  
R. Bruce ..... 557 10 8 R. Thompson ..... £301 10 0  
E. & C. J. J. Burnett, Bir-  
Arundel ..... 547 12 6 y\* 419 4 0

BOLTON-UPON-DEARNE.—For private street works, Whitworth-street, Whitworth-street (continued), Elizabeth-street, and two back roads, for the Urban District Council:—  
C. Sprakes & J. Holmes &  
J. Brook ..... £975 0 0 Son ..... £548 10 1  
W. Son ..... 910 3 0 J. Moran, 51,  
S. Hamilton 655 10 0 Fitzwilliam  
W. Johnson 651 0 0 street, Shef-  
H. Ellison ..... 647 2 11 1/2 field\* 539 10 0  
G. Hall & Co. 575 3 7



## COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.	Designs to be delivered
*EXTENSION OF MUNICIPAL BUILDINGS	Birmingham Corporation	1054.	Mar. 31

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Penge.—Wood Paving, Anerley-road	Penge U.D.C.	H. W. Langdon, Surveyor, Town Hall, Anerley, S.E.	Dec. 10
Poundsbridge, etc., Fenchurch.—Post and Rail Fence	Sevenoaks R.D.C.	W. H. Bolt, Surveyor's Office, Leigh, Tonbridge	do.
Manchester.—One Group of 3 Transformers	Manchester Electricity Committee	F. E. Hughes, Electricity Department, Town Hall, Manchester	do.
Manchester.—Switchboards	do.	do.	do.
Salford.—Paving, etc., Twenty-nine Streets	Salford Corporation	Borough Engineer's Office, Town Hall, Salford	do.
Hertford.—Stoneware Pipe Surface, Water Drains	Hertford Corporation	J. H. Evans, Borough Surveyor, Hertford	do.
Bradford.—Painting	Bradford Corporation	City Surveyor, Town Hall, Bradford	do.
Yonge.—Classroom at Council School	Billericay Advisory Sub-Committee	F. Whitmore, County Architect, Duke-street, Chelmsford	do.
Landon.—Additions to Infants' Room, etc.	do.	do.	do.
Houghton-le-Spring.—Drainage at Workhouse	The Guardians	J. W. Holbrook, C.E., Houghton-le-Spring	Dec. 20
Halifax.—Stores	Halifax Gasworks Committee	J. Wilkinson, Engineer, Gasworks, Halifax	do.
Cardiff.—107 yds. of Brick Sewer in New-rd., Canton	Cardiff Corporation	Mr. Harpur, City Engineer, Cardiff	do.
Swinton.—Concreting Floor of Dining Hall at School	Manchester Guardians	A. J. Murgatroyd, Architect, 25, Strutt-st., Manchester	do.
Redditch.—1,417 yds. of Stoneware Pipe Sewer	Redditch R.D.C.	P. Perrins, Surveyor, Council House, Redditch	Dec. 21
Bradford.—Refracts, Firebricks, etc.	Bradford Corporation	Gas Engineer, Town Hall, Bradford	do.
Worthing.—Alterations to Stables, Worthing Lodge	The Corporation	F. Roberts, Borough Engineer and Surveyor, Worthing	do.
Annan, N.B.—Buildings and Walls	Merthyr Tydfil Education Comm.	J. Llewellyn Smith, Architect, Central Chambers, Merthyr Tydfil	Dec. 23
Penrith—Electricity—Mixed School for 200	Dublin Waterworks Committee	City Architect, Municipal Buildings, Cork Hill, Dublin	do.
Dublin.—Stm.-Heating, Plumbing, etc., Fire Brig. Sta.	Fenton U.D.C.	S. A. Goodall, Surveyor, Town Hall, Fenton, Staffs.	do.
Penton.—800 yds. of Fencing	Exmouth Gas Co.	J. T. Foster, Secretary, Exmouth	do.
Exmouth.—40 tons of c.i. Main Pipes	Manchester Tramways Committee	Hair & Buckhill, Architects, Southampton	Dec. 23
Southampton.—Alms, etc., to Moira House, above Bar	Messrs. H. Lyons & Co. Ltd.	Grime-Watts & Tulloch, Architects, 77A, Victoria-street, Belfast	do.
Manchester.—Permanent Way Points, Tongues, etc.	Slough Gas and Coke Co.	J. Harper Bakes, Architect, Calverley-chibbs., Victoria-sq., Leeds	Dec. 25
Sligo.—Warehouse Premises	do.	J. Witte, Architect, Elgin	do.
Clayton, near Bradford.—Sinking Borehole, etc.	do.	do.	do.
Slough.—Pipes	do.	do.	do.
Elgin.—New Lodge at Cemetery	Oxford Corporation	City Engineer's Office, Town Hall, Oxford	Dec. 27
Elgin.—Toolhouse, Walls, and Railings at Cemetery	Hemsworth R.D.C.	T. H. Richardson, Surveyor, Hemsworth, near Wakefield	do.
Elgin.—Laying-out Grounds and Road-Making	Salford Building & Bridges Comm.	C. S. Allott & Sons, Engineers, 46, Brown-street, Manchester	do.
Elgin.—Water Supply at Cemetery	Leigh U.D.C.	W. J. Petch, Surveyor, Council Offices, Leigh	do.
Oxford.—Stores	Merthyr Tydfil Forward Movement	A. Marks, Architect and Surveyor, Glebe-lane-street, Merthyr	do.
Hemsworth.—Reconstruction of Two Bridges	The Corporation	G. H. Hanby, Borough Engineer, Town Hall, Lowestoft	do.
Leigh-on-Sea.—Making-up Streets	Rochdale Canal Co.	C. R. Dykes, 80, Dale-street, Manchester	Dec. 28
Pontmorris, Merthyr.—Hall, Vestries, etc.	Commissioners of H.M. Works, etc.	The Postmaster, Carmarthen	Dec. 29
Lowestoft.—Mortuary on South Quay	The Corporation	E. H. Bright, Engineer, Dodd's Hall, Braintree	Dec. 29
Rochdale.—Stores	Southampton County Council	County Surveyor, The Castle, Winchester	Jan. 1
*NEW POST-OFFICE, CARMARTHEN	Chelmsford Guardians	W. W. Durnell, 96, High-street, Chelmsford	do.
Preston.—School in Robuck-street	Widnes Corporation	Isaac Carr, Engineer, Widnes	Jan. 2
Bocking, near Braintree.—Sinking Borehole, etc.	Leyton U.D.C.	W. Dawson, Surveyor, Town Hall, Leyton	do.
*SMALL BRIDGE WITH APPECHS., BISHOPSTOCKE	Lambeth Guardians	Guardians' Offices, Brook-street, Kennington-road, S.E.	do.
Chelmsford.—100 Tons of Rough Granite	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	Jan. 4
Abbeyleigh.—Tower and Spire at Church	Totnes R.D.C.	S. S. Rendle, Highway Surveyor, Hilsdale, Marlton-road, Paigton	do.
Widnes.—Brick and Puddle Gasholder Tank	The Corporation	W. A. Vignoles, Boro' Electrical Engineer, Elec. Works, Grimsby	Jan. 5
Leyton.—Street Works	Carmarthenshire Education Com.	W. D. Jenkins, County Educational Architect, Shire Hall, Carmarthen	do.
*HOT-WATER, ETC., BROOK-ST. INF. LAUN.	do.	do.	do.
*NEW SORTING OFFICE AT FOREST HILL	do.	do.	do.
Totnes.—Fencing	do.	do.	do.
Grimsbv.—Electrical Plant	do.	do.	do.
Llandilo.—Additions & Alterations to Council School	Manchester Education Committee	Education Offices, Deansgate, Manchester	Jan. 6
Brynddu.—Additions & Alterations to Council School	Littlstone-on-Sea Water Co.	A. F. Phillips, Engineer, 38, Parliament-street, S.W.	Jan. 8
Brynamum.—Heating Apparatus, etc., Council Sch.	Freembridge Lynn Guardians	L. F. Engleton, Architect, King-street, King's Lynn	do.
Hillfield.—Ventila. & Fold. Partitions to Council Sch.	do.	do.	do.
*SCHOOL, ARDWICK	Wandsworth Borough Council	Council House, Wandsworth, S.W.	Jan. 9
*WATER-TOWER IN BRICKWORK	Clutton Guardians	W. F. Bird, Architect, Midsomer Norton, Somerset	do.
Gayton.—Drainage and Water Supply at Workhouse	do.	do.	do.
*WORKS AND MATERIALS	Crown Agent for Colonies	Crown Agent, Whitehall Gardens, S.W.	do.
Clutton.—New Vaerant Works	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	do.
Timber for Central South African Railways	Southsea Clarence Pier Co.	A. H. Bone, Engineer, 148, High-street, Portsmouth	Jan. 1
*BOARD OF TRADE, ETC., OFFICES, RUNDLAND	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.	do.
*EXTENSION OF PIER	LANCASTER CORPORATION	E. W. Mountford, Architect, 17, Buckingham-street, W.C.	Jan.
WRE GUARDS, ETC., RAILWAY ASSY, SUTTON	Tewkesbury R.D.C.	H. A. Radham, Clerk, Tewkesbury	No do.
NEW TOWN HALL, LANCASTER	do.	G. W. Barrett, Architect, Chester-road, Lichfield	No do.
Ashchurch.—Sewage Disposal Works	do.	W. H. Scott, Architect, Victoria-chambers, 18, Queen-street, Cardiff	do.
Lichfield.—Six Villas at Cherry Orchard	do.	W. G. Lower, Surveyor to Trustees, 12A, High-street, Guildford	do.
Cardiff.—Forward Movement Hall and Home	Essex Education Committee	Office of the District Committee, 44, Eastern-road, Romford	do.
Guildford.—40 ft. Road, Harvey Hill to Powley Hill	do.	do.	do.
*ADDS, HORNBURCH P.K.-LA. SCHS., ROMF.	do.	do.	do.

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be in
*ASSISTANT INSTRUCTORS OF WOODWORK	London C.C.	100l. per annum	10. 28
*HEAD MASTER	Leeds Education Committee	200l.	10. 31
*CLERK OF WORKS	Bucks Education Committee	Not stated	do.

Those marked with an asterisk (\*) are advertised in this number.

Competitions, IV.

Contracts, IV. VI, VII, X.

Public Appointments, XVI, XVII.

TENDERS.—Continued from page 657.

LOWLEY (Middlesex).—For new road and surface-water drains for the Rural District Council, Mr. Edmund Birks, Engineer and Surveyor, Town Hall, Uxbridge.			
Thomas & Sons	£1,049 0 0	W. S. Gibb	£748 19 9
T. Watson	838 4 8	S. T. Gibb	738 9 2
John & Sons	810 0 0	L. A. G. G. & Sons	729 0 0
J. C. Truman	796 0 0	Hardy & Sons	724 11 6
McGregor & Crook	781 12 0	T. Free & Sons	
		Maidenhall	

CROYDON.—For the erection of a school for 1,256 children, Winterbourne-road, Thornton Heath, for the Education Committee of the Croydon County Council, Mr. H. Carter Pegz, architect, of Thornton Heath. Quantities by Mr. F. Downing, Middle Temple, E.C.4.			
Strling	£21,128 3 6	Martin Wells	£18,570 0 0
C. Wall, Ltd.	20,294 0 0	Co., Ltd.	18,570 0 0
Marricott & Co.	20,050 0 0	Kerridge & Co.	18,528 0 0
G. Everett	19,990 0 0	J. & M. Patrick	18,409 0 0
Bell & Co.	19,912 0 0	F. G. Minter	18,334 0 0
Down & Sons	19,820 0 0	G. & S. Enderby	18,280 0 0
Dun & Co.	19,797 0 0	Smith & Sons	17,983 0 0
Grice & Marsh	19,705 0 0	S. P. S. P. & Co.	
J. Jones & Co.	19,641 0 0	Cann & Co.	17,848 0 0
Andrew & Co.	19,325 0 0	Wallis & Sons	17,760 0 0
Shebourne & Co.	19,300 0 0	B. E. Nightingale	17,753 0 0
Willcock & Co.	19,250 0 0	Smith & Co.	17,753 0 0
H. Kent	19,220 0 0	G. & S. Enderby	17,753 0 0
Norman & Burt	19,189 0 0	Bros.	17,400 0 0
Johnson & Co.	19,171 0 0	A. Faulks	17,288 0 0
Co. Building	19,171 0 0	Lawrence & Sons	16,994 0 0
Co.	19,085 0 0	Cook & Sons	16,930 0 0
Smith & Sons	18,888 0 0	Hudson & Co.	16,877 6 6
W. & A. G. & Co.	18,888 0 0	Ltd., Loughborough	16,790 0 0
Dickens & Co.	18,888 0 0		
Dewley & Co.	18,880 0 0		

DORKING.—For constructing 250 yds. of 9-in. stone-water pipe sewer for the Urban District Council, Mr. R. Somers Mathews, Surveyor, 64, South-street, Dorking.			
H. Kent	£251 14 0	Smith & Co.	£185 0 0
Redhouse	216 2 0	J. May	180 0 0
A. Atkins	202 5 0	Deaves, Ball & Co.	183 0 0
A. G. & Co.	199 13 2	Dan & Co., Ltd.	
W. W. Trimm	189 9 0	High Holborn	147 0 0
W. Swaker	189 19 9		

[Surveyor's estimate, £200.]

EASINGWOLD (Yorks).—For 400 lineal yds. of 12-in. drainage sewers, etc., for the Rural District Council, Messrs. Fairbank & Son, engineers, Lendal-chambers, York.			
Shofield, Sons & Co., Ltd., Kirkstall-road, Leeds	£246 9 2		

ENFIELD.—For new post-office.			
W. Pavey & Son	£5,725 0 0	Speachley & Co.	£4,395 0 0
T. Thomas	5,223 0 0	Smith	4,395 0 0
J. & W. H.	5,223 0 0	Smith	4,395 0 0
Patman	5,185 0 0	Son	4,384 0 0
F. & A. Willmott	4,984 0 0	Press, Robinson	
J. G. Jones	4,711 11 0	& Co.	4,346 0 0
Rowley Bros.	4,576 0 0	A. Monk	4,312 0 0
Thomas & Edge	4,567 0 0	J. Jarvis & Sons	4,300 0 0
J. H. Patrick	4,499 0 0	Almond & Son	
Parsons	4,487 0 0	Ltd.	4,187 0 0
Robard & Brand	4,438 0 0	Medway	4,170 0 0
J. B. Nightingale	4,429 0 0	Allen, Fairhead	
J. Cricknell	4,422 0 0	W. H. Hydes	4,159 0 0
		W. H. Hydes	4,062 0 0

ERITH (Kent).—For 3,000 yds. super. of cement mortar flag paving, for the Urban District Council.			
		Per super. yd.	

Bartholomew, etc., Co., Ltd.	£1,162 10 0		
Imperial Stone Co., Ltd.	760 0 0		
Excelsior Patent Stone Co., Ltd.	762 10 0		
Adamant Stone, etc., Co., Ltd.	712 10 0		
Abel & Cannell	712 10 0		
Granite Flag Co., Ltd.	712 10 0		
Shane Granite, etc., Co.	700 0 0		
Shane & Sons, Ltd.	700 0 0		
Crompt Granite, etc., Co.	700 0 0		
Empire Stone Co.	700 0 0		
Patent Maintenance, etc., Co.	687 10 0		
Patent Victoria Stone Co.	675 0 0		
J. R. White & Co.	675 0 0		
Allan Stone Co., Ltd.	655 0 0		
Edison & Co.	650 0 0		
Gibbs Bros.	637 10 0		
Gamble Wood (Gibbs & Co.)	631 5 0		
A. Walker & Son	611 11 0		

GRAVE.—For 135 tons of scoria bricks, for the Urban District Council, Mr. A. C. James, surveyor, High-street, Grays.			
		per ton.	

Wiskorie Brick Co., Co., Ltd.	20s. and 21s.		
Nicholls & Co., 16, Water-lane, E.C.	18s. 3d. and 20s. 3d.		

GRAVE.—For 550 lineal yds. of 9-in. and 18-in. lineal of 6-in. stone-water pipe, for the Urban District Council, Mr. A. C. James, surveyor, High-street, Grays.			
Albion Clay Co., Woodville—9-in. pipes, 1s. 4d. per yd., 6-in. pipes, 9d. per yd.; junctions, 2s. each. Less 24 cent.			

GUILDFOED.—For forming about 1,100 ft. of road on Woodbridge Estate, Messrs. Houston & Houston, surveyors, 148, High-street, Guildford.			
W. & F. Forbes	£1,607 0 0	S. Kavanagh	£1,525 0 0
M. & S. White	1,689 0 0	J. May	1,500 0 0
W. & F. Forbes	1,689 0 0	A. & S. Streeter	
Son & Sons	1,644 16 10	G. A. Francis	1,477 18 9
Smith & Sons	1,630 17 3	S. Edwards	1,473 0 0
W. & F. Forbes	1,607 0 0	Co., London	1,430 0 0
J. & W. B. Bubb	1,554 0 0		

HAMPTON.—For erecting a fire station at Hampton Hill, for the Urban District Council, Mr. S. H. Chambers, Surveyor, Public Offices, Hampton, Middlesex.			
J. & W. Drako	£525 0 0	J. Singleton	
Condon & Co.	510 0 0	Sons	£438 0 0
Cunningham & Co.	493 0 0	J. Wright & Sons	410 0 0
W. Shepherd	450 0 0	F. Smith	394 0 0
E. Potterton	445 0 0	H. J. Budd, 14, Bedford-road, Kingston-on-Thames	342 0 0
J. Barker & Co.	438 0 0		
Farrington & Read	438 17 8		

HANLEY.—For constructing four settling tanks 2,000,000 gallons total capacity, for the Corporation.			
G. Baker & Co.	£28,299 11 2	Sons	£12,995 0 0
T. A. Macdonald	19,348 0 0	0	12,988 12 0
B. A. I. & Co.	16,715 0 0	0	12,948 0 0
Robinson	16,715 0 0	0	12,948 0 0
A. Graham	16,135 0 0	0	12,866 0 0
R. H. B.	15,901 0 0	0	12,829 18 4
N. A. I.	14,143 18 7	0	12,719 16 11
F. Mitchell	13,233 11 0	0	12,556 0 0
& Smart	14,860 4 6	0	12,446 8 7
Thompson	14,249 7 6	0	12,443 11 2
G. G. Rayner	14,143 18 7	0	12,150 0 0
E. Boon	14,146 4 8	0	11,854 17 1
Muirhead & Craig	13,750 0 0	0	11,697 17 0
Matthews	13,750 0 0	0	11,657 0 0
O. Wright	13,607 13 4	0	11,585 11 9
Lawrence & Sons	13,444 5 10	0	11,566 0 0
H. E. Buckley	13,358 4 4	0	11,500 0 0
W. & A. G. & Co.	13,306 12 4	0	11,449 6 5
G. F. Tomlinson	13,223 0 0	0	11,100 0 0
A. Smith	13,223 0 0	0	10,868 0 0
Wait & Co.	13,208 8 0	0	10,619 0 0
Co., Ltd.	13,068 15 5	0	

Resolved.—That the tender of Mr. Thomas Godwin for the construction of sewage tanks and other works for the sewage works, amounting to £10,693, be accepted.

HARROGATE.—For Harrogate Post-office enlargement.			
F. Shepherd	£2,115 5 0		£22 0 0
R. & S. Ltd.	2,080 0 0		25 0 0
W. Nicholson & Son	1,889 2 8		12 0 6
I. Gould, Ltd.	1,800 0 0		8 7 8
Oak Building Co.	1,817 0 0		45 0 0
Stott & Alcock	1,785 0 0		25 0 0
W. Pearce	1,705 0 0		13 0 0
D. H. & Son	1,657 0 0		28 10 0
Barker Bros.	1,541 6 6		

IFLEY.—For sewerage, etc., works, for the Headington Rural District Council, Mr. H. H. Humphreys, engineer, 28, Victoria-street, Westminster. Quantities by engineer.			
P. E. Cousins	£2,693 10 8	S. West	£1,785 10 11
G. Henson	2,411 16 8	G. G. Rayner	1,780 0 0
T. Free & Co.	2,043 19 6	I. H. Macdonald	1,709 12 8
L. A. G. & Co.	2,010 0 0	D. Davies, Hall & Co.	
Johnson	2,010 0 0	Sheerness	1,540 15 2

LEE.—For roadworks, part of Micheldover-road, Lee, for Lewisham Borough Council.			
Fry Bros., Greenwich	£508 0 0		

Harvey Bros., 25, Victoria-street, S.W.	194 11 8		
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LONDON EDUCATION COMMITTEE TENDERS.			
Bermansley, "The Chaucer" (Partition).			
J. Appleby & Sons	£143	J. Marshall & Sons	£117
J. H. Ford	129	Galbraith Bros.	112
W. J. Coleman & Co.	127	Holliday & Greenwood	108
W. Downs	124	Ltd.	
W. V. Goad	120	T. D. Long, Caxton-street, Deptford	98
J. G. Chalkley	120	Works, Evelyn-street, Deptford	
W. H. Lascelles & Co.	118		

Bermansley, Page's-walk (Division of rooms).			
H. Bonneau	£252 10 0	Holliday & Greenwood, Ltd.	£223 0 0
W. J. Coleman & Co.	250 0 0	R. Johnson	221 0 0
W. Downs	242 0 0	Galbraith Bros.	210 0 0
J. Appleby & Sons	237 0 0	T. D. Long	205 0 0
W. H. Lascelles & Co.	229 0 0	J. C. Chalkley	201 0 0
J. Marshall & Sons	228 0 0	K. Whitehead & Co., Ltd., Port-land-place North, Clapham-road	198 0 0

Behnd Green, S.W., Virginia-road (Provision of Head Master's Room).			
J. Stewart	£75 0 0	Vigor & Co.	£63 0 0
Parrott & Isom	69 0 0	J. T. Robey	62 0 0
W. H. Lascelles & Co.	68 0 0	Stevens Bros.	58 10 0
Barrett & Power	65 0 0	H. Lins, 81, Peckham-road	55 0 0
G. Barker	64 12 6		
Bone and Bromley, Alley-road (Timber store).			
H. Groves	£275 0 0	F. & F. J. Wood	£268 0 0
Staines & Son	74 0 0	G. Barker	67 12 4
J. T. Robey	74 0 0	A. E. Symes	66 10 0
A. E. Symes	71 0 0	King-street, Poplar	66 10 0
Stevens Bros.	68 10 0		

City of London, Gravel-lane (Covered Playground).

Parrott & Isom	£179 0 0	Stevens Bros.	£149 0 0
W. H. Lascelles & Co.	160 0 0	Barrett & Power	145 0 0
G. Barker	157 12 2	Belcher & Co.	143 0 0
Staines & Son	157 0 0	H. Lins, 81, Peckham-road	119 0 0
G. Munday & Sons	153 0 0		

Hackney, N., Wordsworth-road (Alterations).			
E. Lawrence & Co.	£230 0 0	H. Bonneau	£198 0 0
G. S. & Williams	211 0 0	McComick & Sons	195 0 0
& Son	210 0 0	J. Grover & Son	193 0 0
C. R. Price	209 15 0	W. H. Lascelles & Co.	193 0 0
J. Stewart	207 0 0	Co., 121, Bunhill-row	
Barrett & Power	207 0 0		

Hackney, S. (Homerton Residential School for Mentally Defective Deaf Children).			
C. R. Price	£155 10 0	J. Grover & Son	£127 0 0
J. Stewart	148 0 0	W. Lawrence & Co.	123 10 0
L. H. & R. Roberts	148 0 0	Stevens Bros., 1A, Long-pk., Seven Sisters-road	102 0 0
E. Lawrence & Co.	145 0 0		
G. S. & Williams	134 0 0		

Lewisham, Holbeach-road (School for Physically Defective Children).			
Kirk & Randall	£349 0 0	H. Groves	£215 0 0
H. Bragg & Sons	311 0 0	Grace & Marsh	205 0 0
W. Akers & Co.	259 0 0	J. & C. Bowyer	197 10 0
H. Leney & Son	245 0 0	Enders Bros.	192 0 0
T. D. Long	232 0 0	Enith, Kent	

Poplar, Bromley-hall-road (Altering stepped flooring, etc.).			
E. Lawrence & Co.	£215 0 0	A. E. Symes	£161 0 0
Vigor & Co.	198 0 0	Stevens Bros., 1A, Yonge-park, Seven Sisters-road	157 0 0
G. Munday & Sons	180 0 0		
W. Martin	173 0 0		
A. Porter	172 10 0		
H. Bonneau	172 10 0		

St. Pancras, N., Rhyll-street (Roofing over Fines-court).			
Parrott & Isom	£120 0 0	W. H. Lascelles	£92 10 0
Barrett & Power	102 0 0	Belcher & Co.	77 15 0
G. Barker	91 0 0	H. Lins, 81, Peckham-road	77 0 0
Stevens Bros.	91 0 0	Peckham-rye	
G. Munday & Son	85 0 0		

Stepney, Trafalgar-square (Additional Erit).			
Parrott & Isom	£161 13 0	T. T. Robey	£151 0 0
Vigor & Co.	150 0 0	A. E. Symes, Carpan	150 0 0
W. H. Lascelles & Co.	150 0 0	ter-road, Stratford	146 0 0
Turnbull & Son	147 0 0		

Woolwich, Powis-street (Special School).			
W. Harris	£432 0 0	H. Groves	£356 0 0
Thomas & Edge	427 0 0	H. Lins	333 0 0
E. P. Bulled & Co.	399 0 0	Ennes Bros., Erith	274 0 0
Vigor & Co.	365 0 0	Kent	
Kirk & Randall	363 0 0		

Greenwich, Hughes-fields (Heating).			
Wippell, Bros., A Row	£139 10 0	W. H. Lascelles	£109 18 0
Paragon Heating	135 0 0	Palmer & Sons	109 0 0
Stevens Bros.	132 10 0	Co., Ltd.	103 10 0
G. Davis	120 18 0	W. G. Cannon & Sons	100 0 0
Brightdale Foundry & Engineering Co., Ltd.	119 0 0	London-road, South-wark	95 0 0
J. Grundy	117 0 0		

G. Davis	£120 10	J. Defries & Sons,	
W. G. Cannon &		Ltd. ....	£74 0
Sons	118 0	J. Yettton & Co.,	73 10
G. & E. Bradley,	89 10	Wenham & Waters,	
Stevens & Sons,	87 0	Ltd., Paragon	
Palowkar & Sons	79 0	Works, Croydon*	69 5
Brightside Foundry			
and Engineering			
Co., Ltd.	75 10		
(Greenwich, London-road (Heating))			



**LONDON.**—For new boiler-house and other work at the Anglo-American Laundry, Lower Tooting. Mr. S. J. Reynolds, engineer, Reigate. (Quantities by Mr. J. Kennard, Croydon.)  
 Jocelyne & Young £1,308  
 Hanscombe & Smith 1,394  
 D. W. Barker 1,844  
 A. Kers & Co., Ltd. 1,337  
 W. Taylor & Co. 1,283  
 W. Johnson & Co., Ltd. £1,283  
 J. C. Richards & Co. 1,275  
 W. & C. Brown, Earlsfield\* 1,230

**LONDON.**—For hydrants, for the London County Council:—

	Price for a complete single hydrant.	Price for a complete double hydrant.
	£ s. d.	£ s. d.
A. L. Thomas & Sons, Ltd. ....	4 15 0	9 10 0
Highton & Co. ....	4 4 6	7 17 0
Glentfield & Kennedy, Ltd. ....	3 12 9	6 15 6
Parsons & Wills. ....	3 0 0	6 15 0
Railway & General Engineering Co., Ltd. ....	3 0 0	6 0 0
T. Lister & Co., Brassfounders Ltd. ....	2 7 0	4 16 6
G. Napier & Sons, Ltd. ....	2 0 8	4 4 6
J. Blackborough & Sons ....	1 17 6	4 0 0
Ham, Baker, & Co., Ltd., 13 Grosvenor-road, S.W.* ....	1 17 0	3 15 0

**LONDON.**—For the supply of conductor tee-rails, for the London County Council:—  
 Steel, Peck, & Tozer, Ltd. .... £9,050 0  
 P. & W. MacLellan, Ltd. .... 8,612 10  
 Bolckow, Vaughan, & Co., Ltd. .... 8,530 0  
 Frodingham Iron and Steel Co., Ltd., Frodingham, near Doncaster\* .... 8,250 0

**LONDON.**—For the erection of Poplar car-shed, for the London County Council:—

C. Yates & Co. £39,994 0 0	T. Rowbotham £32,197 0 0
F. & G. Foster 39,100 0 0	G. Munday & Sons 31,665 0 0
H. Kent. .... 39,120 0 0	A. Faulks 35,836 2 7
A. Faulks 35,836 2 7	Kirk & Randall 35,837 0 0
W. H. Hyde. .... 35,556 0 0	Martin, Wells, & Co., Ltd. 34,400 0 0
Perry & Co. .... 33,875 0 0	F. & H. Higgs 32,750 0 0
J. Shelbourne & Co. .... 32,437 0 0	Rowley Bros. 32,349 0 0
H. H. Higgs & Greenwood, Ltd. .... 32,333 0 0	F. & E. Thorne 32,200 0 0

[The architect's estimate comparable with the tenders is £29,600.]

**LONDON.**—For reconstruction of Denmark-hill bridge, for the London County Council:—

W. Moss & Son, Ltd. ....	£7,999 12 0
J. Strachan ....	6,400 0 0
Pedrette & Co. ....	6,216 9 0
Westminster Construction Co., Ltd. ....	5,668 14 10
A. Thorne ....	5,594 18 7
Hennan & Froude, Ltd. ....	5,366 16 2
J. Jackson & Co. ....	5,334 9 0
S. Kavanagh & Co. ....	4,265 16 9
Wilkinson Bros. ....	5,223 0 0
Tilbury Contracting and Dredging Co., Ltd. ....	5,059 19 9
G. Hay & Co. ....	5,029 9 2
Muirhead, Greig, & Matthews ....	5,010 2 4
A. Fassey & Son, London* ....	4,961 5 0
H. Woodham & Son ....	4,369 14 4
Johnson & Langleyton ....	4,868 5 0

NEW MALDEN.—For the making up of Albemarle-gardens, for Mr. Thomas B. Simmons, Engineer and Surveyor, New Malden, Surrey.  
 S. Atkins .... £730 5 0  
 Harris & Co. .... £585 0 0  
 Shebourne & Co. 640 0 0  
 R. W. Swaker .. 634 0 0  
 Cunningham & Forbes, & Co. .... 632 1 3  
 Kavanagh & Co. 577 0 0  
 T. Free & Son, Maidstone\* .. 573 5 7  
 Streeter & Co. .... 479 0 0

**POTTERS BAR.**—For road improvements for South Mimms Rural District Council. Mr. W. H. Mansbridge, Surveyor, 40, High-street, Barnet. No quantities.

Grounds & Co. £1,068 10 0	Worboys. .... £700 0 0
Ford .... 821 0 0	Rayner .... 668 0 0
Mann .... 821 18	Tudor .... 637 3 7
Adams .... 820 0 0	Davies .... 531 18 0
Bell .... 813 0 0	Wheeler* .... 496 10 0
Killingback .. 701 0 0	

**PLYMOUTH.**—For erecting a police and fire station at Prince's Rock, for the Corporation. Mr. James Paton, Borough Engineer and Surveyor, Plymouth.  
 W. A. K. H. M. .... £1,985 0 0  
 H. J. Allen .. 1,918 18 0  
 W. B. Blake. .... 1,918 0 0  
 W. E. Bennett 1,017 0 0  
 F. J. Stanbury 1,872 14 0  
 A. Andrews .. 1,777 0 0  
 Steer & Pearce £1,780 16 3  
 A. C. Jones .. 1,705 0 0  
 S. Roberts .. 1,699 17 7  
 Pearce Bros. .... 1,668 18 0  
 A. N. Coles. .... New Town  
 Chas. Plymonth\* .. 1,618 0 0  
 [Engineer's estimate, £1,705.]

**SLEAFORD.**—For a waterwheel and pump, for the Urban District Council. Mr. Jesse Clare, Surveyor, Sleaford:—

A. Dodman & Co. ....	£454 0 0
Wakes & Lamb ....	297 10 0
J. Wolstenholme & Son ....	254 15 0
A. Mather & Son ....	237 0 0
Rayward, Tyler, & Co. ....	199 11 0
Goddard & Massey ....	185 5 6
W. Antrobus ....	174 7 8
J. W. Grimsey & Co. ....	161 8 6
G. Gilkes & Co., Kendal. ....	156 8 6

**SWINESHEAD.**—For decorating and general repairs at Park House, Swineshead, near Boston, Lincs., for Mr. A. J. Solo, Messrs. J. G. Stallebrass & Sons, architects and surveyors, North-street, Peterborough. Quantities by architects:—

F. Mawer. .... £401 0 0	Copper & Son .. £335 0 0
Barron & Co. .... 413 0 0	G. T. Shearnan 333 16 0
F. Nichols .... 397 15 0	E. English, Sparrow & Son 374 0 0
D. Mackears .... 383 0 0	C. Illett .. 240 10 0
H. Pattinson .... 380 9 4	W. Brumfit .. 151 4 0
W. Read .... 352 0 0	R. Bradley .. 135 0 0
T. Long .... 349 0 0	

**THORNTON.**—For erecting two through houses at Mountain, Thornton, Messrs. John Drake & Son, architects, Queensbury. Quantities by architects:—

Mason: W. Drake, Queensbury ....	£375 10 0
Joiners: J. Banstow & Son, Queensbury ....	126 0 0
Slater: A. Blakbrough, Bradshaw ....	21 0 0
Plasterers: Mudd & Siddall, Thornton ....	33 3 4
Plumber: W. Roddick, Queensbury ....	83 10 0
Painter: J. Varley & Son, Thornton ....	14 17 0

**WATERING.**—For erecting two villas. Mr. John Mutton, architect, Charlton-st., St. Austell:—  
 J. Bunt, St. Austell .... £390 0 0

**WHADDON.**—For rebuilding Whaddon Vicarage, near Roston. Mr. W. Milner Fawcett, M.A., architect, Cambridge:—  
 Taylor .... £1,600  
 Gimson .... 1,624  
 Jacklin .... £1,480  
 Wade, S. Neots\* .. 1,452

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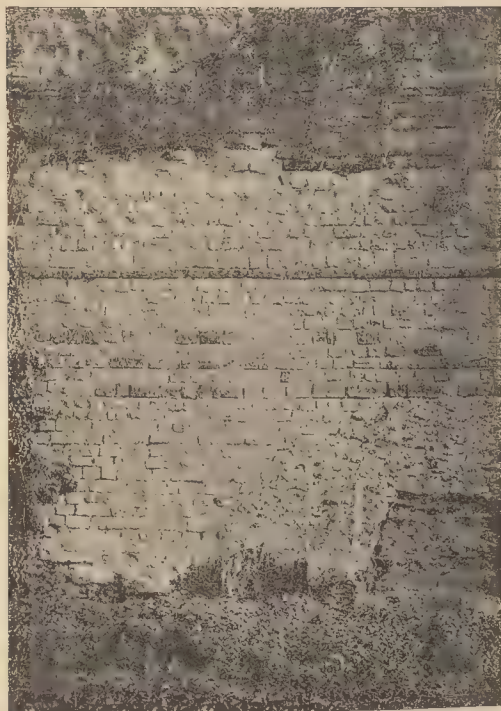
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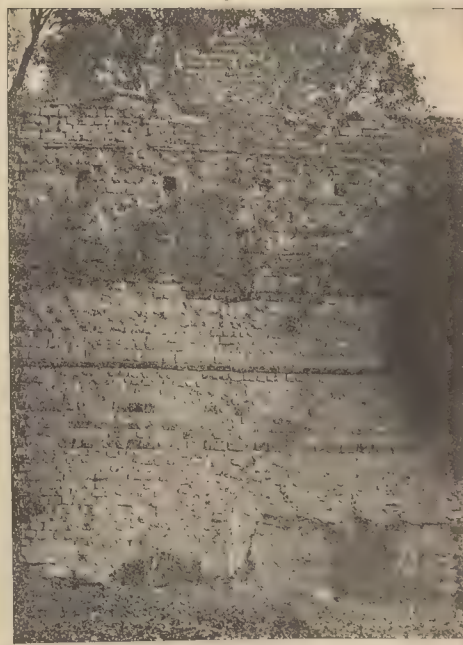
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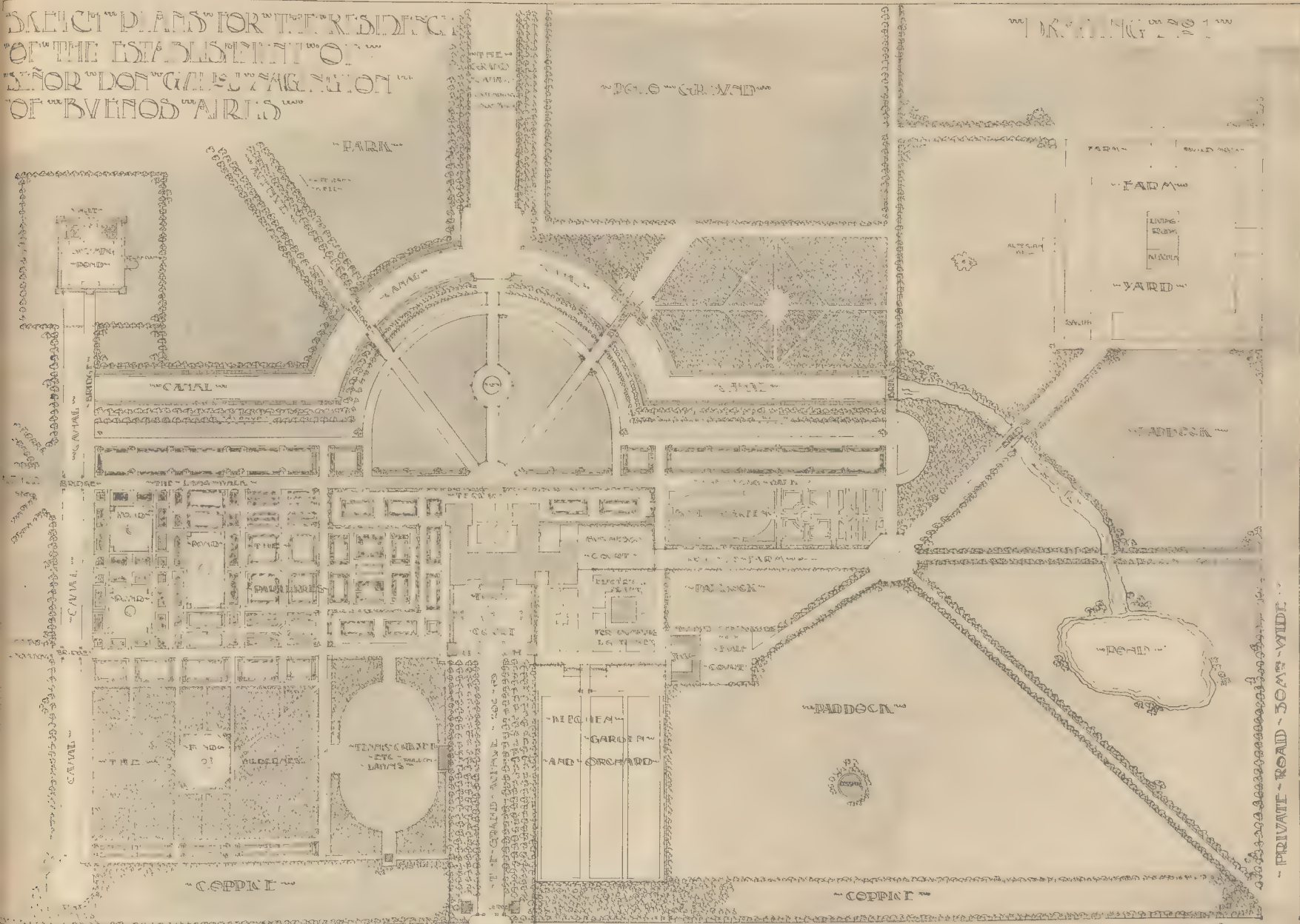


General description  
of the  
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Leonard Hargrave  
Architect  
March 1905





# The Builder.

VOL. LXXXIX.—No. 3281.

DECEMBER 25, 1905.

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All Hallows, Lombard-street: Measured Drawings.....By Mr. W. S. George and Mr. G. R. Woolway.

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### The Lesson of the Charing Cross Accident.



THE startling disaster at Charing Cross has raised the question among engineers as to the continued safety of iron structures dating from the middle of last century, and awakened the doubt sleeping in the mind of many an architect whether iron and steel ought to be regarded as permanently trustworthy materials of construction.

The two points are connected to some extent, although the conditions under which the materials are employed are very different. Iron members incorporated in a bridge or roof are fully exposed to climatic influences, except for the more or less inefficient protection afforded by a thin layer of paint. They can be inspected and replaced as occasion demands, and so the life of an engineering structure, whether of cast-iron, wrought-iron, or mild steel, may be extended almost indefinitely. In justification of this statement we may point to the cast-iron arch at Ironbridge, now more than a century and a quarter old; the Menai Suspension bridge, with the respectable age of eighty-five years; the High-Level bridge at Newcastle, and the Britannia bridge across the Menai Straits, both in their sixtieth year; to the Crystal Palace, more than fifty years old, and to many other historic iron structures still enjoying a green and vigorous old

age. The periodical failure of bridges and the occasional collapse of other engineering structures in the United States can be disregarded, because in one case the reason is inadequate strength for loads not contemplated by the original designers, and in the other risky design or faulty workmanship.

What may happen some day to buildings which rely for strength upon embedded iron and steel columns and joists, no one would like to predict with certainty. When iron has been buried in brick walls it cannot be examined, repainted, or replaced like the members of a purely metallic structure. Brick masonry is by no means impervious to moisture, and it is not unreasonable to suppose that corrosion goes on to a very considerable extent in the metal concealed. We certainly believe architects would be wise to insist upon the protection of iron and steel members so incorporated in their buildings by something more durable than a mere coat of paint. This question, however, does not precisely arise out of the Charing Cross roof collapse, and what little connexion it might otherwise have with that disaster is largely destroyed by the fact that Charing Cross roof is of wrought-iron, manufactured and worked in accordance with practice long since superseded by the improved methods now employed for the preparation of structural steel girders, joists, and other members used in architectural practice.

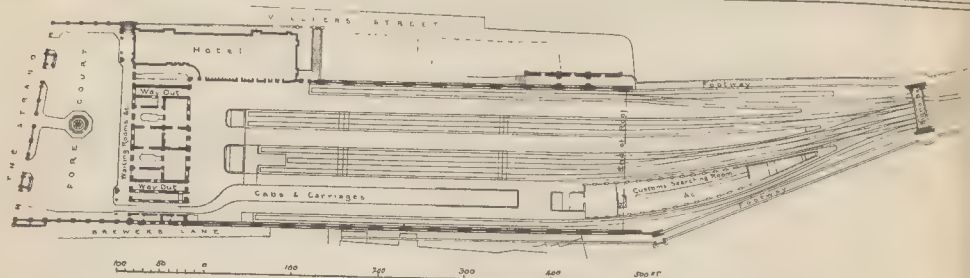
Consequently, the object lesson of Charing Cross applies only in a limited way to ordinary building construction,

and need not in itself add materially to the doubts reasonably entertained as to the life of steelwork embedded in such manner as to be exposed to corrosion without the possibility of access.

Still, the investigation of the causes leading to the recent mishap deserves to be closely followed by architects, and, with the object of helping in this direction, we give in the present article some drawings and a brief description of the main constructional features of Charing Cross station. To these details we add some particulars furnished by personal inspection of the ruins. Our hope is that the information so provided will, in some measure, assist our readers to appreciate the importance and relevancy of evidence brought forward hereafter at the two official inquiries that have been commenced.

Fig. 1 is a plan of the railway-station, which was completed in 1860 from the designs of the late Sir John Hawkshaw, the contractors for the roof having been Messrs. Cochrane, Grove, & Co., of Dudley. The drawing reproduced shows the general arrangement of the station and the thickness of the walls at rail level. As the position of the streets on either side prevented the employment of abutments to sustain the thrust of the roof, the principals had to be designed as arched trusses, so as to be self-contained. The end of each wall was terminated by a pier somewhat thicker than the piers in the length of the walls, but still not sufficiently massive to give an appearance of strength to the construction. As a considerable slope exists from the Strand





Plan of Charing Cross Station.

down to the Embankment, the height of the brickwork increases very much towards the lower end. At Cannon-street station, which is of similar but generally better design, also by Sir John Hawkshaw, the weakness of open ends was avoided by the erection of two massive towers, each 24 ft. square, at the river end of the station. Nothing of the kind exists at Charing Cross, but, some time after the completion of the station, the eastern wall was strengthened by the arched buttresses indicated in Fig. 1. These were added for the purpose of resisting the effects of lateral wind pressure, and now give access to the London County Council footbridge, opened for traffic in the year 1878.

It may be thought that the heavy girder forming the lower member of the wind screen, and extending from side to side at the southern end of the station, might operate to bind the walls together. In point of fact, this girder could scarcely have acted as a tie, for during the collapse the eastern end was dragged from its support and the girder fell from its place, with a lateral movement towards the west wall, and in falling scored a groove of segmental outline on the inner face of the eastern wall down to a point where the end of the girder reached a distance of about 15 ft. above rail level. Below that height the girder evidently swung clear of the brickwork. Hence it is clear that, with the exception of the part strengthened by the buttresses added at a later date, the station walls were incapable of resisting lateral pressure. This condition was foreseen by Sir John Hawkshaw and provided for in the design of the roof, and is one that must be duly recognised by all who wish to arrive at a correct opinion as to the true cause of the recent failure.

Let us turn next to Fig. 2, which includes a transverse section of the roof principal, or truss, and a plan of one bay, both drawn to Scale B, various small details to Scale A, and a section of the main rib of the truss to Scale C.

The roof comprises fourteen principals, in addition to the wind screen, which is of entirely different construction. Each truss has the clear span of 166 ft., and the trusses are spaced 35 ft. apart, centre to centre, forming fourteen bays. Thus the area covered measures 490 ft. by 166 ft.

The curved main rib of each truss is a wrought-iron plate girder with a rise of 45 ft., and when built consisted of a web plate 18 in. deep by  $\frac{1}{2}$  in. thick, with flanges formed of 6-in. by 3-in. by

$\frac{1}{2}$ -in. angle-bars, as shown in the section at right-hand top corner of Fig. 2. Each end of the rib opens out to the width of 2 ft., as indicated by the detail end view in the same figure. At the eastern end the foot of the principal is fixed to the stone cap upon the top of the brickwork, and at the western end provision is made for expansion by means of a suspension link saddle. These details are shown by the small drawings under the section of the roof truss in Fig. 2.

The type of expansion joint here introduced is not so desirable as one with rollers, because hinged joints are always liable to be rusted up, and such a result is by no means improbable in the case of a roof that has stood in place for forty-five years. In this connexion it may be noted that the analogous principals in the Cannon-street roof were provided with roller bearings at the free end. Supposing the joints at Charing Cross had become fixtures, the roof would still be free to expand upwards, but this facility would not relieve the western wall from alternations of push and pull, induced by temperature variations. We do not say that the suspension saddles had become fixed, but merely call attention to the fact that this is not improbable. If such a condition has been in existence for several years the cohesion of the brickwork must have been seriously reduced, and the consequent weakening of the wall would not be without its effect upon the failure, however small that effect might be.

To make the roof principals self-contained, and thereby to prevent the development of thrust against the wall at the free end, the main rib is trussed, as shown in Fig. 2, the chief members being vertical struts at eight points, dividing the truss into nine panels; diagonal ties in each of the inner seven panels; and a tie-bar forming the lower member common to all the panels. Each strut consists of two 6-in. by 3-in. by  $\frac{1}{2}$ -in. tee-bars bolted together, and each diagonal tie of a 4-in. by  $\frac{1}{2}$ -in. flat bar provided with cotters and gibs for tightening purposes. The struts and diagonals are riveted to  $\frac{1}{2}$ -in. plates connected with the main rib at the top, and with the screwed coupling-boxes of the tie-bar at the bottom. By the detail drawings in Fig. 2 it will be seen that the three members meeting at the main rib are very securely connected, while the similar connexion at the tie-rod couplings does not seem to be so secure. Of course, as the struts press strongly against the coupling-boxes there is not so much need for mechanical connexion there as at the

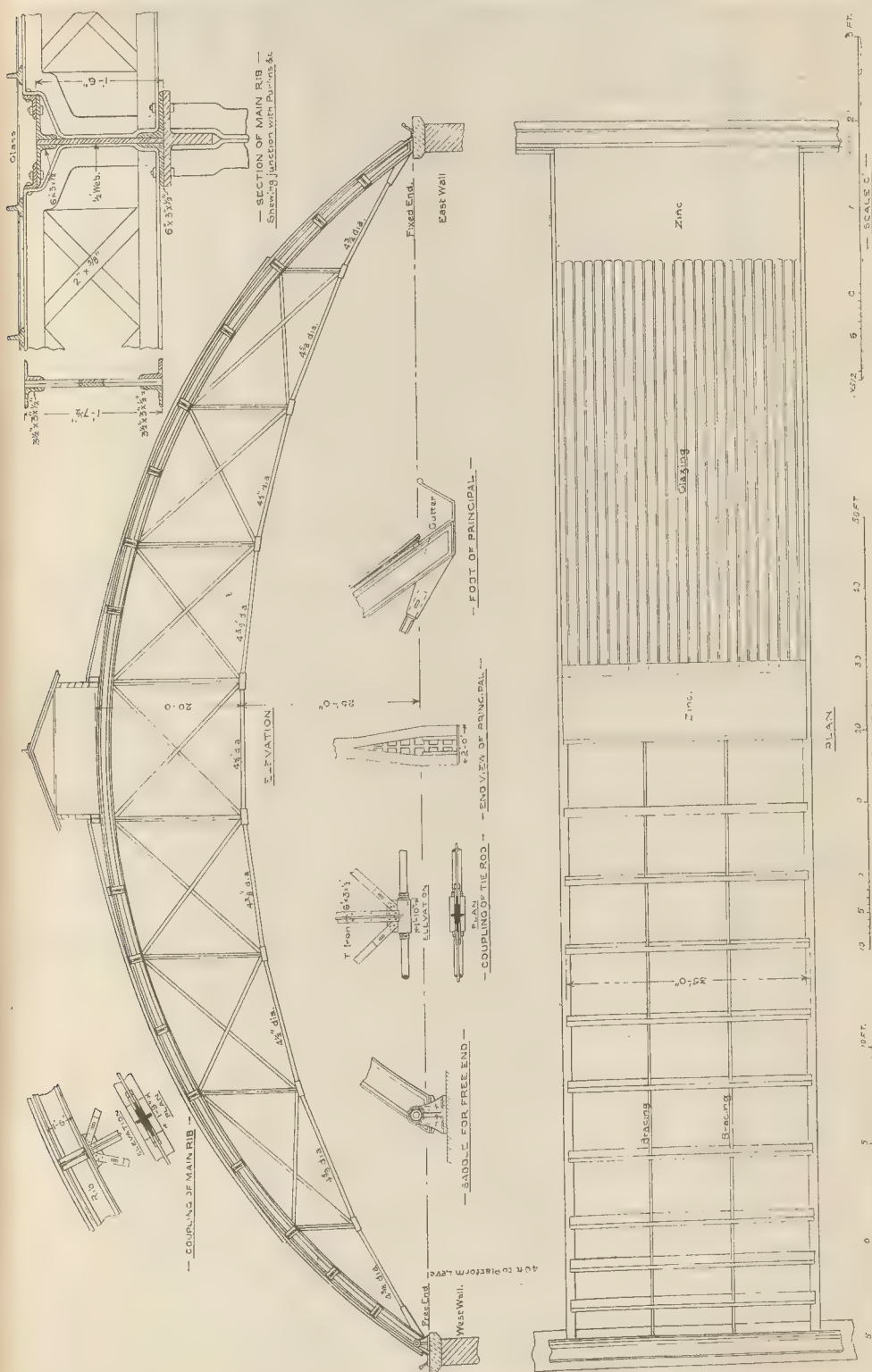
top, the chief thing being to connect the struts and diagonals firmly together and to make provision for preventing the group of three members from slipping out of place at each coupling-box. In view of the fact that the fractured tie-rod of the first principal broke away from the bracing and hung downward from the outer wall, and that the broken tie-rod of the second principal now hangs below the bracing of three panels, it is evident that the connexions were not so secure as could have been desired.

Notwithstanding the perilous appearance of the second roof truss, the member did not fall. The fracture of the tie-rod occurred near the eastern wall, which, being strengthened by buttresses, was probably able, with the assistance of the truss bracing, to resist the outward thrust developed after the fracture of the main tension member. The point is an interesting one, upon which further information will no doubt be forthcoming at a later date.

The tie-rod is made up of nine lengths of the following diameters:— $\frac{1}{2}$ -in. in the end panels;  $\frac{3}{4}$ -in. in the second panels;  $\frac{1}{2}$ -in. in the third panels;  $\frac{3}{4}$ -in. in the fourth panels; and  $\frac{1}{2}$ -in. in the central panel. At each end of the truss the tie rod is fixed into the piece projecting from the foot of the principal by means of a cotter and gib fastening, which permits the regulation of tension. The ends of each length of the tie-rod are of enlarged cross-section, and being threaded are screwed into the coupling-boxes. This method of construction looks very well on paper, but, owing to the fact that in 1860 the resources of ironworks were unequal to the rolling and forging of bars so large as those used at Charing Cross without having recourse to welds, the tie-rods are not so strong as their cross section suggests. The point here raised is of much importance, and will probably be found to possess an intimate connexion with the failure of the roof.

For the purpose of making clear to our readers what was the practice of iron manufacturers at the date when the station was built, we quote the following passage from a paper read by the late Sir Henry Bessemer at the 1856 meeting of the British Association, when, describing his new process of manufacturing malleable iron and steel, the author said:

"It is true that hitherto no better method has been known than the puddling process, in which from 4 cwt. to 5 cwt. of iron is all that can be operated upon at a time, and even this small quantity is divided into homogeneous doses of some 70 lb. or 80 lb., each of which is moulded and fashioned by human labour, carefully watched



Plan, Section, and Details of the Roof of Charing Cross Station.



and tended in the furnace, and removed therefrom, one at a time, to be carefully manipulated and squeezed into form."

Considering the 4½-in. diameter length of the tie-rod in the roof truss at Charing Cross, taking the length at 19 ft., as shown in the drawing, and the weight of the metal at 53 lb. per lineal foot, we have a total weight of 1,007 lb., which was evidently too great to be rolled and forged without welds by the ironworks of 1860. Even admitting the body of the bar to have been rolled in one piece, the enlarged ends must have been welded on, in accordance with the general practice of those days. In the present day the bar could easily be rolled of sufficient length to permit the ends to be "upset" or "jumped," thus avoiding the known weakness of welds, and the indeterminable weakness depending upon the skill and care of the workmen by whom the welds were made. The facts we have pointed out show clearly that modern structures are free from one source of weakness that was unavoidable in the structures of two generations back. Consequently, we must not be too hasty in drawing general conclusions from the Charing Cross failure.

Continuing our examination of the drawings, it is seen that the purlins, sixteen in number, consist of latticed girders, 19½ in. deep, with webs of 2-in. by ½-in. bars, and flanged, formed by two 3½-in. by 3-in. by ½-in. angle-bars, the manner in which these members are joined with the main rib being illustrated at the top of Fig. 2. The purlins in each roof bay are stiffened by bracing, as shown in the plan, and the glazing is carried by tee-bars, as represented in the plan, and more clearly in the sectional detail of the main rib.

Having before us the main constructional features of the station walls and roof, the next step is to state briefly the circumstances attending the fall of the wind screen, the roof truss next to it, and of the two bays at the southern end of the station.

According to the evidence of the platform inspector, the first indication of the impending disaster was given about 3.30 on the afternoon of Tuesday, December 5, by a loud report, followed by the visible separation of the tie-bar of the first truss, at a point about one-third of the span from the western wall of the station. The same report was distinctly heard by men working in the Avenue Theatre and by draughtsmen in the Admiralty Works Department, Craven-street. As the section that gave way was the 4½-in. diameter length in the third panel from the end, exactly one-third of the truss then relied for the maintenance of its curved form (1) upon the stiffness of the main rib; (2) upon the struts and diagonal tension bars of the bracing; and (3) upon the inward reaction of the wall. We have already shown that the brick wall was never intended to resist any outward thrust, and any capacity it may have had for such a duty would naturally be reduced if the masonry had been subject for any length of time to oscillation following the clogging of the suspension saddle by rust. The resistance of the main rib could not count for much, and the bulk of the work done in preventing the immediate spread of the truss must have fallen

upon the bracing. The members constituting this portion of the roof construction were such as could be produced forty or fifty years ago without the necessity for welds, and being firmly connected to each other, and with the main rib at the top, and securely joined together by riveting to a stiff plate at the bottom, they would withstand a very considerable strain before being pulled apart. Referring to evidence given before the coroner, it appears that at 3.45 the roof, which had been gradually sinking in the vicinity of the first truss, finally collapsed and fell away from the wind screen, which stood for ten seconds, and then fell inwards. It is not clearly established whether the wind screen or the principal was the first to come down, but the general result suggests that the main rib and the bracing were unable to resist the outward spread of the roof, which pushed out the wall to a certain extent, and as the box girder of the wind screen was firmly anchored into the wall, that member would be dragged from its support on the eastern wall, making the segmental groove in the face of the brickwork as previously mentioned. The fall of the truss and the wind screen overturned the upper portion of the west wall, which was precipitated in huge masses upon the Avenue Theatre, practically wrecking that building.

The foregoing description of what happened is substantially in agreement with previously published accounts, and with the inferences drawn as the result of our own examination on the site. Assuming the correctness of the suggestions we have interpolated, the manner in which the successive stages of the disaster slowly developed constitutes a wonderful testimony to the soundness of the general design, as well as to the excellence of the materials used, and the thoroughness of the workmanship in the main rib and the bracing, members which we have shown were able to withstand an enormous strain for at least fifteen minutes before finally confessing defeat. The tie-rod construction stands on a different footing, and the desirability of the general type of design represented by the Charing Cross roof is quite a separate matter, which we abstain from discussing in the present article.

In the official statement issued by the general manager of the railway company it was said that the collapse "was apparently due to the breaking of a tie-rod . . . or to a settlement from some unknown cause which put an undue strain upon the tie-rod." Sir Benjamin Baker is reported as having expressed the opinion that the snapping of a tie-rod was undoubtedly the cause of the accident, but that until careful examination had been made it would be impossible to say what was the nature of the flaw in the member that gave way. We wish to avoid anything that might appear like an attempt to anticipate the result of the investigations that will be made in every possible direction to ascertain the real cause or causes of the failure, and in stating below the condition of the tie-rod and of the other portions of the ironwork that have fallen, we are actuated chiefly by the desire to place the facts before our readers and to put them in a position to form an opinion as to the

effects of time upon metal structures, so far as indicated by the example under consideration.

We have already stated that, at the time when the roof was built, welds necessarily occurred in important tension members such as tie-rods, and we have good reason for suggesting that the bar upon which so much depended at Charing Cross probably failed at a joint of this description. Examination of one broken end of the bar in question makes this suggestion anything but unlikely. In the area of 15.9 sq. in. there are three portions with a lustrous fracture. Two of these are disposed symmetrically on either side of the vertical axis, the base of the segment in each case being at an angle of about 40 deg. with the same axis, and extending from the top to a little below the centre. The third portion indicating recent rupture is of smaller area, and the base of this segment is perpendicular to the vertical axis, the distance from the chord to the circumference of the circle being about one-sixth of the diameter. The collective area of the three portions of the section representing sound metal is barely 6 sq. in. Inside these three areas there is a portion roughly of triangular form, the surface of the metal being corroded, and having very much the appearance of a defective weld, and in the middle of the triangle is a darker area, where the metal is not only seriously corroded, but presents small cavities. Viewed from the side the broken end of the bar has a uniform inclination of about 45 deg., resembling that of a scarf weld.

Whatever may be discovered concerning the condition of the wall foundation, the condition of the broken tie-rod is quite sufficient to prove that the roof must have been in a most critical state at the time of the disaster, and indeed for some considerable period before that occurrence. Without saying that the tie-bar was the originating cause, we are satisfied that a comparatively small disturbance would be sufficient to sever the sound portions of the metal. The only wonder is that they should have remained intact so long as they did.

In his evidence before the coroner on Monday, the foreman in charge of the roof repairs stated that "a diagonal brace had cracked almost in the centre of the roof." It is by no means clear whether this bar gave way before or after the severance of the tie-rod. If before, it may have occasioned the "undue strain upon the tie-rod" mentioned in the official statement of the railway company, and we ought to know, if possible, why it cracked. If after the occurrence, it would obviously be in consequence of the tie-rod failure, and therefore of no special significance.

The general condition of the fallen ironwork is another matter of interest to architects. Without exception the metal is seriously corroded, and has suffered much for want of paint. The surface of the tie-rod was eaten away and pitted by rust to the extent of something like a ¼ in. in places, while the lower girder of the wind screen, the main rib, and the purlins had suffered seriously. The paint adhering to them could be peeled off in strips and showed rust on the side next to the iron. As a striking example

of the extent to which the ironwork has deteriorated since it was first erected, we may point to the fact that the web of the main rib, originally  $\frac{1}{2}$  in. thick, has dwindled down to a thickness of little more than perhaps  $\frac{1}{8}$  in. Several holes had been knocked clean through this web, and in one place a tee-bar of about 3 in. by 3 in. had been driven through the web, the end projecting for a length of some feet. The seriously corroded condition of the roof had been known for some time past to the directors of the railway company, and the cleaning and repainting operations in progress at the time of the disaster prove that they were taking measures to prevent the further disintegration of the work. From what we have seen, however, it is manifest that something more than mere painting was required.

In conclusion, we may mention that on inspecting a portion of the box girder formerly at the bottom of the wind screen we noticed that, while the outside was much corroded, the surfaces of the metal inside the girder had suffered very little, and in the portions we were able to examine were still covered for the greater part by the original mill scale. Although not conclusive testimony, the circumstance may tend to reassure architects as to the fate of iron and steel members placed in dry walls where they are shielded from direct exposure to the atmosphere.

#### NOTES.

**Waterworks and Mining Rights.** LAST week we commented on the rights of parties where a subsidence has been caused by mining operations under roads; this week an important question has been raised in the Law Courts in connexion with the reservoirs which have been constructed by the Corporation of Manchester for the water supply of that city. The action was brought by the corporation against the defendants, who were lessees and owners of certain coal seams, for an injunction and damages for subsidence caused in the reservoirs from the defendants' mining operations. The defence was twofold; in the first place the defendants asserted that the plaintiff corporation had purchased the land subject to the mining rights, and that as far as concerned the workings within 40 yds. of the reservoirs they had been given the opportunity of treating for a purchase of the mining rights, but had refused to avail themselves of the opportunity. As to the workings at a greater distance than 40 yds. the defendants alleged that there was no right in the plaintiffs to support. These issues necessitated a trial extending over many days, but in the result the corporation failed in their action. The Court held that as regards the workings within 40 yds., as the plaintiffs had not availed themselves of the terms of the statute which regulated their powers, the Waterworks Clauses Act, 1847, and treated for the purchase of the rights, they were without remedy; and as regards the workings outside that limit which are defined by the same Act, the corporation had no rights, as their Private Act had not extended the limits. This is another example of the drawbacks attending

municipal enterprise, and before long, we fancy, the ratepayers must become alive to the disadvantages attending a system which renders them liable as shareholders with unlimited liability and with no control.

**Noisy Localities.** We would not recommend anyone who is not a lawyer to read the lengthy judgment of the Court of Appeal in the case of *Rushmer v. Polsue & Alfieri, Limited*, important though these judgments are. The point at issue was whether a householder can obtain an injunction to prevent annoyance—in the present case the working of printing machines—when he lives in a mechanical neighbourhood. In other words, is the nuisance, we use the word in a legal sense, to be regarded, bearing in mind the standard of the neighbourhood? "What would be a nuisance in Belgrave-square would not necessarily be so in Bermondsey," was once said by the judges in a leading case. In the present case the result of the judgment seems to be that, while the standard of the neighbourhood must be regarded as the primary test, that standard does not allow a thing to be done so as to injure a dweller in the locality, if it is, so to say, an extension of the standard. In other words, you cannot, if you go and live in a locality chiefly occupied by printing works, complain of a normal noise of a machinery, but you may of a noise from works more than, and in excess of, the general quantity of noise.

**"Occupiers" of Private Roads.** A CURIOUS little legal point in connexion with the roads came before the Divisional Court last week for decision in *The King v. Somers; ex parte The General Estates Company*. The justices, under sect. 36 of the Highway Act, 1862, had made an order that a certain private or occupation road should be declared to be a highway repairable by the inhabitants at large. The General Estates Company moved to set aside the order on the grounds that it was *ultra vires*, and that the terms of the section had not been complied with. It appeared that the company by a deed of conveyance given to their predecessors in title had acquired a right of way over this portion of the road, which adjoined a private road of which they were freeholders, in consideration of a money payment and an obligation on their part to keep the road in repair, and they contended that they, in respect of this right of way, were "occupiers" of the road within the meaning of the section, and that their consent had not been obtained. The Court decided that the section denoted persons having such an interest in the road as would be affected by an increase in the traffic—i.e., owners of land or occupiers of property abutting upon the road—and that it did not extend to persons having a mere right of way.

**Joint Committee on Concrete-Steel.** A SATISFACTORY sign of the times is given by the appointment of a Reinforced Concrete Committee by the Royal Institution of British Architects, and the decision to invite the co-operation of the Institution of Civil Engineers and the Institution of Mechanical Engineers in

the investigation of the important subject indicated. The work of the Science Standing Committee of the Institute has done much to emphasise the intimate connexion of science with art in architectural practice, and there is reason for congratulation in the fact that architects and engineers are to join in considering the properties and uses of concrete-steel. From the very first architects have taken strong interest in this new material; civil engineers have followed suit; and in course of time we may expect mechanical engineers to discover its great adaptability to the requirements of manufactories and workshops.

**Fire Tests of Concrete.** MUCH difference of opinion undoubtedly prevails as to the value of various familiar aggregates for concrete to be used in fire-resisting construction. With the object of throwing light upon this question, an experimental fire and water test was undertaken in October last by the British Fire Prevention Committee. For the purpose of the investigation, seven floor slabs were prepared with the following aggregates:—furnace slag, broken brick, broken granite, burnt ballast, coke breeze, furnace clinker, and Thames ballast. The proportions of the concrete were 1 part Portland cement, 2 parts sand, and 3 parts aggregate for all the slabs except those in which burnt ballast and coke breeze were used, the proportions in these being 1 part of Portland cement to 5 parts of aggregate. Upon examination of the slabs after exposure to fire for three hours at temperatures ranging up to 1,800 degrees Fahrenheit, followed by the application of water for two minutes, the results were found to be very divergent, and in some cases decidedly unexpected. Those who desire full particulars will find them in the official report issued by the Committee, and we must content ourselves here with a brief reference to the chief lesson to be drawn from the test—that Thames ballast is an unsuitable and entirely unreliable material for fire-resisting construction. The slab made with this aggregate was cracked across in numerous places, and curved downwards about 2 in.; the under-surface exhibited bad cracks in all directions, and much of the concrete was washed off by water. These results are in striking contrast to the evidences offered by the coke breeze and burnt ballast slabs, which showed no cracks either on the top or the bottom surface, were not curved downwards at all, and only suffered in places from the effect of the water application. Although the tests are by no means conclusive, they seem to point to the fact that intrinsically weak aggregates are better for resisting fire than strong aggregates.

**Shear Tests.** SOME experiments carried out for the purpose of ascertaining the behaviour of various well-known materials of construction are described in the paper read last week by Mr. E. G. Izod before the Institution of Mechanical Engineers. In tests relative to shear the most troublesome hindrance to accuracy is elongation of the outer fibres of the specimens under examination, and to obviate this



disadvantage as far as possible the author employed a special form of shearing device, consisting essentially of two hardened steel plates with cutting edges between which slides a third cutting plate, so that the opposite edges shall induce nearly perfect shear. Even with this apparatus, however, it was impossible to prevent a certain amount of stretching, which affected the fibres for about  $\frac{1}{2}$  in. on each side of the shearing plane. The materials examined include different qualities and alloys of cast iron, wrought iron, steel, copper and aluminium, and four descriptions of timber, these being tested across and along the grain. The results point to the fact that there is no general law governing the ratio of tensile strength to shearing strength. Crystalline metals, or those with little or no elongation, are shown to be stronger in shear than under tensile stress by from 20 per cent. to 25 per cent., and ductile metals may be anything from 0 to 50 per cent. weaker in shear than in tension. For timber the results showed the ultimate shearing strength to be from 33 per cent. to 53 per cent. of the ultimate tensile strength across the grain, and from 5.5 per cent. to 10.4 per cent. along the grain. The results are tabulated and plotted in convenient manner, and they ought to be appreciated by all who are interested in the strength of materials.

In his presidential address to the Birmingham Local Section of the Institution of Electrical Engineers, Professor Threlfall discussed several interesting problems in electro and electro-thermal chemistry. He stated that the fixation of nitrogen by electrical means would become an important industry in the future when the nitrate deposits in Chili begin to be exhausted. Nitric acid can now be made electrically at practically the same price as that manufactured from Chili saltpetre. The author described the investigations of Dr. Ludwig on the effects of heating carbon to very high temperatures under great pressures. When the carbons were in hydrogen at a pressure of 1,500 atmospheres it was found impossible to maintain a continuous arc between them, as the carbon at very high temperatures became non-conducting. As it cooled it became conducting, and so an intermittent arc was formed. When the carbon, at a pressure of 2,000 atmospheres, was cooled suddenly by means of a jet of water it was converted into a transparent medium, which however was not diamond. Professor Threlfall also described his own researches in the same field. Reasoning on the analogous relations between the properties of diamond and sulphur, he calculated that in order to make large diamond crystals it would be necessary to obtain pressures of at least 10,000 atmospheres. In this case the rate of cooling would probably be quite immaterial. He pointed out that the problem of making cubic carbon crystals was much easier, as at high pressures carbon vapour probably condenses in this form. These crystals would be useful as an abrasive. He also described the novel process invented by Elihu Thomson for making silica tubes. A carbon rod is buried in suitable

sand, and a large electric current is sent through it. The heat developed round the conductor fuses the sand grains together, and so a tube is formed round the carbon which can easily be smoothed by a carborundum wheel. In appearance these tubes are similar to white vitreous earthenware, but they do not break even when heated red hot and dropped into water.

#### EXPERIENCE at the Dover Harbour Works has demonstrated in a striking

manner the remarkable physical properties of the Tasmanian blue gum (*Eucalyptus globulus*), which is probably the strongest and most durable timber in the world. It certainly is denser than any other wood, having the specific gravity of 1.2, and is practically impervious to the attack of the teredo. These facts have only been recognised by timber experts within the last few months, and it is well that they should be generally known. So far as the works at Dover are concerned, the chief value of the blue gum piles from a constructive standpoint was that, while Oregon pine piles could not be driven in deep water subject to strong currents unless weighted at the end with iron, the piles employed required no such assistance. Further, owing to their immunity from injury by the teredo and to the great strength of the timber, most of these piles have been in continuous use for more than four years, and some of them have been driven three or four times in different positions. We learn from Mr. W. Heyn, the timber expert of Messrs. S. Pearson & Sons, that tests very carefully made show that the Tasmanian wood will sustain about double the weight that can be carried by English oak, and will even regain its elasticity after having been subjected to loads equal to the breaking weight of oak.

#### Cottage Exhibition, Cleveleys.

COTTAGE exhibitions seem likely to be one of the popular entertainments of next year. Following upon the competitive exhibitions in several different districts proposed by the Rural Housing Reform Association (already mentioned in our pages), we have now the prospectus of a cottage exhibition to be held at Cleveleys, in Lancashire, from July to September of next year, which professes to be a kind of continuation of that at Letchworth. We notice, however, that in offering prizes for four different classes of cottages, they have in the first two classes not specified any limit of cost, but offered the prize for "the best and most economical cottage, or (in Class II.) pair of cottages, to be built in accordance with the by-laws of the Thornton Urban District Council." This is a great deal wiser than specifying a sum which (as we saw at Letchworth) every competitor professes to be able to build his cottage for. In the other two classes the sum of 180l. is named as the limit of cost for a single cottage, and 350l. for a pair of cottages; this also seems to be a lesson from Letchworth, where the exhibition went to prove that a 150l. cottage of durable materials cannot be built except under

especially advantageous conditions. We notice that among the conditions in regard to the competition in Classes III. and IV., the competitors will be required to declare, before the opening of the exhibition, the price (including builder's profit) at which, under similar conditions, they will be prepared to duplicate their exhibit. There is also to be a competition, comprised under Class V., for the best laid-out garden.

#### It is stated that the Duke of Sutherland is about to present his seat in Staffordshire to the County Council for the purposes of a technical college. The mansion was built in the earlier half of the XVIIIth century after the model of Buckingham House, St. James's Park, but was considerably altered and improved by Holland for the first Marquis of Stafford (obit 1803). Subsequent improvements upon an extensive scale were carried out by Sir Charles Barry, who refaced the cemented brickwork of the exterior, added the cornice and balustrades and the belvedere tower, and greatly embellished the details of the old building which contained the reception-rooms. Barry added also the grand entrance-hall and the semicircular corridor giving access to the state-rooms, designed the wing containing the private apartments, and, laying out the gardens, effected a notable transformation of the house and its surroundings. Trentham Hall is identified with the "Italian Palace" described in "Lothair" by Lord Beaconsfield, and its beautiful park, extending over 500 acres, watered by the Trent, is a favourite resort of holiday-makers from the districts around. Launcelot Brown laid out the greater portion of the grounds; his work at the house was superseded by that of his relative Holland—see Watts's *Seats*, etc., 1779, and Ackermann's *Repository*, 1824.

In the course of some excavations which are being made for a structural repair of the ancient castle have been found the remains of a minting-house, with its furnace, broken crucibles, and some "Derby" coins. Rushen Castle, at one time the principal fortress in the island, was built in 945 by Guttred, son and successor of Orry, Prince of Denmark, and second of the twelve petty kings, called Orries, who reigned over the island. The castle, which in many respects is similar to that at Elnore, is quadrangular on plan with square towers on the sides; the keep was converted into a prison, and within the area were erected lodgings for the lieutenant-governor, and buildings for the numerous courts appertaining to the civil government. A lofty embattled wall and a fosse surround the castle, which is further defended by a glacis of stone masonry built, reputedly, by Cardinal Wolsey during his guardianship of Edward, Earl of Derby. A drawbridge from the castle crosses the river which flows through Castletown, and the pit of the portcullis has recently been discovered. Sir John Stanley, K.G., obtained, temp. Henry IV., a grant, by liege homage, of the island and lordship of Man. His

#### Rushen Castle, Isle of Man.





Borgia, nephew of Pope Alexander VI. (between 1492 and 1494), or, in part, at least, for Cardinal Ludovico Borgia (between December 22, 1536, and July, 1537).<sup>\*</sup> The cathedral possesses another missal, which was formerly at Guardiagrele, illuminated perhaps by a local artist, of the end of the XIVth century. The other two were a MS. of the Old and New Testaments, with notes and an index written by S. Giovanni da Capestrano (a Franciscan friar who led the crusade against the Hussites in Bohemia in the XVth century), to whom it was given by Pope Calixtus III., and a fine office for nuns' use, known as the Ufficio della Beata Cristina, and belonging to the Municipality of Aquila.

To the same section belonged the mediæval coins, medals, and seals, of which a small collection was exhibited.

The fourth section consisted of (1) tapestries, the best of which come from Pescocostanzo, twenty miles south-east of Sulmona, and belong to the XVIIth and XVIIIth centuries. The designs are, as a rule, decorative, but there was one curious specimen in the first room of the end of the XVth century, with a representation of the Siege of Troy, formed by the superposition of stuffs of various colours sewn on to the fabric, some of the details being filled in in black on a white ground. (2) Laces and embroideries, of which, again, many belong to Pescocostanzo.

In both classes it is noticeable that the decorative patterns employed are often Greek patterns broken down.

A less important section (the fifth) was formed by sculptures in wood and stone, the former nearly all coloured and gilded, while the sixth, and last, section was devoted to modern reproductions of old lace, tapestries, majolica, ironwork, etc.—industries which seem to be flourishing and to be doing good work.

The exhibition was well housed and well arranged, and there was plenty of room to see the objects to advantage. But the municipal palace, in which it was held, is a modern building, with no pretence to architectural interest. It was, further, a pity that it was found necessary to displace and temporarily store the archaeological collections belonging to the city, as there would not otherwise have been sufficient space. Archaeology was, indeed, poorly represented, a fine set of the coins of Hadria (Atri) being almost the only exhibit of any note in this direction.

The exhibition was, however, of considerable importance and interest, and the promoters of it deserve much praise for their labours.

To the influence and active interest of the Archbishop of the diocese must be attributed the magnificent show of crosses, reliquaries, and other objects of value in the third section, a considerable proportion of which belong to the churches which are under his authority. THOMAS ASHBY, JUN.

#### EXHIBITION OF SMOKE-ABATEMENT APPLIANCES.

In connexion with the Conference arranged by the Royal Sanitary Institute and the Coal Smoke Abatement Society an exhibition of smoke-abatement appliances was held last week in the hall of the Royal Horticultural Society at Westminster. The exhibits were not very numerous, nor did they cover the whole range of the subject of smoke-abatement as outlined by the organisers of the exhibition. The only section which could be regarded as at all adequately represented was that of gas and its uses for lighting, heating, and cooking. Electrical appliances were not as conspicuous as one would have expected. There were few open domestic fires, and boilers and radiators for heating buildings by hot water and steam were not, as far as we could see, represented by a single exhibit.

The first stall was occupied by gas appliances made by Messrs. Parkinson and W. B. Cowan, to whom two bronze medals were

awarded for gas-cookers and prepayment gas meters. The South Metropolitan Gas Company exhibited a photometer for measuring high-power gas-burners. Two bronze medals were given to the Imperial Stove Company (Leamington Spa) for gas-cookers and for gas-stoves with removable enclosures, and the same company showed the "Cyclone" water-heater in connexion with a gas cooking-stove. The Cannon Iron Foundries (Deepfields, near Bilston) had an interesting collection of gas-stoves of various kinds, and received four bronze medals for gas-cookers, a gas washing-boiler for domestic use, a prepayment gas-meter, and a simple device for regulating the air supply to gas-stoves and fires. The Richmond Gas Stove and Meter Company (Warrington) had a large stand, divided by partitions into a number of rooms (including a hall, dining-room, drawing-room, bedroom, and kitchen), which were fitted with gas-stoves and fires of various kinds. Bronze medals were obtained for their grillers with a firebrick radiator, and for the "Ilford" gas-fire, which is made so that the various parts can be easily removed, and is fitted with an adjustable nipple for regulating the supply of gas and air to the burner. The cast-iron stove, exhibited by this firm, for burning coke or anthracite, deserves mention for the simplicity of its design.

Messrs. William Sugg & Co. showed their system of high-pressure incandescent gas lighting (driven by a hot-air engine) in operation, some of the lamps shown being of 1,000 candle-power; low-pressure incandescent gas-burners were also shown, and a bronze medal was received by the firm for gas-cooking apparatus. Messrs. Fletcher, Russell, & Co. (Warrington) had a large exhibit of gas-heating appliances, and received a bronze medal for their "Rapid" water-heater with safety-tap. Appliances for lighting and heating were also shown by Mr. Wm. Edgar, and at the next stand Mr. Joseph Nutting exhibited his ingenious gas cooking-stoves, fitted with V-shaped tubular copper boilers and overhead hot-water tanks, the waste heat from the stove being used to raise the temperature of the water. Messrs. A. E. Podmore & Co. exhibited (in operation) their "High-power Low-pressure Recuperative Incandescent Self-intensifying Gas Lamps"; this is a long name for a little fitting, but certainly the lamp appears to be both useful and economical; all the details have been carefully considered in order to render the lamp dust-proof and to increase the life of the mantles and chimneys. Mr. Thomas Potterton received a bronze medal for his apparatus for hot-water services heated by gas, and the Davis Gas Stove Company received another for gas-cookers with automatic gas-tap and by-pass; the same firm showed a large variety of gas-stoves and fires, one or two of which were of better design than usual. Messrs. Wilsons & Mathiesons (Armsley) had also a good selection of gas-stoves and fires, among which two are worthy of special mention. The "Delft" is one of the best-designed gas-stoves which we have seen; the ironwork is simple, and the blue and white tiles add greatly to the effect. The "Sheraton" is not quite so pleasing, but has received a bronze medal for the ventilating grida with which it is fitted. A large "Model Smokeless Kitchen," fitted up by the Gas Light and Coke Company, was well worth seeing.

To the architect the most noticeable feature of the exhibits of gas stoves and fires is the wretched character of the designs in general. Nearly all are commonplace in shape, and covered with meretricious and meaningless ornament. Some of the exhibitors are evidently only just awaking to the fact that good design will "pay," while others still think that it has no commercial value. Here and there a tendency towards better things was noticeable, but, on the whole, the exhibition, however good it might be from the practical point of view, was artistically a failure.

The Westminster Electric Supply Corporation and the St. James's and Pall Mall Electric Light Company, assisted by Messrs. Rashleigh, Phipps, & Co., had a large exhibit of electrical appliances, including cooking stoves and utensils, "Promethes" and other heaters, the "Stellite" Air-filter and Deodoriser for purifying and (if desired) perfuming the air required for ventilating dining-

rooms, etc., and a great variety of ingenious appliances for other purposes.

Sir Charles Cookson exhibited an ordinary hob-grate burning gas-coke, the special feature being the method of lighting the fire by an iron pipe fitted with a Bunsen burner, and connected with the gas service. Messrs. Bratt, Colbran, & Co. showed a number of "Heaped" fires with different surrounds; the principal novelty was a surround of green bull-nosed Dutch tiles, 9 in. square, without any metal-work. The "Florence" grate was exhibited in operation by the London Warming and Ventilating Company, together with a number of stoves for burning anthracite and other fuel, and some gas-stoves. The "Florence" grate is fitted with rocking bars of peculiar shape, and at the time of our visit was burning anthracite coal satisfactorily. The Coalbrookdale Company exhibited the "Bostel" fire-grate in operation; this has a fire-basket hung on pivots, so that it can be tilted into various positions to alter the rate of combustion. Messrs. Doulton & Co. had a small exhibit of their faience, etc., including a sunk fire without any metal except the bottom grate. A bronze medal was awarded to the Eagle Range and Gas Stove Company for their automatic draught-regulator and automatic indicator for dampers, applied to the "Eagle" kitchen range; they also exhibited the "Eagle Premier" domestic fire-grate with sliding doors for regulating the rate of combustion. A dog-grate and basket-grate were shown in operation by Mr. Samuel Firth, M.A., the inventor.

A small apparatus for washing the smoke from an ordinary domestic fire-grate was shown by the Mugnas Smoke-Washing and Fuel Economising Apparatus Company; an electric fan forms part of the apparatus, but adequate information about this and Mr. William Thomas's "Wildwm" smokeless chimney was not available.

Mr. Joseph W. Lovibond (Salisbury) exhibited various instruments for "measuring the colour of smoke," etc., and was awarded a bronze medal for his simple "Pocket Tintometer" for this purpose.

The Power-Gas Corporation Company received a silver medal for a model of the Mond Gas Plant, with ammonia-recovery apparatus, and Messrs. Crossley Bros. a bronze medal for their Suction Gas Plant.

Appliances for reducing the coal consumption in factory boilers were shown by a number of firms. Messrs. Edward Bennis & Co. (Little Hulton, Bolton) gained a silver medal for their Patent Stoker and Self-Cleaning Compressed-Air Furnaces for Lancashire boilers, and a bronze medal for their Improve Smokeless Chain-Grate Stoker. Another chain-grate stoker, made by Messrs. Balcock & Willcox (Renfrew) obtained a similar award. A bronze medal was also given to the Schwartzkopf Coal-Dust Firing Syndicate (St. Helens) for their Coal-Dust Furnace-Feeder. Smoke-consuming bridges and other appliances for Lancashire boilers were shown by Messrs. Hampton & Son (Loughborough), the British Fuel-Economiser and Smoke-Preventer Company (Bermondsey), the Horsfall Destructor Company (Leeds), the Smoke-Abolition Syndicate, the Courts-Turner Engineering Company (Manchester), and Messrs. Wilekemp (Wandsworth); and photographs and diagrams of other appliances for the same purpose were exhibited by other firms.

A bronze medal was awarded to Messrs. Sanders, Rohlbers, & Co. for their ingenious "Adco" Automatic CO<sub>2</sub> Recorder, which continuously and automatically records on a chart the percentage of CO<sub>2</sub> in the flue-gases of boilers; and the same firm's "Phenix" Indicating and Recording Draught-Gauge is also worthy of mention.

Refuse-destructors were shown by the Horsfall Destructor Company (Leeds) and Messrs. Meldrum Bros. (Manchester), and ventilating appliances by Messrs. Matthews & Yates (Manchester).

This almost exhausts the list of exhibitors. We ought to add that, at the time of our visit, the awards in the lighting section had not been made.

MISSION ROOM, BEDFORD.—A mission room has been erected in Chandos-street, Bedford. Messrs. Mallow & Grocock superintended the erection of the structure by Messrs. Humphreys & Co., of Knightsbridge.

<sup>\*</sup> The former theory is sustained by Bertiaux in the *Revue de l'art ancien et moderne*, the latter by De Lantier (the president of the committee of the exhibition) in a commemorative number of a publication entitled *Peris Latina*, which appeared at Chieti on the occasion of the opening of the exhibition.



## THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

An ordinary meeting of the Royal Institute of British Architects was held on Monday at No. 9, Conduit-street, Mr. John Belcher, A.R.A., presiding.

*Deceased Member.*

Mr. Alexander Graham, Hon. Secretary, said it was with much regret that he had to announce the death of Mr. H. H. Collins, District Surveyor for the Eastern District of the City of London. He was elected an Associate in 1859 and a Fellow in 1877. There were very few architects who were not acquainted with Mr. Collins, for they met him before him professionally in many ways, and especially in his capacity of District Surveyor. Mr. Collins was a familiar figure, therefore, to all of them, and they much regretted that he had passed away. He had, however, left a good name amongst them.

For many years Mr. Collins took an active part in the work of the Institute, and had always been an ardent supporter of its best interests. He moved that a letter of sympathy be sent to the family condoling with them on the loss they had sustained, and expressing the full appreciation of the members of the Institute of the merits and work of the deceased.

*Stained Glass.*

Papers were then read by Messrs. Alexander Gascoyne and A. J. Dix on "Stained Glass," the following being abstracts:—

Mr. Alexander Gascoyne, referring to examples that remain of old stained-glass work, said that, without attempting to copy deliberately, many lessons may be learnt from it. If once we can catch the spirit and feeling that inspired the early glaziers, and work it into modern requirements, we shall be progressing towards perfect work. No better model could be desired than the beautiful arrangement of the best XVth century glass—e.g., York Minster and Morley Church in Derbyshire. The windows in the north of the nave of Cologne Cathedral also afford excellent examples. Whether or not glass can be manufactured equal to the old glass is a matter of opinion; but by waiting and picking out the choicest sheets at the makers', and carefully selecting these, results can be obtained which will compare favourably with the early windows. It is the inequalities, variations of thickness and colours, and accidental markings which give the depth and brilliancy to the glass, and upon their judicious employment depends the success of the work. In good work the use of the glass rarely, if ever, enters into the consideration of the glazier; he chooses the various glass as the artist does his colours. Beautiful results can be obtained by giving a free rendering of the early principles, and by designing foliage or ornament to take the place of canopies and bases, without losing the feeling or character of the old glass. It is immaterial what particular style is adopted provided we allow our originality to develop that style, and produce stained glass which for charm of design and colour will adapt itself to the character of the building. The assistance architects can give in suggestions for the general schemes of windows cannot be over-estimated; their co-operation has produced in many instances most successful results. When the profession as a whole demand really good work, and encourage designers who are known to have the interests of their craft at heart, there will be no lack of beautiful work. But so long as the greatest demand is for the cheapest article, it cannot be expected that the domestic or ecclesiastical stained glass of this country can improve. A stained-glass window need not necessarily be expensive. It can be made simple in design, and therefore not costly; but it does not follow that it is not in the best possible taste, and that the best material has not been used. The author impressed upon those designing stained glass for churches that the windows have a double mission—they should form a beautiful decoration and be devotional in feeling. The figures introduced should be an aid, not a hindrance, to devotion. Arouse the critical faculty, and no devotion is possible. To design some windows much careful consideration is necessary; really good work can hardly be done unless the artist is personally in sympathy with the object of the design.

The author cited various errors in the treatment of windows due to the unsympathetic artist. The designing of a church window should be a work of love, and the artist will not be satisfied unless the symbolism truly interprets the teaching. Stained glass for modern dwellings should be designed to form part of the decorative scheme; the building itself should be seen before preparing designs. Rich colour schemes should be used with the greatest care. Simple treatment in white glass has been used by some architects with the most satisfactory results, harmonising admirably with any style of decoration. The importance of massing the design in domestic ornamented glass cannot be over-estimated. Referring to the full-size detail drawing prepared to give the architect an idea as to the general effect of the leads, the author pointed out that this was not a working drawing; a line drawing of the various shapes of the glass had to be prepared to guide the cutter in cutting the glass, and the glazier in piecing it together; unless every care was taken with this drawing all the architect's trouble might be lost.

Mr. A. J. Dix, after explaining the difference between stained and painted glass and defining the term "stained glass," said what he proposed to deal with was the making of what is generally understood by a stained-glass window—i.e., the using of the material in such a way that shall interest and charm by a variety of design and combinations of colour in which it may be employed. A design for a stained-glass window may be in any medium and upon whatever material that most commends itself to the artist, even painted on glass in transparent colours, or of small pieces of the actual coloured glass itself put together like a mosaic. Nor is it even necessary that a design should be made at all; the cartoon may be drawn in the first instance, and a colour scheme for guidance in choosing the glass may be a coloured photograph of the cartoon, or a sketch to scale of the lead-work, coloured in, perfecting the scheme already in the mind and suggested by a possible rough sketch made before starting the cartoon. In the author's opinion the highly-finished competitive design for a stained-glass window is a mistake, a delusion, a snare. An attractive design by no means a guarantee of a good window.

The capabilities of a maker of stained glass should be judged by his finished work and not by design. One very important point to observe is the architectural fitness of the design—i.e., its suitability as regards proportion, not only as a whole, but in detail. It should always be treated in such a way that will keep the window subservient to the architecture, about which there need be no fear if a strict adherence be observed to the natural limitation of the material. The position and size of window should be thoroughly considered, as much detail is often thrown away and a broadness of effect missed by over-elaborating a window which is only seen from a distance; also the amount of light one may safely exclude without over-darkening the interior of the building should be considered. Having referred to the cartoon and skeleton drawing, the author went on to speak of the selection of glass—perhaps the most interesting and absorbing stage in the work—and described the various colours or tones giving the most satisfactory results, and the method of their employment and arrangement. The practice of superimposing pieces of glass held together in one lead in two or even three layers, called plating, though occasionally a useful expedient, the author considered should not be resorted to until every resource had been exhausted to obtain the required colour or tone. As regards the best tint of white glass, one could not go wrong in choosing a tint so often found in early glass—i.e., a cool off-white hue. Describing the method of preparing and arranging the glass before painting, the author emphasised the importance of viewing the glass so prepared in a position against the light, as it will be in the window when finished. Now is the time to make any alteration desired. If the work corrections are not made now before the work is painted, any offending pieces will be more difficult to eliminate, adding to, and should be one of the initial stage of correction, not only in the initial stage of the glass in its raw state, but as the work

proceeds, altering the work to obtain the effect aimed at as it progresses. In the process of painting, and, in fact, at no period, should anything be taken for granted; the work should be viewed in a perpendicular position, and from as great a distance in the studio as possible, and no advance made until at each and every stage nothing suggests itself that could possibly be improved upon. The author went on to describe the process of painting the glass, the pigments employed, the firing, leading, etc.; and, in conclusion, he referred those who wished to make a study of stained glass to the works of Winston, Mr. Westlake's "History of Design in Painted Glass," Mr. Lewis F. Day's "Windows," and Mr. Wall's book in the "Artistic Craft Series."

Mr. J. D. Crace, in proposing a vote of thanks to the readers of the papers, said that it was impossible to follow them one by one, but there were a few which he might be allowed to refer to. He thought that Mr. Dix had done very valuable service in bringing before them in so conspicuous a manner the action of the atmosphere and rain upon old glass, and he did not think any of them quite realised the great extent to which the surface of glass was changed, and, of course, the admixture of black, which was what it practically came to, had a wonderful effect in toning and harmonising the colours. He quite agreed with Mr. Dix that no amount of weather would make a bad window a good one, but there was no doubt that the action of time was a very kindly one upon the harmony of colour. One point which he had rather hoped would have been touched upon was the great importance in stained glass of producing what was generally known amongst painters as the palpitation of colour, by varying the depth of the colour individually used in any one mass. There was no doubt that a great deal of the jewel-like effect produced in the best windows was the result of varying the amount of power in the colour presented both in the one mass and in those which surrounded and contrasted it. The art of putting colour together in a glass window was a sort of special art, inasmuch as that one had to deal with colour in a more intense and pure scale than in almost any other branch of art. Of course, the painter toned his colour as he went on, but, under any circumstances, could not produce so rich a result as even a moderately brilliant painted window. The very beauty produced by brilliancy was also a sort of standing danger. One of the points of great value to those wishing to influence the colouring of windows which might be executed for them was that of having the glass when selected arranged on a plate-glass screen. That was a most useful and necessary thing. It was necessary for the artist engaged on the work and to everyone concerned in the responsibility for the production of a good window. It enabled, in the first instance at any rate, any slip of judgment in choosing the glass to be corrected before too much labour had been expended on it, and it undoubtedly had the effect of showing the artist the accuracy of his work in its crudest form, and therefore enabled him to make the corrections upon a proper scale. He supposed that few men who really cared about their work ever could finish a window, even if it was headed up, without wishing to change a few portions of the glass. He would certainly recommend anyone who was interested in a window to carefully look at it against a light as nearly as possible like that which it was to be exposed to before it was finally soldered together. This final inspection would often save a great deal of trouble afterwards. He was glad to hear Mr. Gascoyne refer to the Florence windows, because he did not think that either architects or glass-stainers until recent years had given half enough attention to the lessons to be learned from Italian glass. Perhaps he ought to say glass in Italy, because there was a great deal of beautiful glass in that country which undoubtedly was produced by skilled Frenchmen brought there. At Florence and Siena a number of beautiful windows were produced from designs by Ghiberti, as well as by Ghirlandajo. He would only say to any young architect who might be going to Italy for other purposes that any time he could spend on stained glass would be time well



devoted. It is characteristic of the guide-books for English tourists that stained glass, as an object of interest in any Italian church, is rarely mentioned. To read Baedeker no one would suppose that at Florence the Cathedral, Sta. Croce or St. Maria Novella were full of splendid glass—the same at Assisi or Siena.

Mr. G. H. Fellowes Prynzne, in seconding the motion, said that Mr. Dix had stated with much truth that many of their churches had been ruined by restorations, but more, he thought, had been ruined by the bad glass put into them. If, as Mr. Dix had said, the artist in stained glass really would work with the architect, especially in church work, they would, he was sure, work together harmoniously, and the effect generally would be far better. It was that want of touch between the artist in painting and the architect that was so often felt in their churches. They found that after the church had left the hands of the architect one glass-painter was turned on and then another, and so a sort of competition ran round the church, for there seemed to be no unanimity and no unity of effect at all by such method, or rather want of method. He was sure that glass-painters must feel this themselves. Mr. Dix said that where he had the opportunity of putting in very elaborately-coloured windows it was a great opportunity, but he (the speaker) was not quite so sure of that. If there was too much of that single opportunity it was very often disadvantageous to other glass in the church, and to the general harmony of effect. The thing must be considered as a whole, and he was sure Mr. Dix would agree with that. When they got brilliant lights, as they would in the east, it was the greatest possible mistake to overdo the light glass. Of course, green glass, as they had seen, had been exaggerated, but he was not sure that it had not been an exaggeration in the right direction. As they all knew, white always exaggerated itself. If they put a piece of white next a piece of red the red must necessarily look smaller. The white really took away from, or rather spoiled, the proportion of the surrounding colours, so that little pure white could be used advantageously in stained glass—it must be toned with a very distinct tone of warm yellow or green. With regard to the cartoons Mr. Gascoyne had set before them, he might say that, in the cartoons and illustrations put before them that night, it would have been better if the lines separating the portions had been shown, because they become a very important feature in arranging the design. In all cartoons they were apt to be misled, for in the glass the lines were apt to come at very awkward places, and so it was obvious that in the cartoons they should be shown as much as the lead parts. The bars must be considered, for they were necessary to support the glass. Those who had been to Huy, in Belgium, must have been struck with the very long narrow windows with the single mullions running down, surrounding the apical east end of the cathedral. They were simply magnificent—not so much in the actual quality of the glass, but as to the colour introduced. The actual glass itself was not particularly good, but age had acted upon it to a certain extent, and the narrow and general massing of lines of colour were sublime in their effect. He agreed with Mr. Gascoyne in his idea of a man thoroughly entering into the symbolic feeling of what he designed, for this was absolutely essential. Unless the artist really had that feeling in him (and this applied particularly to church work) there would be but little to admire in his work, but they saw the mannerism of this or that stained-glass artist standing out in a window rather than the devotional or poetic effect he should try to get in the window. They often found artists who laid down a definite rule that they would not treat single lights with anything but single figures. He sympathised with them to a great extent when clients came and said, "We want a sea scene, or most elaborate pictures, brought into a space of about 9 in. or 12 in." That was hopeless in glass as a rule, and one sympathised with single figure treatment on the whole, but he thought it could be carried too far. He felt that there should be a certain amount of "lesson" or teaching in glass, whether historical, devotional, religious,

or whatever it might be. If they had a single figure, it was a very usual thing in the XVth century to find some sort of story, martyrdom or event in the life of the individual. It was common to find some historical or interesting event depicted below on a smaller scale, and very often there was a little inscription which did tend to interest the ordinary beholder. That was, of course, wholly independent of the scheme of colour which one would try to carry through. He did feel that the more the stained-glass artist could throw the real devotional feeling and poetry into his design, the better he would make his work, and this was the same with artists and with architects.

Mr. G. Hubbard said it had occurred to him sometimes in glass-painting that if they had more white glass introduced they would have a better chance of judging the richness of the colouring. As a rule, old glass always appeared to be a medley of colour. He did not say that the effect was not extremely charming, but he did not think it possible to compare one colour with another. They could not compare the full power or intensity of blue with red, and he thought he was right in saying they could only compare all colours with white, and unless they had a sufficiency of white glass they did not get a true appreciation of the full intensity of the colours. He did not say that they must have a clear, transparent white glass which would be dazzling, but when he was at Chartres he was struck with the richness and beauty of the glass in the window of the cathedral. He had the opportunity of viewing it, not only from the interior, but he got on to the roof and examined the glass from outside, and he found that the glass had been washed over with what appeared to be a sort of thin cement-wash. It occurred to him at the time that possibly the great richness of the colour was due to this cement-wash, and he would like to know whether that wash was put there to preserve the glass or whether to add to the richness of the colouring.

A member asked if Mr. Hubbard referred to the large figures in the nave.

Mr. Hubbard said it was XIIIth-century glass, but it was long ago that he saw it, and he did not remember which window it was.

Mr. H. Townsend said that Mr. Dix had referred to the American system of superimposed glass, and, while admitting that it produced certain beautiful effects, he said that it was not an entirely legitimate way of carrying out the work. Mr. Dix left it at that point, but he (the speaker) would like to know why it was a particular offence to produce by the means of glass, whether superimposed or singly, the best effect one could, and why one should hesitate to use double thicknesses if one thought one was going to gain in colour effect and value.

Mr. E. W. Hudson said that, with regard to the disfigurement of the glass by the saddle bars coming across the design, he believed it was a fact that the camees were made so well that it was almost unnecessary to introduce these cross-lines which naturally would be a disfigurement. He believed also in large windows it was the custom to adjust the bars rather to suit the principal lead lines. As to superimposed glass, he believed it was the fact that there were grades of thickness and grades of density of colour in the same glass, so that they could select them graded, which would give much the same effect as superimposed glass would give. They must have been struck with the beauty of the drawing of the cartoons shown, and also the executed glass, but one could not help thinking that they were intended to be viewed from very close down. With regard to the glass, it had to be placed at a much greater height if he supposed there was nothing amongst the cartoons showing the strength of the lines which would be adopted for 30 ft. or 40 ft. high. He was much struck many years ago with the painted glass in the Abbey Church of St. Denis, and thought that a magnificent effect was produced, but some years later he went with strong glasses and looked at it, and he never saw a more dreadful instance of drawing representing the human form divine than in that glass.

The Chairman said it was important, as was pointed out by Mr. Gascoyne, that in church windows there should be a strong

devotional feeling in the work. By that he took it that Mr. Gascoyne meant there should be no disturbing element in them, and that anything which seemed to suggest a problem to be solved was a mistake in a place of worship, for immediately the mind would be occupied in trying to solve the problem instead of being impressed by the beauty and quietness and silence of the windows. Another matter, which had been mentioned, and which was of importance, was that the building should be first seen before the glass was designed. If the stained-glass designer had no idea of the aspect or the height of the window from the ground he could not by any possibility design a window suitable for its position in the building. He had had experience of a case where some stained-glass windows were wanted for a staircase which was abundantly lighted, but was chiefly lighted from a skylight above. The windows were some 10 ft. from another building, so that there was no direct light upon the staircase windows. There was a competition for these windows. He knew nothing about it at the time, but several eminent artists were requested to send in designs, and it happened that the selected artist had not seen the building, and had taken no particulars even of the size of the opening, and when the window was sent down completed it was at least 15 in. too short, and the effect was disastrous. The work was entirely a failure, and the committee called him (Mr. Belcher) in to know what was the matter. The artist said that too much light had been supplied on the staircase, and that they should put electric light behind. The whole intention was spoiled, and he hoped eventually to have the window removed and proper glass put in. When he was a young man he imagined that he could design stained glass and do everything necessary in a building, and he did design some stained-glass windows, but was glad to say he had since removed them. Mr. Dix mentioned that it was important that the question of scale should be considered; that in the examination of a building and in noting the scale and general disposition of its parts the artist should be guided in the scale of his figures. The history of stained glass had not been much gone into, but it had been rather hinted that the XVth-century glass was that which they should endeavour to copy. He felt very strongly that, if possible, all their work should be designed in the XXth-century style, and that they should avoid, as far as possible, mere imitation. If they could develop the beauty of stained glass, by all means let them do it, and adopt every method and every feeling that came to hand, and also endeavour, as far as possible, to make it suitable for the positions which it was to occupy.

The motion was heartily carried. Mr. Gascoyne replied, and said that, with respect to the question of cement-wash outside the windows of Chartres Cathedral, what Mr. Hubbard saw was no doubt the effect of age, and was not cement at all. It looked just like cement, but it was simply the effect of age corroding the glass on the outside. They would notice the same at Cologne. With regard to the work at Florence, they could see one light in the Duomo Museum at the back where they had the opportunity of examining closely the glass which looked so well in the clearstory window, and they would be struck with the difference.

Mr. Dix also acknowledged the vote of thanks, and said that, in regard to the question of superimposed glass, he had given a strong reason in his paper for not liking it. It appeared to him that the method was not quite playing the game. If a man could not get with one layer of glass the effect he wanted in his stained-glass window, he thought he had better leave it alone. That idea would certainly be borne out if they wished for their work to be looked at when time and atmosphere had done their work. If they wished their work to remain until, as in the case of the York windows, it had to be placed between sheet-glass, then it would be impossible, with the superimposed method, for the glazier to put it together. What was supposed to be a cement-wash was absolutely due to the effect of the atmosphere. It had all the appearance of being washed over with cement, but it was simply decay.

The Chairman announced that the next meeting, for the election of members, would be held on January 8.



## THE ARCHITECTURAL ASSOCIATION.

An ordinary general meeting of this Association was held on Friday, last week, at No. 18, Tufton-street, Westminster, S.W., the President, Mr. E. Guy Dawber, in the chair.

The minutes were read and confirmed, and some nominations were read, after which the following gentlemen were elected members of the Association, i.e., Messrs. H. E. C. Claydon, R. N. Hewitt, G. T. Jell, F. J. Daniel, S. Davies, W. G. Wales, and Sir F. L. Rupert Ford, Bart.

The President announced the reinstatement of Mr. R. Hebert.

Mr. Tanner, hon. secretary, then announced the following forthcoming meeting:—The Discussion Section, January 3, when a paper would be read by Mr. P. J. Turner on "The Houses of Parliament" at 7.30.

He also announced the following donations to the library:—

"A History of Architectural Development," Vol. I, by Professor F. M. Simpson. Presented by Longmans, Green, & Co.

"Gothic Architecture in England," by Mr. Francis Bond. Presented by Mr. B. T. Batford.

"Practical Trigonometry," by Professor Henry Adams. Presented by the author.

"The History of London Building Acts, 1894 to 1905," by Mr. Bernard Dicksee. Presented by the author.

A vote of thanks was accorded to the donors.

*Church Towers and Spires.*

Mr. W. H. Bidlake then read the following paper on "Church Towers and Spires," which was illustrated by a large number of excellent lantern slides:—

"In a survey of the development and design of English medieval towers and spires, the prospect which stretches away before the mind's eye from Tudor to Saxon England is so extensive, and it may be viewed from so many standpoints, that it would be impossible in an hour's paper to do more than refer broadly, in some cases even superficially, to the more salient features which arrest the attention. Moreover, the subject is so attractive, and is capable of being attractively illustrated, that many have taken in hand to set forth in order its principal features, and I shall not attempt to adduce any new facts or invent any new theories. It is difficult, indeed, unless one is content with minor examples, to find any illustrations which have not already been given in that excellent series of drawings in "Wicks's Towers and Spires," which, since its publication in 1855, has been regarded as the standard work on the subject. And it is a subject which is so dependent on illustration that I shall rely on the lantern photographs rather than on any words of description.

I will first illustrate the historical evolution of the tower and spire, and its employment in connexion with the rest of the building, and then consider some special points relative to tower and spire design.

The typical position for the tower in an English church is the centre of the west end, making, with the western terminations of the north and south aisles, a symmetrical façade. Usually the tower stands free on its three sides, but occasionally the aisles are brought up to its western face.

As the tower in this position forms the western termination of the nave, it contains on its west face the central doorway and the west window.

The whole composition is evidently intended to impress the worshipper as he approaches it from the front. It is the frontispiece, behind which the church lies more or less hidden.

This is still more the case with the typical cathedral front, where two towers flank the central doorway, and the composition is still less suggestive of the sectional outline of the nave and aisles behind, especially when, as in so many French examples, the central gable is masked by a horizontal arcade.

It is not unlike, in its intention and conception, the façade of an ancient Egyptian temple, which masks the building behind, and in which the pylons flanking the central doorway may be compared to the western towers of the Gothic cathedral.

Occasionally, indeed, a still more magnificent façade is presented, either by extending the screen beyond the towers to flanking north and south turrets, as at Lincoln, or placing the towers themselves outside the

aisles, and decorating the extended front with splendid sculpture, as at Wells, or, grander still, the arcaded caverns of Peterborough.

At Exeter twin Norman towers form the transepts, while Ely is the only example of a cathedral with a western tower on the central axis, a position so common in the parish church.

Some of our cathedrals have no western towers now remaining, as Winchester; and poor, indeed, do their fronts appear in comparison with those we have been considering.

The dome of the Byzantine and the lantern of Spain and the South of France becomes, in Normandy, the central tower, and no Norman or Anglo-Norman cathedral was complete without it. In France the loftiness of the high vault compelled her architects to substitute for the central tower the elegant, but far less imposing, timber *fèche*; and if, after contemplating the wonderful loftiness and airiness of her cathedrals, we return dissatisfied with the low proportions of our own, let us find our consolation in the fact that this very lack of internal height has secured for us the retention of the central tower.

The typical Norman cathedral, then, had both central and western towers, as at Southwell, and it is only when all three are present that the English cathedral realises its full majesty, and becomes, in fact, one of the grandest works of man.

It is possible that each tower was intended—after the Norman period—to carry its spire. Not a few had timber and lead spires at one time, which have since been taken down. Lincoln once had small timber spires on the western towers, as shown on old prints, and a spire no less than 523 ft. high on the central tower. It is possible, too, that Peterborough was intended to carry spires on all its five towers, but Lichfield alone of all the cathedrals retains her triple spires, and these endow her with such grace that she becomes one of the most beautiful and distinctive in the country.

In the smaller Anglo-Norman churches a central tower, or, rather, one which occupies an analogous position on the central axis at the eastern part of the nave, is not uncommon, as at Ilfley.

Occasionally a western tower also exists, and this tandem disposition recalls the twin towers so common in Auvergne, as at Issoire and Brioude and in other parts of central France, although it is improbable that there is any historical connexion between the two types.

Of the Saxon towers still remaining, many of them are in the centre of the west end, as at Earls Barton, and it seems not improbable that the western position of the tower in subsequent styles was due to a continuation of this essentially English arrangement; a supposition rendered the more probable by the rarity of central-western towers in Normandy.

If we pursue the subject backwards, and ask what was the origin of these Saxon towers, we are led to the larger subject of the origin of the Romanesque tower, and to a consideration of those at Tours, Ravenna, Milan, and Central Syria. But this would lead us astray from our present subject.

Although the central-western position of the tower is the typical one for the parish church, the tower is occasionally found on one side, as at St. Mary Redcliffe, Bristol, or All Saints', Stamford. At Wisbech, the tower is almost detached from the church, and in the surrounding district may be found several instances in which it is wholly so.

The magnificent tower of West Walton, some few miles away, forms, in fact, the lych-gate of the churchyard.

Detached towers are also a local peculiarity of Herefordshire.

While in an overwhelming majority, the tower plan is square, the octagon is occasionally found, as at Stanwick; and in Northampton and Ireland the round tower is frequent, for the former due to the use of flint and the latter due to building quoins in that material.

Both Saxon and Norman towers must have been roofed with wood, and a simple squat pyramid, like those which the late Mr. Christian reconstructed on the Norman west towers of Southwell, must have been very frequent, because their construction would be the simplest and most direct.

But timber spires must also have existed, for they are represented in old manuscripts. Their form, in all probability, resembled the

ancient timber spires still existing at East Meopham and Newhaven, which, though not of actual Norman date, probably reproduce the design of the Norman originals.

This form of spire is octagonal in its upper portion, the diagonal sides bending out below towards the angles of the tower, which they meet in a point. Its shape is due to the timber angle-pieces of the spire being framed into a collar, which is supported by the hip rafters of the lower spreading sides.

This type of spire is common in Germany, as at Erfurt, and still more so in Scandinavia, as at Alskog and Bro, in the island of Gotland.

Its character varies considerably according to the relative slope of its upper and lower portions.

A fine modern example is that of All Saints' Church, Margaret-street, by the late Mr. Butterfield.

Both this form of spire and the squat pyramidal roof were subsequently translated into stone, and the former may be found as late as the Perpendicular period, as at Bythorn.

We may also suppose that an octagonal timber spire arose sometimes from the flat upper surface of the cornice, and gave rise to that form of spire so common in France, of which Christ Church, Oxford, is an example.

This form, however, like the simple pyramid, was destined to die out, while the broach spire which, if it did not originate in Northamptonshire, was certainly developed in that district, took its place in the Lancet period.

The broach spire is, in the main, a copy in stone of a timber roof, and its cardinal sides come down over the sides of the tower and end in dripping eaves, but the broaches which fill the triangular spaces between the diagonal sides of the spire and the angles of the tower are of true stone construction, and, whether their sloped sides meet those of the spire high up or low down, will determine very much the general outline and character of the spire.

At first these broach spires are of an obtuse angle, and have bold spire lights. They appear as veritable stone roofs, and, whether they rest on a slight cornice or corbel table, always overlap the walls of the tower to form dripping eaves. One of the noblest spires of this type is to be found at Frampton, a small village near Boston, hidden among trees.

In the towers of the Lancet period buttresses are sometimes employed in pairs at the angles—the diagonal buttress comes later—but they stop at the belfry stage against the flat pilasters which have been retained from the earlier style. The staircase turret likewise stops short either at the belfry stage or the spire eaves, and a corbel table is carried between the angle pilasters so as to offer an unbroken square as seating for the spire.

In some cases, as at Ely, Walsoken, West Walton, and Sutton St. Mary, bold octagonal buttresses occur at the angles of the tower, and reach to the cornice. These must either have been finished with pinnacles, as at Oxford Cathedral, or have carried timber spirelets in conjunction with an octagonal timber spire over the tower, as at Sutton St. Mary.

Possibly towers of still earlier date were similarly treated, for the Norman central towers of Norwich and Tewkesbury probably had pinnacles or spirelets at the angles, and Tewkesbury once had a timber spire.

With the exception, however, of an occasional saddle-back roof, it is improbable that any towers were considered complete in the Lancet and Geometrical periods without a spire either of timber or stone.

As the style advanced the broach spire became more acute and loftier, and the broaches and spire lights less in proportion. The broaches, moreover, began to take to themselves pinnacles either at the extreme angle of the tower or at their apex against the spire, or mid-way up the slope. The central spire of Lichfield has two pinnacles on each broach.

Next, the bottom spire light was no longer placed on the cornice, but higher up the spire, and the upper spire lights more frequently alternated on the diagonal and cardinal sides. Their gablets were frequently crocketed, and niches with crocketed gable heads were placed at the apex of the



broaches lying back on the spire, as at Ketton and St. Mary's, Stamford.

The spire itself becomes ribbed or ribbed and crocketed along its angles, and has an occasional horizontal band or moulding, and more pronounced mouldings and a more definite cornice mark its junction with the tower.

At length a momentous change takes place—cornice and dripping eaves are alike abandoned, and a passage is made round the base of the spire; probably a practical innovation to facilitate the repair of the spire; for spires were more frequently struck by lightning in those prelightning-conductor days than at present. For safety's sake the passage required a parapet.

Although the parapet might slightly overhang the faces of the tower, being carried forward on the cornice, especially when pinnacles supported it at the angles of the tower, yet it was necessary to set the spire and its broaches in a little so as to allow room for the passage. And thus commenced the shrinking of the spire.

Woodford is a simple example of a parapet carried round a broach spire, and, near by, Denford, across the meadows of the Nene, has a parapet carried round a spire of the timber type.

Some very fine steeples belong to this transitional type, and pre-eminent among them is Grantham. Not far away is Newark, evidently by the same architect.

Heckington is a particularly noble steeple of this type. It is of strong outline and fine proportions, and its large hexagonal pinnacles admirably support the lines of the spire. It has but little ornament—a little crocketing on the buttress gables, and some carved bosses in the cornice, and the belfry lights are single. It is one of those masterpieces which are independent of any added ornament for their beauty.

In the simple type of broach spire the lines of the broaches satisfactorily carried down those of the spire to embrace the angles of the tower, and, whether seen in front or diagonal elevation, there was a complete unity between tower and spire.

Not so with the parapet spire. The first effect of the parapet is to introduce strong horizontal lines between tower and spire. Its second is to cause a certain shrinking of the spire to allow a passage round its base. The third is still more important, and more pregnant of future development.

It results from the fact that, while the apparent breadth of the tower increases from the front to angle elevation in the ratio of the side to the diagonal of a square, that of the octagonal spire remains the same. Hence the spire which seems in correct proportion to the tower on front elevation appears too narrow and shrunken on the angle elevation, and the angle pinnacles in like manner appear to have moved away from it, leaving a disconnecting and awkward gap in the skyline.

As long as the broaches were retained their full height behind the parapet, as at Newark, this difficulty hardly presented itself.

But hardly had the parapet been introduced when the broaches began to shrink, and, ultimately, to disappear behind it.

Then commenced a series of experiments to overcome this double difficulty, namely, the disconnecting effect of the parapet between tower and spire on the one hand, and the difference between the apparent proportions of tower and spire on the front and angle elevations on the other.

The most evident solution, and the one that was at first attempted, was to make the angle pinnacles of the tower so massive and tall that the tower should seem to be carried up into the domain of the spire, and the pinnacles themselves should, on the angle elevation, appear to support the spire and fill up the gap between its sides and the angles of the tower.

These large pinnacles begin to appear, in fact, before the broach has quite disappeared, as at Heckington.

Other fine examples are to be found in St. Mary Redcliffe, Bristol, and the western towers of Lichfield Cathedral.

The disadvantage of this arrangement is that the pinnacles tend to block the passage round the spire.

At Oakham the pinnacles, though still massive, are rather smaller, and are connected with the spire by horizontal masses of

masonry, which are pierced so as to form bridges across the passage. It is the embryo of the subsequent flying buttress.

The second method adopted was to keep the tower pinnacles comparatively low and subordinate them to an inner range which filled the space between them and the spire, as in the central tower at Chichester, or the more magnificent one of Salisbury.

In fact, in this grand example, the problem seems solved. The inner pinnacles are a mean between the outer pinnacles and the spire, and the eye, following upward the lines of the tower, passes by easy steps from angle pinnacles to inner pinnacles, and from these to the spire itself. Tower and spire are welded together, and the unity of the broach steeple is restored. Moreover, the angle view is equally satisfactory with that in front.

Yet the parapet is not sacrificed; the tower and spire retain their respective characters, and there is not that confusion between them which one finds sometimes on the Continent, as at Freiburg and St. Stephen's at Vienna, in which it is impossible to say where tower ends or spire begins.

An elaboration of this idea is to be found at St. Mary's, Oxford. Here, in place of the tower pinnacles, each of the pair of buttresses at the tower angles carries an elaborate gabled and crocketed canopy over a sculptured figure, and the inner pinnacles are in two stages, with similar elaborate ornament, the whole combining with the spire lights to form a cluster of richly-decorated gables and pinnacles, from the centre of which the spire rises.

This type of clustered spire reaches its fullest expression in the south flanking tower of the west front of Peterborough, in which graceful triangular spirelets rise between tower pinnacles and spire having one side of the triangular base adhesive to the spire, and the opposite angle carried by the tower pinnacle, and allowing a clear passageway beneath. The height of the spirelets is so arranged that their apex is on the line drawn from the apex of the tower pinnacles to that of the central spire.

In contemplating such an example as this one recognises that the central spire is only one of a cluster, and has entirely ceased to represent the tower roof, as in such early broach spires as Frampton. It has, in fact, ceased to be an essential part of the tower, and has become only an ornamental accessory. It is, therefore, sooner or later, doomed to obey the inexorable law of extinction of useless members.

But there was yet a third way of connecting angle of tower with spire, and one which became very popular with the Perpendicular architects. It is to put a small pinnacle at the tower angle, and connect it with the spire by a flying buttress; a poor contrivance, but serving in some degree to carry the eye over the hiatus between tower-pinnacle, and spire on the angle elevation.

The buttress abuts against the centre of the diagonal side of the spire, and seems sadly to lack articulation, and its particular form suggests resistance to a thrust, which, if it existed, would make short work of buttress, pinnacle, and all.

Higham Ferrers and Rushden may be taken as typical examples of this method. Also Moulton and Whittlesea.

The magnificent steeple of Louth is the only one in which the flying buttress seems worthy of its position. No; I am forgetting, there is one at Newcastle, in which the flying buttress has run away with the spire.

At Middleton Cheney an inner range of small pinnacles is introduced, and these are connected by flying buttresses, both with the spire and the tower pinnacles. It suggests a tentative arrangement which, in the neighbouring church of King's Sutton, is fully worked out. Here the inner pinnacles are of fine proportions, while the tower pinnacles are mere outliars, but connected by a strand of stone which rather suggests open tracery than a flying buttress. This really belongs to the group of clustered spires, and is very elegant and beautiful.

We now come to the fourth and last method of uniting tower and spire—by the interposition of an octagon.

This occurs in its most rudimentary form at Abingdon, which consists in little more than setting the spire on an octagonal drum, and marking the junction by an embattled string.

At Exton, a beautiful little steeple, amid beautiful surroundings of wood and park, affords an excellent example of the employment of the octagon. The tower pinnacles finish in miniature embattled octagons, which assists in harmonising tower and spire and giving breadth to the design. The octagon, however, seems so evidently to exist at the cost of the spire that the latter looks somewhat strangled by it.

But you will already have forestalled me and arrived at Coventry first. It is impossible to speak of the association of octagon and spire without immediately thinking of St. Michael's.

Whilst elsewhere in the Perpendicular period they were more busy with towers than spires, the Coventry people seem to have reared their steeple as a vindication of the spire and a protest at its increasing neglect.

And a very noble steeple it is, although it excites our wonder as a *tour-de-force* as much as our admiration as a design. The truth is it looks a little too unstable; attenuation is written on every part; the octagon seems balanced on the tower, the spire on the octagon, and the weak eye flying buttresses add very little to the sense of stability, and rise too high from the tower pinnacles, which are themselves weak in outline.

The corona of open panelling at Patrington serves a similar purpose with the octagon, and may almost be regarded as such. A fine design is here marred by the ridiculous straddle tower-pinnacles and their flying buttresses, and the poor belfry windows.

If at Exton the octagon is taken out of the spire, at Wilby it is no less evidently taken out of the tower. The three stages are too equal, and the tower is low in proportion, and appears crushed by its load.

It is on the same lines as this steeple that some of the large German steeples are designed, to which I have already referred, and in which the tower passes insensibly into the spire, as at Freiburg, St. Stephen's at Vienna, at Cologne Cathedral.

At Graffham, near Huntingdon, the angles at the upper part of the tower are cut off by squinches carrying pinnacles to form an octagonal base to the spire, an arrangement of which Bloxham may be considered as an elaboration.

But if it is true that in the Perpendicular period some of our most famous spires were erected, it is no less true that it is the tower which is characteristic of the style.

For by this time the spire had come to be regarded so entirely as an ornamental adjunct and finish to the tower that there was no reason why, if the design required it, it should not be dispensed with altogether. The tower, too, is more in keeping with the pervading rectangularity of the architecture of the day.

Moreover, the spire was costly, and involved a more difficult problem in design and construction than a square tower with parapet pinnacles and a flat timber roof.

Not that one would wish to disparage the late Gothic tower, for it shares with the fan tracery vault, and the open-timber roof the honour of demonstrating to the world the vigour and originality of the English Perpendicular school.

That the Perpendicular builders were sensible of the value of the spire as a crowning feature of the design, the steeples of Coventry and Louth are sufficient witness, and they not infrequently erected timber and lead spires over towers which were otherwise complete without them, as, for example, the three towers of Lincoln.

As Northamptonshire and Lincolnshire, with Peterborough as centre, is the home of the spire, so Somersetshire, with Glastonbury or Wells as centre, developed the most important school of tower design, although Norfolk and Suffolk may lay claim to many excellent examples.

The Somersetshire type is sufficiently distinctive, notwithstanding considerable variation in individual towers, that it can be at once recognised.

Of lofty proportions, these towers are usually divided into three stages by string courses, and the buttresses, which are in pairs, are set in a little way from the angle of the tower, allowing the string course to peep out, as it were, at the angle. The buttress weatherings usually line with the strings, and carry crocketed pinnacles set



diagonally, and with one angle engaged with the buttress face above.

Similar pinnacles flank the windows of the belfry stages, pierce the centre of the parapet, or are employed at the tower angles with larger pinnacles to form a complex pinnacle system, in which at times an isolated pinnacle is hung out at the angle, supported by a grotesque below, and united above by a strand of stone to the main pinnacle, as at Huish Episcopi.

The parapets are usually embattled, and have pierced traceried panelling, and occasionally, as at Glastonbury and Taunton, are very elaborate. In these cases the angle pinnacles are usually of open tracery work.

The lower stages of the west wall is occupied by the Tudor arched door, enclosed within a square frame of mouldings, which are sometimes the plinth mouldings brought over. The west window is placed immediately over the door or at a short distance above. Niches for sculpture are often freely used for surface decoration, and the coupled belfry windows are usually filled with a stone lattice of pierced quatrefoils in place of the usual oak leaves. Occasionally, too, sunk quatrefoils form decorative bands beneath the main cornice or intermediate string courses.

There are several fine towers outside the Somersetshire district which belong, more or less, to this type, as at Wrexham and Evesham.

St. Neots, near Huntingdon, has an unusually fine tower for the district, with certain points of resemblance to the Somersetshire towers. But the strings and buttress weatherings do not line, the engaged pinnacle is of different design, and the belfry lights are insignificant, and go far to spoil the beauty of the design. The central portion of the parapet is carried up higher than the sides in a manner peculiar to this eastern district, other examples occurring at Huntingdon, St. Martin's, Stamford, and Wisbech.

A smaller, though not less beautiful, tower is to be found at Tichmarsh, in the land of spires, decorated with quatrefoil bands and gabled niches, and crowned with a forest of pinnacles.

Here, as in many east county towers, a band of quatrefoils is carried beneath the plinth weathering.

There are a few towers carrying octagonal lanterns, as at Irthlingborough. At Lowick the whole design is of excellent proportion, and the octagon ends in a corona of pinnacles.

But the grandest example is to be found at Boston, irreverently called "Boston Stump."



Greeks were very subtle in the refinements of some of their buildings; and there were many of these subtleties. He did not intend to speak of Professor Goodyear's amazing series, and, as to our English spires, they were made in some cases to bulge a little at the centre, just in the way the Greeks treated their columns. For instance, in looking at the details of Louth spire, he was struck with the clever way the entasis had been obtained; the builders did not bulge out the eight sides, but they enlarged the crockets half way up, and then gradually diminished them in size. The people who did that were as clever as the Greeks. So it was with the windows of the late spires; they got smaller and smaller in fixed ratio as they went up. But some diminished more rapidly than they ought to do, and the result was that, because of the sharp diminution of size, the apparent height of the spire was increased. He agreed with what Mr. Bidlake had said as to the slope of the weatherings of the buttresses.

Mr. Arnold Mitchell, in supporting the vote of thanks, said that two points had struck him. One was that the system and method of study which Mr. Bidlake had evidently given to his subject was one which might be commended to all students. Mr. Bidlake had traced the development of the tower and spire from the early to the late periods, and the knowledge he had shown them in all he said was only to be acquired by travelling here and there and examining, sketching, and photographing. It was only possible to get such an accumulation of knowledge by systematic and continuous labour and study. The constant visiting of many examples had enabled Mr. Bidlake to store up in his mind the facts as to the stages by which the late work grew from the earlier, and it was this particular presentation of his facts which made the discourse so delightful to follow. The other point was as to the way in which Mr. Bidlake had traced the development of the spire from the timber construction. It seemed to him (the speaker) that there was another point of view, and that was that, judging from the study of old examples, it was not necessarily a timber construction which originally started the spire; the spire may have been begun with the endeavour of the builders to build, if possible, in a permanent material. He found that where builders had acquired the necessary skill in the use of materials and tools, they abandoned perishable materials and built in stone. That was seen in vaulted roofs; as the builders attained facility in construction, the stone construction was applied to a wider space. That was seen in Normandy, in the tower especially, and it was the roofing of a tower with stone from which (it seemed to the speaker) the stone spire was developed. The tower finished internally with an oversailing course. On the oversailing course a second oversailing course was placed, and so on, and these oversailing courses gradually formed a little, low, pyramid roof, and the spire was only a prolongation of this. Gradually the pyramid form was raised, the faces became more and more acute, and so the spire form was achieved.

The Chairman, in putting the vote of thanks to the meeting, said that the illustrations shown were so good that one could not but regret that it was not possible to publish the photographs side by side with the letterpress; the reading of such a paper without illustrations was not half as good as reading it with them. One regret he had, and he was sure they would all share it, i.e., that Mr. Bidlake had omitted to show examples of his own work.

The vote of thanks having been very heartily agreed to,

Mr. Bidlake, in reply, said this was the first time he had been in the new premises of the Association, and he must say how great a satisfaction it was to him to find the Association so well housed. The preparation of the paper had given him a great deal of pleasure, and he sometimes thought that as to those who did any lecturing the benefit to the audience might be doubtful, but the benefit to the lecturer was unquestionable. Not only was the preparation of the lecture very agreeable to him, but it had obliged him to visit a good many places in order to get photographs—places he had visited years before on sketching expeditions. Sketches were out of court in a lantern illustrated

lecture like the present, and it was almost impossible to get architectural lantern slides without going to the buildings themselves and photographing them. As this had to be done in the latter days of autumn, he had to be very expeditious, and frequently had a race against the falling light. He thought he could give a lecture on the sorrows of a photographer in the dark days of October and November. What Mr. Bond said about entasis of spires was very interesting. Some spires had very pronounced entasis, like the spire at Caythorpe, which was almost cigar-shaped. He would like to refer to one of the best modern examples, the Victoria Tower of the Houses of Parliament, which, he believed, was originally designed to be a third as high again. After seeing the original design for the tower he felt that the actual work was disproportionate, and it was the parsimony of Parliament which, he believed, compelled Sir Charles Barry to build the tower no higher than he did. The original design showed a most magnificent tower, and one was filled with regret that the architect was obliged to curtail his design.

The Chairman announced that the next meeting would be held on January 19, when Mr. Lynn Jenkins would read a paper entitled "The Consideration of Sculpture by Architects."

The meeting then terminated.

#### THE SMOKE ABATEMENT CONFERENCE: THURSDAY'S SITTING.

ON Thursday last week the Conference arranged by the Royal Sanitary Institute and the Smoke Abatement Society was resumed at the Hall of the Royal Horticultural Society, under the chairmanship of Sir William Preese.

The Chairman, in opening the proceedings, commented on the difference in the atmosphere of London and Berlin, and said that Berlin was a city of cleanliness, owing probably to the use of stoves and patent fuel. It had been proved that carbon particles were the cause of the density and darkness of London fogs, and the presence of carbon particles in the air was proof of the imperfect combustion of coal in their domestic as well as their factory fires. Hence, the removal of this matter from the air meant not only purification of the air, but economy of production, for it must increase the efficiency of the furnace. The proposals to establish a few large power-houses on the river in London to supplant the seventy or eighty scattered generating stations which now existed, had one great merit, as it would abate the nuisance of smoke, and introduce more perfect methods of fuel combustion, and so reduce fog, for the cheapening of the cost of production of electric energy meant the adoption of every known means of economy. Internal combustion engines, where producer-gas was sucked in and exploded, was another promising field for the enthusiast. Probably the greatest sinners were the ordinary domestic grates, which were the most unscientific and inefficient heat producers in existence. The price of electric energy was falling so rapidly that the electric radiators would soon become a domestic comfort within the reach of all. In dealing with the remedies for the smoke nuisance Sir William pointed out that legislation was often obstructive, and the best method was to convince people of the economy of using smoke-prevention apparatus.

#### Stoking and Smoke Abatement.

Commander W. F. Camborne, in a paper on this subject, said that good stoking was the main factor in the prevention of the emission of smoke from furnaces. It was abundantly evident that the stoker of the present day should be an intelligent and well-trained man, with an education equal, or little inferior, to that possessed by an ordinary practical engineer. In this country there seemed to be no provision made for the instruction or training of men destined to become stokers for land service. The Prussian Government, in 1902, introduced a course of instruction for stokers, and in the Budget had allocated 2,000*l.* per annum for the purpose. He thought they in this country might well adopt some plan analogous to that inaugurated by the Prussian Government.

He would, however, substitute municipalities and county councils for the State. If instructional courses for stokers were instituted, and if employers gave a preference to those persons who had been properly trained, the result would go far towards mitigating the terrible smoke nuisance under which they all groaned.

#### Abatement of Smoke in Factories.

Dr. S. Rideal submitted a paper on the "Abatement of Smoke in Factories," which, in his absence, was read by Commander Camborne. In the paper the author had drawn up a report based upon returns furnished by manufacturers who had succeeded in securing the abatement of smoke in their factories. A circular letter was issued in February by the Coal Smoke Abatement Society to sixty-three firms inviting a description of their methods. Thirty-eight firms supplied information, out of which thirty-two agreed to the publication of their methods. Three of the thirty-eight firms had substituted gas-engines for steam plant, leaving for further analysis the information supplied by the thirty-five firms. Thirteen firms mainly ascribed their success in preventing the emission of smoke to careful stoking. The following are the list of the various fuels used:—Seventeen firms burned Welsh coal only; one Welsh coal and coke; two Welsh coal and hard steam coal; one Welsh coal and bituminous nuts; one Welsh coal and anthracite; four anthracite only; one anthracite and hard steam coal; one anthracite, coke breeze, and small house coal; four hard steam coal only; one "good small coal"; one bituminous coal; and one coke. Of mechanical devices for economising fuel, eighteen firms supplied the following information of the results of their experiments:—

One British fuel economiser (economical); two Martin's patent smoke-consuming door (economical); one perforated furnace doors (fairly economical); one Richard's patent for forced draught (economical); one special mechanical device (economical); one tubular fire bars, supplying heated air to back of bridge (economical); one Edwin Cole's furnace door—Cuddy's tubular bars (not stated); one Johnson's economiser and smoke consumer (slight saving); two chain grate stokers (one not successful with electricity generating stations, the other not running long enough to form an opinion); one induced draught (economical); one steam blower (not economical); one automatic air boiler (very economical); one Meldrum's forced draught and smoke preventer (very economical); one Meldrum's forced draught and smoke preventer (economical); one patent Venetian fire bars (effective, but extravagant cost of coal); one Venetian rocking furnace (saves 10 per cent. of fuel).

Two firms which had tried various mechanical devices emphatically disclaimed any benefit derived from them, and supported the evidence of other firms in favour of careful stoking. Two firms ascribed success to the height of the chimneys—this giving an excellent result, but, in addition, one of them, in addition to the fact that their boilers had been "set" with large flues. One firm was abandoning their mechanical devices in connexion with their boilers and steam engines, and was replacing them by electrical machinery in the hope of effecting an economy. It would be seen that the general consensus of opinion favoured skilful and careful stoking as of the first importance.

#### Artificial Production of Persistent Fog.

The Hon. Rollo Russell said it had been suggested that since mere combustion resulted in the projection of a very large volume of dust-laden gases into the air of London, and since vapour precipitation took place only on solid particles, many of which are microscopic or even smaller, therefore we shall be subject in London to an excess of fog whatever the fuel which may be used. It had been argued plausibly that the very fine invisible dust produced in countless millions from every gas jet would be competent, no less than the smoke particles from kitchen chimneys, to maintain the excess of London fogs. He did not know the theoretical, but they had the data on which to disprove this proposition. Fine invisible dust had been shown in the laboratory to be capable of producing fog by precipitation of vapour on cooling. On the other hand, they had the overwhelming evidence of experiments on a large scale against it—the evidence of the districts of anthracite coal, of towns where wood was burned, of towns where oil or oil-gas was burned, of towns where charcoal and gas were burned—that no excess of fog affected these places. In an excellent test case, that of Pittsburgh, coal smoke caused much



darkness and fog cloud. Then coal was superseded by oil-gas, which freed the city from obstruction. Then, after some years, coal was largely used again, and dark fogs returned. The chief problem for immediate practical purposes was the preservation of the cheerful open fire of sitting-rooms, including many kitchens, without the production of much smoke. Improvements in grates for more scientific feeding of fires would lessen the nuisance considerably. The most important immediate problem requiring solution was the easy kindling of fires with little smoke, careful stoking, and economy in fuel of the right sort.

#### Work of a Hamburg Society.

Mr. John B. C. Kershaw described the aims and work of the Hamburg Smoke Abatement Society, which is an entirely voluntary organisation of steam users, bound together by the common desire to obtain greater efficiency and less smoke for their steam-raising plant. Regular examinations of the plants of members, and the methods of working them, was undertaken by the expert staff of the society, and suggestions were made for improvements where such are required. The education and control of the firemen in the proper performance of their duties were also undertaken by the firemen instructors on the staff. Comparative tests of fuel and tests of smoke prevention and other appliances of a similar character were also carried out by the expert staff, and the results were circulated amongst the members of the society. From the figures given in the reports it was shown that there was a loss of 61 per cent. in efficiency of plant where untrained stokers were used. The practical lesson to be learned from the work of the society was that the smoke problem was to be solved, like many another problem, by the application of the old English method of self-help, which was now sadly out of fashion. What was wanted, however, was some society or organisation which would provide fuel users with the technical advice and oversight required for obtaining the smokeless combustion of fuel in their own works.

#### Reliable Observation of Smoke Densities.

Mr. Joseph W. Lovibond described the instrument which he had designed at the request of the Coal Smoke Abatement Society for measuring and recording the density of smoke as it issued from chimneys. In designing such an instrument he said that certain conditions must be complied with to make the readings reliable, viz., all observations must be made under similar conditions; the light used for comparisons must be uniform in character; in the scales of standards used for matching the divisions must be equal and the unit recoverable.

#### Smoke and Plant Life.

Mr. Arthur Rigg (member of the Council of the Royal Botanic Society) said that in 1880 Mr. Sowerby brought the question of the destructive effect of London smoke on plant life before the Society, and there seemed to have been no appreciable improvement or reduction in the number of fogs or their density during the twenty-five years since that complaint was written, and the evergreens, with other plants, are still crusted as thickly as ever with a black slimy product which comes down as fog. The author referred to a number of experiments which Mr. Brinsley Marlay had made, and, in conclusion, said it could be taken as a general rule that all trees or plants possessing smooth leaves can better resist the action of fogs than those which possess rough or hairy leaves, such as the foxglove, salvia, and common primrose. These and others of their kind suffer the most injurious effects. So far as plants under glass are concerned, similar conditions prevail, affecting such plants as, for instance, the Chinese primula and cineraria. In all cases, however, it is necessary to keep the glass clean by washing after the occurrence of fog. Apart from the injury to human health and life, due to fogs and sunless days, the vegetable world and plant life suffers also.

Miss M. Agar gave her experience on the same subject as a landscape gardener to the Metropolitan Public Gardens Association. She endorsed the conclusions of Mr. Rigg, and said the pity of it all was that things would grow in large towns if only the air

could be purified. Many country towns had famous private gardens, whereas the little gardens of the better-class London houses were generally eyesores of limp grass, smutty paths, and enfeebled privets. It was to be hoped that electricity and an enlightened public conscience might remedy this by abating the smoke nuisance.

Mr. Scott Menckrieff opened the discussion, and said he felt, after all, that there was something in the scheme which he proposed twenty-five years ago for taking less gas from coal and using the residual for fuel. He suggested that municipalities owning gas works should make experiments in this direction.

Mr. Gibson (Edinburgh) believed that, with the improved appliances for stoking, firemen working under normal conditions had the matter in their own hands.

Mr. W. H. Patchell (Engineer to the Charing Cross and Strand Electric Supply Company) said that he had seen blacker smoke in Berlin than in London. He had put his company to great expense in trying induced draught, and it had turned out a failure.

Mr. J. Geldard described the great improvement which had taken place in Bradford, and thought that machine stoking presented a solution of the difficulty.

Mr. R. S. Richards thought that London compared favourably with either Edinburgh or Bradford with regard to smoke. He looked forward to electric heating as a solution of the problem.

Dr. Ormandy (Warrington) said the cause of the failure of mechanical stokers was because they were left under the control of the engineering staff, and he suggested that they should be left to the chemists.

Mr. Aitken Berry said the Smoke Abatement Society did not make the law, but, in the interests of the public, they tried to see it carried out. It would be an admirable thing to give advice, as suggested by Mr. Kershaw, but they wanted funds to carry it out.

Mr. Rhodes (Central London Railway) complained that the Society persecuted those who had the difficult task of trying to remedy the evil. His company were making experiments at great cost, but they were being closely watched all the time.

Mr. Baile Anderson (Glasgow) thought that municipalities should recognise their duty to the community by striving to get a clear atmosphere, and employers were beginning to see that they could save expense by having electric motors instead of steam boilers, and also improve the atmosphere.

The Conference adjourned.

#### FRIDAY'S CONFERENCE.

Sir William Richmond presided at the concluding sitting of the Conference on Friday. In his opening remarks he said they were aware that light gave life to colour, and that flowers lost their brilliant tints if placed in a dark cellar. Pictures became black or deep yellow if shut up in a case for any lengthened period. This had always been known to artists, and he had a letter from Rubens to a friend who he requested would have a picture which he had dispatched immediately taken out of the case and placed in the sun so that it should recover its clearness and brilliancy of colour. The Venetian painters were the great colourists of Italy, and it was related of Titian that it was his habit to place his pictures to dry in the sun, and he also allowed his pictures to remain out all night so that they might receive the benefit of the dew of the morning mists. Both these experiments he had tried in London, with periments he had tried in London, with disastrous effect. Some forty years ago a Royal Commission considered the desirability of transferring the whole of the national collection of pictures to South Kensington. Amongst the experts examined was Faraday, who said that every smut, however small, which remained upon the surface of a picture, even if the colour was dry, left behind it a greasy matter so potent that it could only be removed by a solvent of such a strength that, being applied, it would eat into the surface of the paint. Owing to the poison in the atmosphere of smoky cities the most noble and sphere of most durable of all methods of painting, the most durable of all methods of painting, the buon fresco, was out of the question. The failure to be permanent of the frescoes in the Houses of Parliament was mainly due to two causes. Firstly, the contact of the lime with

gas and other poisons, and, secondly, to an inadequate incorporation of the pigments within the strata of lime, the angles, and surfaces of crystallisation. But in the country, given that the walls of a building were quite dry, and there was pure water to be had, and no gasworks near, there was no reason why buon fresco should not be as permanent in England as in Italy. Until, however, they rid London from the poison of smoke, fresco painting could never be practised with security. Marble was poisoned by coal smoke and rendered powdery. The same action of the grease, which he had referred to with regard to paintings, acted upon the surface of marble. The absolutely priceless Greek, Assyrian, and Egyptian works of sculpture in the British Museum were slowly but surely decaying. That exquisite surface so dear to the great craftsmen of old was fast becoming granular. Washing with water was of little use, for water would not remove the essential oil deposited by poisonous smuts. Glass would protect the surfaces in a measure if it was hermetically sealed so that poison could not enter. Precious manuscripts were liable to the same deterioration. Bronze was easier to deal with because bronze could be cleaned with a solvent, but even here they were in difficulties because the surface of bronze, upon which was dependent so much of its beauty, was eaten into by the poisonous particles. All metals, even gold, were similarly injured. Stone decayed under the same causes. Upon the lintels of windows, inside as well as outside, of St. Paul's Cathedral was deposited in places a thick layer of hardened smoke, sulphur, and what not, and this layer was in constant action. It was alive with acid which was devouring the stone and causing it to decay into powder. They had to ask themselves if all this mattered, and, putting it upon the lowest ground of commercial interests, he asked if it was wise to risk a certainty of destruction, which must come sooner or later if public opinion did not push, and, by unanimity, force Parliament to legislate firmly and surely. Pressure from the outside was the only chance for reform. In any Bill before Parliament, however, they must watch, lest it be pruned down by sophistry and weakened at every point to provide a possible loophole of exit for persistent offenders.

#### Systematic Analyses of Air.

Sir John Ure Primrose, Bart., read a paper on "A Plea for a Systematic Comparative Analyses of the Air of Towns, and a Consolidation of the Law Dealing with Smoke Emissions," and gave the figures which the chief sanitary inspector of Glasgow, who was responsible for the abatement of the smoke nuisance in that town, had taken. These figures, he said, illustrated what might be termed the "smut fall in Glasgow" in spring and winter, and what he desired was that similar experiments should be made in London and the large towns of the kingdom in order (1) that notes might be compared; (2) that the education of the public might proceed on exact and scientific lines; and (3) that some reasonable standard might finally be adopted for town air, beyond which pollution might be considered flagrant and reprehensible. At present information under this heading was in a chaotic state. With regard to the consolidation of the law dealing with smoke emissions, the most casual glance at the various Acts of Parliament under which municipal authorities were now working showed the disparity which existed between them. Speaking generally of these Acts they all, with one exception, appeared to give power to abate the smoke nuisance, and then, by the use of certain limiting expressions, permitted a loophole of escape. In Nottingham alone the law seemed to be simple and perfect, for they had no qualifications nor limitations.

#### Amendment of the Law.

Mr. Julian S. Corbett spoke as to the amendment of sect. 24, subsect. 6 of the Public Health (London) Act, 1891, the working of which section, he said, had always been a stumbling-block. Difficulties had constantly occurred in proving that the smoke complained of was "black," for in each case a successful prosecution depended upon what degree of density would, in the opinion of the particular magistrate, satisfy the legislative conception of "black." Municipal



inspectors were equally human, and no means exists of defining the word "black" in such a way as would be binding upon either of them, except by Act of Parliament, and it followed that the administration of the law must remain in this difficult, uncertain, and cumbersome condition until the section in question was amended. A further reason which made such an amendment highly desirable was that, apart from smoke which more or less nearly approximates to "black," great quantities of noxious smoke were emitted which cannot by any stretch of words be called "black," and which yet was as noisome and offensive as the densest. The Society suggested that the section should be amended so that it should read: "Black smoke or smoke in such a quantity as to be a nuisance."

Mr. Joseph Hurst followed with a paper on "English Law Relating to the Emission of Smoke from Chimneys." He pointed out that the emission of smoke from chimneys might be dealt with under English law in the following cases:—(1) Throughout England where that emission is a nuisance at common law; (2) throughout England (except London) where that emission offends against the provisions of the Public Health Act, 1875, or against similar provisions in local Acts; (3) in London where that emission offends against the provisions of the Public Health (London) Act, 1891. The author dealt with the Acts in detail, and quoted a number of legal decisions bearing on the matter, and, in conclusion, said that up to the present time no legislation had been attempted with the view of minimising smoke from domestic kitcheners or grates. The height of buildings, etc., affecting the access of light and air had been the subject of drastic enactments; but the domestic kitchener or grate, which, by the smoke it sends forth, enormously affected light and air, had, so far as legislation was concerned, been left to work "its own sweet will." This seemed inconsistent with the principle which one would assume underlies legislation, under which domestic appliances in connexion with water, gas, electric current, etc., had been the subject of jealous regard, and were the objects of frequent domiciliary visits even in the neighbourhood of the domestic hearth. It was to be hoped that, as a result of the inquiries now being carried on by the Coal Smoke Abatement Society, with the assistance of the Office of Works and others, a domestic grate might be discovered which shall, by improved combustion, prevent, at least, black smoke. When such a grate was discovered, legislation would be not only desirable, but opportune, by which there may be secured to the consumer more beneficial use of fuel, and to the metropolis and to large provincial cities and towns brighter and clearer atmospheres.

#### Local Authorities and Smoke Abatement.

Mr. L. W. Chubb (Secretary of the Coal Smoke Abatement Society) gave details of the replies which had been received from 205 local authorities to a series of questions addressed to them as to what extent they had grappled with the problem of smoke abatement. Of the 205 reports those received from county councils did not call for comment, as such councils did not possess urban sanitary powers. Thirty other authorities confessed to having entirely neglected the matter; twenty-two authorities have special smoke inspectors; twenty authorities utilised the services of the police; forty-eight authorities had time limits for the emission of smoke; twenty-five replies showed that an increase of the nuisance had taken place; eighty said it showed a tendency to decrease; and forty said it remained stationary. In twenty-three metropolitan borough councils 4,353 reports of smoke nuisances were dealt with during the past two years. To sum up, the returns disclosed that, while the black smoke evil is very generally felt and deplored, relatively few local authorities have in the past taken a decided stand in the matter, and that, while this inactivity may sometimes be traced to apathy, it is more often due, not to any inclination to evade responsibility, but to a feeling of hopelessness in view of the uncertainty of obtaining convictions. Where authorities have taken a decided stand, however, even with the imperfect machinery at present available for the suppression of smoke nuisances, it is only fair to say that

they claim to have diminished the evil. Little improvement or zeal can be looked for until the law is simplified and extended, and a more summary and effective method of procedure provided. It is, perhaps, not too much to hope that the Local Government Board, in view of the suggestions made by important corporations, may see its way to clothe local authorities in the immediate future with the further powers for which they ask.

#### Views of Inspectors.

Mr. T. G. Dee (Sanitary Inspector of the City of Westminster) described the duties cast upon sanitary inspectors under the Public Health (London) Act, and said that if too much smoke was even now sent forth from chimneys the inspector was not to blame. He advocated bringing pressure to bear on the legislature to give fuller powers against the evil.

Mr. W. Nicholson (Smoke Inspector of Sheffield) was unable to be present to read his paper on "Smoke Nuisance Inspectors and their Difficulties." The author commented on the apathy displayed by local authorities in regard to putting the law in force, and thought the Government might compel such authorities to take action. The Government ought to divide the country into divisions, and subdivide it into districts, and appoint divisional and district smoke inspectors who would proceed against nuisances, irrespective of by whom created, without fear or favour. If such a suggested departure was too drastic, then the Local Government Board ought to make the position of the smoke inspector secure under the local authority as long as he did his duty. If security of tenure was given to smoke inspectors it would be a salutary step in the right direction.

A discussion followed the reading of the papers, and Sir J. Ure Primrose proposed the following resolution:—"That it is desirable to consolidate the various societies and bodies throughout the United Kingdom having for their object the diminution of smoke, and that the Coal Smoke Abatement Society are requested to take steps to attain that end."

Mr. Corbett seconded the resolution, and it was agreed to.

Votes of thanks were accorded to the different bodies who had given the members facilities for visiting their works, and the Conference ended.

## Fifty Years Ago.

FROM THE BUILDER OF DECEMBER 22, 1855.

THE TRADE UNIONS, we much fear, have done great mischief, and, conducted as they now are, will do more. Hundreds of thousands of pounds have been injuriously squandered, trade has been diverted to other countries, and the advance of the working classes has been retarded. They would even prevent men from working as long as they please. Take, for example, the following notice lately received, according to a local journal, by a mason in Leicester, because, being employed upon work where he had the advantage of light during only a few hours in the day, he committed the very heinous offence of filling up his time by working in his employers' yard at other times:—"This is to inform you that if you, insisting on going to Work Gaslight after you have been working out all day, you will be considered no longer a member of the Mason Society, but abide by the consequent.—We remain yours, In the Bond of Union, the Masons of Leicester."

## Illustrations.

### DECORATIVE PICTURE: "THE NATIVITY."

THIS illustration of The Nativity is from a cartoon by Mr. N. H. J. Westlake, to whom our readers have once or twice before been indebted for an illustration bearing on the Christmas season. The actual painting was executed as part of the reredos in the Church of the Annunciation, Chislehurst.

### ALL HALLOWS CHURCH, LOMBARD STREET.

THESE illustrations, which form part of the complete survey of the church by students of the Royal College of Art, are from one eighth scale survey drawings made on the spot by Mr. W. S. George and Mr. G. Woolway. They serve to put on record architectural features of a London church of much interest, the existence of which is no altogether safe, proposals for its demolition having already been made.

The history of All Hallows, Grasschurch begins from pre-Conquest times, and, as early as 1053, the church was given by Brightmer, citizen, to Canterbury, of which it forms one of the thirteen peculiars in London. The main fabric, as rebuilt by John Warner, sheriff, and his son, Robert, in 1494-1516, was destroyed by the Great Fire but the tower, completed in 1544, was standing, albeit in a dangerous state, in 1679. As rebuilt by Wren, and completed in 1694, at a cost of 8,058*l.* 15*s.* 6*d.*, All Hallows was the last of the City parish churches finished by him. The exterior, which can scarcely be seen from the street, evokes no especial comment; the tower, 21 ft. 6 in. at base, rises in three stages to about 100 ft., and is finished with a plain cornice and a high parapet, whereof the upper course has an arcade of well-designed plate-tracery work. On the south side of the tower is the porch with Corinthian columns, a cornice, and a small square block, with pediment above. The body of the church is almost a model, in practical qualities, of a church for congregational worship. It is not a regular parallel on plan; it measures about 84 ft. by 52 ft., and is 30 ft. high. The ceiling is coved against the walls with groined openings over the round-headed side windows which alone, until the opening in 1880 of the panel in the ceiling, lighted the church. The interior, however, is remarkable for the variety and beauty of its enrichment in the shape of wood-carving and other embellishments. A considerable portion of the carved work, including the pulpit (similar to that in St. Mary, Abchurch), sounding-board, and the lower portion of the oaken reredos, is attributed to Grinling Gibbons, and presents all the characteristics of his school. The beautiful white marble font and its cover, of which we give an illustration, are relics from St. Bene't, Gracechurch-street. Some other notable features are the altar, the oaken wainscot of the walls, the sword-iron near the pulpit, the handsome trophy of the Royal Arms in the "void," the glass (by A. Gibbs) in the ten windows, and the two door-cases, or lobbies, since used as cupboards, against the screen, in each of which a curtain is most cunningly carved. The church was repaired and beautified in 1947, and redecorated in 1890, at a restoration carried out in 1870, under the superintendence of Messrs. Francis, the organ—by Harris 1695—was rebuilt by Gray & Davison. In our number of April 15 last we published Mr. William Wildman's drawings of the front of the organ-case, and Mr. Walter George's drawing of one of the two door-cases mentioned above. The drawings appertain to a complete set of one-eighth scale drawings, which, together with working details of many of the wood and iron work fittings, were made by student of the Royal College of Art two years ago when the benefice was vacant, and proposal had been made, for the second time, to demolish the church and unite the benefice to the King and Martyr. Petitions against the demolition were made by the British Archaeological Association, and by many gentlemen eminent in art, science, and literature; the proposal was rejected by sixty-four votes to ten at a combined vestry meeting of the parishioners on November 12, 1903. The gateway was removed, with its door, from the Lombard-street entrance into the vestibule in the tower in 1865, at the time of the rebuilding of the adjoining premises; it is elaborately carved in wood with *memento mori* emblems, one of which, a coffin-lid, bears a date "1699." A chained Bible (1613), an Erasmus's "Paraphrase" in two folio volumes printed by Edward Whitchurch, at the Sun in Fleet-street (1548), are relics from the Great Fire which destroyed St. Bene't Church, Gracechurch-street. In the pulpit

Wesley preached his first extemporary sermon; and during 300 years, until 1891, sixty Blue Coat boys went to the church, on the morning of Good Friday, to receive apiece a new penny and a bag of raisins in terms of the will, dated April 24, 1586, of Peter Symondes, citizen and mercer. All Hallows now forms the mother church of St. Bene't, St. Dionis Backchurch, and St. Leonard, Eastcheap (or Milkchurch).

#### THE LONDON TOPOGRAPHICAL SOCIETY.

The annual meeting of the London Topographical Society, which was held at the rooms of the Society of Antiquaries on Friday the 15th inst., was very well attended. From the annual Report it appears that the number of subscribers is now 201, an increase of thirty-six since the last meeting. Fifty of the subscriptions are from public libraries and institutions, of which ten are American and one Colonial. The last publication of the Society consisted of reproductions of the maps of Ralph Agas and of Faithorne and Newcourt, copies of which were hung on the wall. Some remarks on these maps may be of interest.

Of the map engraved by William Faithorne, the Bibliothèque Nationale at Paris possesses a lettered copy; another, without title, and lately acquired for the British Museum, is, we gather, identical with that which was deposited for a while with Messrs. Stanford seven years ago by Mr. C. L. Lindsay. The survey, "composed by a scale [12 in. to a mile], and ichnographically described by Richard Newcourt, of Somerset, in the countie of Somerset, gentleman," is dated 1662—one may doubt that it was ever published—yet it appears from internal evidence that the actual plotting had been begun a few years previously. For whilst it delineates Charing Cross, which, as Lilly records in his "Observations on the Life of King Charles," 1715, was pulled down in July-August, 1647, it does not depict the other Queen Eleanor Cross which stood in Cheapside, opposite Wood-street, until its demolition on May 2, 1643: confer Evelyn's diary *passim*.\* The *Illustrated London News* of December 8, 1855, announced the discovery in London of an impression of the Newcourt, being, we learn, that which was copied on five sheets, 75 in. by 39 in., by George Jarman, and published on May 1, 1857, by A. E. Evans & Sons, of No. 403, Strand, who had supplied the running title by means of a tracing of the impression in Paris. In May, 1878, Mr. Edward Stanford republished the facsimile printed from the five copper plates engraved by Jarman, which are still preserved. The total inhabited area as plotted amounts to no more than four and a half square miles, having Bunhill-fields and Clerkenwell to the north, and St. Giles-in-the-Fields village, St. James's Park, and Tart Hall and "Barkshire" (now the site of Bridgewater) House to the west; the south is bounded by Westminster, Lambeth, and a group of houses around St. George's Church, Southwark; northwards all is open country beyond Clerkenwell and Bunhill-fields, and on the east are only a few houses outside a line drawn from Whitechapel Church to the Tower, with the highways to Shoreditch, Wapping, and Limehouse. At the north, east, and south limits windmills are placed. The shipping below bridge is finely executed.

The map which is commonly attributed to Ralph Agas, who practised as a land surveyor chiefly in Suffolk during forty years, was first drawn, we may presume, at some time within the interval 1561-1576, inasmuch as St. Paul's is drawn without the spire that was destroyed by lightning in 1561, and The Theatre, which Burbage built in the liberty of Halliwell, Shoreditch, in 1576, is not plotted. There is an original impression in the Pepysian Library at Magdalene College, Cambridge. The copy belonging to the Corporation of the City of London was printed from wooden blocks, 6 ft.  $\frac{1}{2}$  in. by 2 ft.  $\frac{1}{4}$  in., but without either date or scale. *temp.* James I., whose coat-arms it bears at the top, though Queen Elizabeth's royal coat-arms are carried

\* Some new buildings up to about 1658 are shown; for example, the west side, Arch-row of Lincoln's Inn-fields, and "New Market" (Clare Market) opened in 1650. In the lettering the names of the churches have not "St." prefixed.



by the State barge. Agas's map has been often reproduced; in 1874 W. H. Overall, F.S.A., librarian to the Corporation, brought out an exact facsimile of the Guildhall exemplar, executed by F. J. Francis. In 1737 George Vertue concocted for the Society of Antiquaries a so-called "reproduction"; he inserted a date "1560" in Roman characters, and made sundry alterations and omissions, using some pewter plates, now conjectured to be spurious. The views of Oxford (1578) and Cambridge (1592) in the Bodleian Library are accredited to Agas, who died in his native town, Stoke-by-Nayland, Suffolk, on November 26, 1621, aged eighty or more years. Two letters written by him to Lord Burghley are preserved in the Lansdowne and Additional MSS., British Museum; one describes his labours in the fen lands, another, dated February 22, 1592-3, relates to land measuring and "plating," and cites the use of the "profitable staffe," a theodolite of some 20 in. in diameter, with a protractor of at least 1 ft.

Mr. Philip Norman, Vice-President, who occupied the chair, showed an exceedingly interesting set of slides illustrating all the hitherto discovered portions of the Roman wall of London, giving in the first instance a plan showing the assumed or (in regard to most parts) the known course of the wall. The photographs brought out admirably the characteristic features of the Roman masonry. It would be of little use, however, to attempt to follow Mr. Norman's remarks in detail without the illustrations on which he commented.

#### THE LONDON COUNTY COUNCIL.

The last meeting of the London County Council before the Christmas recess was held on Tuesday in the County Hall, Spring Gardens, Sir E. A. Cornwall, Chairman, presiding.

**Loans.**—On the recommendation of the Finance Committee, it was agreed to lend Camberwell Borough Council 1,815*l.* for housing purposes; Fulham Borough Council 25,000*l.* for electric lighting purposes; Greenwich Borough Council 2,750*l.* for extension of cemetery; Hammersmith Borough Council 1,848*l.* for street improvement and extension of river wall; St. Pancras Borough Council 21,772*l.* for purchase of property under Part II. of the Housing of the Working Classes Act, 1890; and Wandsworth Borough Council 1,530*l.* for street improvement. Sanction was also given to Stoke Newington Borough Council to borrow 18,020*l.* and 5,800*l.* for provision of dust destructor.

**Quantity Surveyors.**—The General Purposes Committee recommended, and it was agreed—

"That the seal of the Council be affixed to duplicates of the agreements entered into with the undermentioned quantity surveyors—Messrs. Ardning, Bond, & Buzzard, Messrs. Nethercot, Neighbour, & Nicholson, Mr. F. W. Brooks, Mr. J. Downing, Mr. H. B. Robinson, Messrs. W. H. P. B. Stradwick, and Messrs. Young & Brown.

That the seal of the Council be affixed to the supplemental agreement (in duplicate) with Messrs. J. Rider Hunt & Co., of No. 131, Queen Victoria-street, quantity surveyors."

**Lack of Employment.**—They also recommended:—

"That as there is an instruction to the various committees of the Council that the undermentioned conditions shall hold good with regard to any work which it may be found possible to offer the Central (Unemployed) Body for London as suitable for the classes of the unemployed qualified for assistance under the Unemployed Workmen Act, 1905—

(1) That the Central Body shall be the employers and responsible for the conditions of the employment as between themselves and the persons employed; (2) that the works executed by the Central Body shall be subject to supervision by the proper officers of the Council; and (3) that the amount of co-operation in cost on their part shall be such as is certified by the Council's officers to be the fair value of such work, be approved."

The recommendations were agreed to.

**Hammersmith Technical Institute.**—The following recommendations were made by the Education Committee and agreed to:—

"That expenditure on capital account not exceeding 25,500*l.* for constructional work only, in respect of the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute, be sanctioned.

That section "A" (art block) of the London County Council Hammersmith Technical Institute be erected, and that the working drawings, specifications, and bills of quantities therefor, submitted to the Education Committee on November 1, 1905, be approved.

That, in the event of the Works Committee agreeing to undertake the erection of section (art block) of the London County Council Ham-

smith Technical Institute, at the amount of the architect's estimate for the building, the work be executed without the intervention of a specification, and that the working drawings, specifications, bills of quantities, and building estimate be referred to the Works Committee for that purpose.

That, in the event of the Works Committee not being prepared to undertake the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute, tenders therefor be invited by public advertisement.

Tenders be obtained from selected firms, who make a speciality of such work, for the installation of a ventilation system in connexion with the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute; and that the firm whose tender is accepted be required to enter into a contract with the Council to execute the work as sub-contractor to the building contractor."

**Holborn Day Training College and Central School of Arts and Crafts.**—They also recommended as follows:—

"That expenditure on capital account not exceeding 111,610*l.* in respect of the erection of (i) the London County Council Day Training College, and (ii) the Central School of Arts and Crafts, on the site in Southampton-row, (Holborn), be sanctioned.

That the working drawings, specifications, and bills of quantities submitted to the Education Committee for the erection of (i) the London County Council Day Training College, and (ii) the Central School of Arts and Crafts, on the site in Southampton-row, (Holborn), be approved.

That, in the event of the Works Committee agreeing to undertake the erection of (i) the London County Council Day Training College, and (ii) the Central School of Arts and Crafts, on the site in Southampton-row, (Holborn), at the amount of the architect's estimate for the buildings, and subject to the Board of Education approving the working drawings of the Central School of Arts and Crafts, the work be executed without the intervention of a contractor, and that the working drawings, specifications, bills of quantities, and building estimate be referred to the Works Committee for that purpose.

That, in the event of the Works Committee not being prepared to undertake the work, tenders therefor be invited by public advertisement."

The recommendations were carried after discussion.

**The Building Acts Amendment Act.**—The Establishment Committee brought up a report on the question of the staff arrangements in the Architects' Department which would be necessary in view of the great amount of additional work which will fall on the department on the London Building Acts (Amendment) Act becoming operative. They reported:—

"The Council is required to deal with cases within one month from the deposit of plans (or two months during the summer recess), and a period of fourteen days only is allowed within which the Council may refuse to issue a certificate after notice of completion of this work. In all cases will thus have to be dealt with promptly and effectively. The Act also allows an appeal by the owner to the Tribunal of Appeal with respect to any requirement of the Council or refusal to sanction exemption from the provisions of the Act, and the preparation of plans and particulars to support the Council's case before the Tribunal of Appeal will become necessary. In all buildings will have to be dealt with, and the duties which will devolve on the department will be very heavy. They will consist, however, to provide a series of reports on applications and the preparation of plans and particulars in cases of prosecutions to support the Council's case. We may remind the Council that the details of the work will be the method of bringing into force the provisions of the Act were not those used by the Council, but, Parliament having by modifications increased the responsibilities of, and the work to be performed by, the Council, there is no option but to make adequate arrangements for giving effect to the provisions of the Act.

We have very carefully considered what assistance must be afforded to the architect to enable him to successfully cope with the very large amount of additional work falling on his department, and the Building Act Committee have also communicated with us on the matter. The work embraced in the Amendment Act is entirely new, and includes a series of buildings not hitherto under the control of the Council. In the absence of definite experience of this work it is difficult to forecast with precision what additions will be required to the staff. In the first instance the work will most probably be of a fluctuating character, and the additions to the staff will be mainly of a temporary nature. It is necessary, however, to provide a working organisation, and in the circumstances we are advised that the most satisfactory arrangement will be to amalgamate the work of providing means of escape in case of fire now dealt with in the two sections of the architects' department. The work would thereby be concentrated, and, moreover, we are convinced that it will be better to employ a staff that this work, which will be of a somewhat delicate nature, should be in the hands of experienced officials who have for years been trained in business somewhat similar in character rather than to appoint a staff of entirely new officials."

With regard to the permanent staff, they recommended that Mr. J. C. Stransom, A.R.I.B.A., be promoted to supervise the work. The recommendation was agreed to, and it was also agreed that expenditure not exceeding 50*l.* a week be authorised up to March 3 for the employment of assistants on

the unestablished staff in the Architects' Department. Other recommendations as to increases of salary of other officers were taken back for further consideration.

**Tramways.**—The following recommendations were agreed to:—

"(a) That the estimate of expenditure on capital account of 186,000*l.*, submitted by the Finance Committee, to cover the cost of the erection of the second portion of the Greenwich electricity generating-station and the Greenwich sub-station, be approved.

(b) That the estimate of expenditure on capital account of 250,500*l.*, submitted by the Finance Committee, in respect of the provision of the plant, machinery, and other equipment for the second portion of the Greenwich electricity generating-station and the sub-station in connexion therewith, be approved.

(c) That the capital estimates of 2,000*l.*, 15,000*l.*, 18,500*l.*, and 30,000*l.*, approved by the Council, in respect of preliminary works and expenditure in connexion with the erection and equipment of the second portion of the Greenwich electricity generating-station and the Greenwich sub-station, be cancelled.

(d) That the Highways Committee be authorised to accept any tender presented for the execution of the invitation of tenders for the execution of the several works necessary for the erection and equipment of the second portion of the Greenwich electricity generating-station and the sub-station."

**Norbury Estate: Brickmaking Operations.**

The Housing of the Working Classes Committee reported as follows:—

"When the Norbury estate was acquired by the Council, it was intended to be used for the purposes of dwellings under Part III. of the Housing of the Working Classes Act, 1890, one of the conditions of purchase being that the land which had been used by the vendor in the manufacture of bricks on the estate should be purchased by the Council. One section of the estate comprises a rising ground of clay, and it was decided to be levelled before the estate can be properly developed. Seen after acquiring the estate, therefore, the Council had to consider whether it would be better to dispose of the brick-making plant and bear the expense of carrying away the clay or to convert part of the clay into bricks which could be used in the erection of cottages after the estate had been levelled. The Council, after giving the matter full consideration, decided to adopt the latter course, and arrangements have since been made for the work to be carried on through the direct employment of labour.

The bricks already made are being used for the cottages which are in course of erection on Section A of the estate, and we consider it most desirable that the brick-making operations should be continued for the present. During the past season 2,326,000 bricks were made on the estate at an estimated cost of 4,035*l.*, the expenditure sanctioned by the Council being 4,000*l.*, and, judging from the appearance of the clamps and an examination of those already sorted, the output must, in our opinion, be regarded as in every way satisfactory. The brick-making plant is in good working order, and the cost of production would be seriously affected if the machinery were laid up at this stage. The bricks already made fall far short of the number that will be required for the development of the whole estate, and we would ask the Council to sanction the expenditure of 1,000*l.* on account of the operations for the current season until the Finance Committee shall have had an opportunity of fully considering the matter. The Finance Committee have agreed to this course being adopted."

They recommended accordingly.

Mr. Phillimore said he did not think that the brickmaking experiment had been an unqualified success, and he was sorry that it had not been under the supervision of the Housing of the Working Classes Committee. He had visited the estate, and saw that some of the bricks which had been produced were of an inferior quality, and he hoped that the housing work would not be sacrificed in order to make the brickmaking experiment succeed.

Sir Melville Beachcroft moved, and Colonel Rolton seconded, that the matter be referred back in order to have a further report on the matter, but the amendment was defeated, it being denied by some councillors that the bricks produced were inferior.

**Housing: Aylebury-place, Clerkenwell, and Union-buildings, Holborn, Scheme.**—The Housing of the Working Classes Committee reported as follows:—

"The London Aylebury-place, Clerkenwell, and Union-buildings, Holborn, Improvement Scheme, 1899, as modified in pursuance of the Order issued by the Local Government Board on October 14, 1905, providing for the erection of the accommodation of 1,250 persons of the working class shall be erected on the Union-buildings area, Holborn. The area, which comprises property in Leather-lane, Portico-lane, Verulam-square, Baldwin's-square, Dye-court, Providence-place, and Union-buildings is being cleared, and preliminary plans of the proposed dwellings were approved by the Secretary of State for the Home Department on June 16, 1904. The working drawings have now been completed, and it becomes necessary therefore that arrangements should be made for the erection of the dwellings to be proceeded with. It was originally intended that accommodation for 1,480 persons should be provided on the site, and an endeavour was made to secure the extension of the remaining operation under the scheme so as to enable this to be done. The necessary consent, however, was not obtained, and a portion of the site on which it was proposed to erect a block of dwellings containing accommodation for 230 persons, will remain to be



"(a) That new blocks of buildings be erected at

The modifications made to the Council's requirements, in the cases where the requirements were

compliance with the order, the Council is empowered to remove the danger.



The circumstances attending the case of Charing Cross Station are quite exceptional. The roof of the station has a span of 165 ft., and the plates of the roof girders are about 50 ft. above Villiers street, and, in view of the special circumstances of the case, we have appointed Mr. Arthur Ashbridge, District Surveyor for St. Marylebone, to act in conjunction with the interim district surveyor for the district, Mr. A. B. Hayward, in connection with the dangerous structure proceedings, and reports have been received from them to the effect that they have been assured by the railway company's engineer that the works indicated in the Council's notice will be proceeded with as rapidly as possible. Having regard, however, to the importance of the issues involved, we have requested the two surveyors to consult the Superintending Architect and the Chief Engineer of the Council whenever they think it necessary to do so, but it may be found desirable to obtain independent advice, and we therefore have to ask for authority to engage the services of an engineer to advise in the matter should such a course be found to be necessary. We are not at present able to state what fee would have to be paid for the services of an engineer of high standing in the profession, but the amount would be chargeable against the Annual Maintenance Estimates 1905-6, in respect of dangerous structures."

They recommended accordingly, and the Council agreed.

**Fire Stations.**—The following recommendations of the Fire Brigade Committee were agreed to:—

"That, in the event of the Works Committee being prepared to undertake the work at the amount of the architect's revised estimate, the work of erecting the new Knightsbridge fire station be executed by the Council without the intervention of a contractor.

That, in the event of the Works Committee not being prepared to undertake the work of erecting the new Knightsbridge fire station at the amount of the architect's revised estimate, tenders for the erection of the station be invited from selected firms.

That expenditure not exceeding 9,500l. be authorised in connection with the erection of the proposed Plumstead fire station.

That, in the event of the Works Committee being prepared to undertake the work at the amount of the architect's revised estimate, the work of erecting the Plumstead fire station be executed by the Council without the intervention of a contractor.

That, in the event of the Works Committee not being prepared to undertake the work of erecting the Plumstead fire station at the amount of the architect's revised estimate, tenders for the erection of the station be invited from selected firms.

That expenditure not exceeding 9,500l. be authorised in connection with the erection of the proposed Upper Holloway fire station.

That, in the event of the Works Committee being prepared to undertake the work at the amount of the architect's revised estimate (to be reported after the Christmas recess), the work of erecting the Upper Holloway fire station be executed by the Council without the intervention of a contractor.

That, in the event of the Works Committee not being prepared to undertake the work of erecting the Upper Holloway fire station at the amount of the architect's revised estimate, tenders for the erection of the station be invited from selected firms."

**Tramways.**—The following recommendations of the Highways Committee were agreed to:—

"That the estimate of expenditure on capital account of 2,300l., submitted by the Finance Committee, be approved in respect of the acquisition of a site at Hackney for an electricity substation for the Council's (Northern) Tramways.

That expenditure, on capital account, not exceeding 2,350l., be sanctioned in connection with the acquisition of a site for an electricity substation at Hackney.

That the Shoreditch Metropolitan Borough Council be again asked to give its consent to the construction of single lines of tramways along Curzon-road and Harwar-street, for use alternately with the existing single lines in Old-street and Kingsland-road.

That, subject to a satisfactory agreement being arrived at with the Middlesex County Council, the consent of the Council be given under seal, for the purposes of the standing orders of Parliament, to the introduction of a Bill to authorise the Middlesex County Council to construct tramways in the County of London.

That the Highways Committee be authorised to agree terms with the Middlesex County Council in respect of the construction of the tramways referred to in the foregoing resolution, providing for the granting of mutual running powers over the lines, subject to the terms of any such agreement being submitted to and approved by the Council before it is finally settled."

**Housing.**—The following recommendations of the Housing of the Working Classes Committee were agreed to:—

"That the estimate of expenditure on capital account of 1,700l., submitted by the Finance Committee, be approved in respect of a part of the Council's contribution towards the cost of carrying into effect the Brantome-place and Prospect-terrace, St. Pancras, schemes, 1896, under Part II. of the Housing of the Working Classes Act, 1890.

That the offer of Messrs. F. & T. Thorne to erect two blocks, Nos. 5 and 7, of cottages on section A of the Norbury estate, in accordance with a modified specification, and allow a reduction of 3 per cent. on the schedule of prices contained in their contract, with the Council, be accepted; that the Housing of the

Working Classes Committee be authorised to complete such arrangements as they may deem desirable for the erection of block 8."

**Stained-glass Panels, Fleet-street.**—The Local Government, Records, and Museums Committee recommended, and it was agreed:—

"That the offer of Mr. C. Y. Sturge to defray the cost of inserting stained-glass panels in the windows of the Council Chamber at No. 17, Fleet-street, be accepted; that the work of preparing the panels and placing them in position be carried out under the supervision of the Council's architect; and that the thanks of the Council be communicated to Mr. Sturge for his gift."

**Marble-hill Mansion.**—The Parks and Open Spaces Committee recommended, and it was agreed:—

"That the resolution of October 31, 1905, accepting the tender of Mr. J. Christie of 767l. for the adaptation for park purposes of the mansion at Marble-hill, be rescinded.

That the offer of Messrs. Chambers Brothers, of 800l., for the adaptation for park purposes of the mansion at Marble-hill, be accepted."

**The Aldwych Site.**—Upon the reception of the report of the Improvement Committee,

Sir M. Beachcroft asked if it were true that a syndicate had offered 50,000l. a year for a building lease of the Aldwych site, and that that offer had been refused.

Mr. Horniman, chairman of the committee, replied that two or three syndicates were negotiating for a lease, and the committee would, in due course, report as to which offer they considered as most advantageous to the Council.

The Council adjourned, after sitting for seven hours.

#### APPLICATIONS UNDER THE 1894 BUILDING ACT.

The London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

**Chalk-farm and Highgate Stations.**—Charing-cross, Euston, and Hampstead Railway.

**Hampstead and St. Pancras, North.**—Station buildings to be known as Chalk-farm and Highgate stations at the junction of Haverstock-hill and Adelaide-road, Hampstead, and on the west side of Junction-road, Islington, respectively (Mr. L. W. Green for the company).—Consent.

**Lines of Frontage and Projections.**

**Brizton.**—An addition to No. 205, Clapham-road, Clapham (Messrs. H. Wakeford & Sons for Mr. R. J. Dougherty).—Consent.

**Camberwell, North.**—Eleven houses on the north side of Halsem-road, Floden-road, Camberwell, (Messrs. P. Arundell & Sons).—Consent.

**Clapham.**—Projecting porches to seven houses on the south side of Rodenhurst-road, Clapham (Mr. J. Carmichael).—Consent.

**Dulwich.**—Buildings on the site of Nos. 24, and 26, Peckham-rye, Dulwich, to abut also upon Nigel-road (Mr. T. Chapman).—Consent.

**Wandsworth.**—Buildings on the south side of Upper Richmond-road, Putney, eastward of Roehampton-lane (Mr. E. J. Partridge for Mr. H. J. Hawkins).—Consent.

**Holborn.**—An iron and glass shelter in front of the main entrance to the Hotel Russell, Russell-square, Holborn (Messrs. J. W. Singer & Sons, Ltd., for the Fredericks Hotel Company).—Consent.

**St. George, Hanover-square.**—Five projecting pilasters on the Piccadilly frontage and five projecting pilasters on the Old Bond-street frontage of buildings upon the site of Nos. 44, 46, and 48, Old Bond street, and Nos. 87, 89, 91, and 93, Piccadilly, St. George, Hanover-square (Messrs. Read & MacDonald).—Consent.

**Strand.**—Addition of iron brackets and electric lights to an iron and glass shelter at the entrance of the Gaiety restaurant, Strand (Messrs. Jones & Willis, Ltd.).—Consent.

**Wandsworth.**—A building with a projecting balcony in front on the southern side of the Embankment, Putney, eastward of Ruvigny-mansions (Messrs. Bartlett & Ross for Mr. G. Ayling).—Consent.

**Brizton.**—No. 22, Atholfield-street, Stockwell, with a projecting porch (Mr. V. Vagnolini for Mr. W. P. Goosey).—Consent.

**Wandsworth.**—Two houses, with bay windows and porches, on the north side of Garratt-lane, Lower Tooting, between the houses known as Copplestone House and No. 1, Alice-terrace (Messrs. W. & C. Brown).—Consent.

**Wandsworth.**—One-story shops in front of Nos. 3 to 10 (inclusive) and 18 to 16 (inclusive), Margate-parade, Garratt-lane, Earlsfield (Messrs. T. Sheppard & Co.).—Consent.

**Camberwell, North.**—Buildings on the south-east side of Wyndham-road, Camberwell, at the

rear of the "Clarendon" public-house (Mr. E. Powell for Mr. W. Smith).—Refused.

**Lewisham.**—Additions to No. 164, Stanstead-road, Lewisham, to abut upon Cole-road (G. Tolley for Dr. A. McLean Cato).—Refused.

**Lewisham.**—Buildings upon the site of Nos. 299 and 301, Stanstead-road, Lewisham, to abut upon Stanstead-road and Ravensham-road (Messrs. Norfolk & Prior for Mr. J. W. W. Refused.

**Marylebone, West.**—Buildings on the north-east side of Maids Vale, Marylebone, to abut on Maids Vale and St. John's Wood-road (Mr. V. Galesworthy for the Governors of Harrow school).—Refused.

**Paddington, North.**—The re-erection of Nos. 7, 8, 9, and 10, Paddington-green, Paddington (Messrs. W. F. Meakin & Son for Messrs. Brocks Phillips, & Co.).—Refused.

**Rotherhithe.**—Buildings on the site of No. 2 Lower-road, Deptford (Mr. J. H. Bethell for Mr. H. Belleham).—Refused.

**St. George, Hanover-square.**—A project showcase in front of No. 80, New Bond-street, St. George, Hanover-square (Madame S. G. Ward).—Refused.

#### Width of Way.

**Hoxton.**—Buildings with external walls at less than the prescribed distance from the centres of the roadways of Wood's-buildings and K. John's-court, Great Eastern-street, Hoxton (Mr. T. H. Smith for Messrs. Brown Brothers Ltd.).—Consent.

**Newington, West.**—A building at the rear of No. 119, Newington Butts, Newington, with external walls at less than the prescribed distance from the centre of the roadway of Rose-court (Mr. H. L. Florence for Mr. A. E. Chittenden).—Consent.

**Woolwich.**—A building on the east side of passage-way at the rear of houses on the east side of Herbert-road, Plumstead, northward of Lollane (Messrs. W. Marriage & Co. for Mr. W. S. S. Refused.

**City of London.**—A building upon the site of Nos. 75 and 76, Lombard-street, City, with external walls at less than the prescribed distance from the centre of the roadway of such street (Mr. M. E. Collins for Messrs. Slazenger & Son).—Refused.

**Peckham.**—Fences in front of Nos. 1 and Wagner-street, Peckham, at less than the prescribed distance from the centre of the roadway of such street (Mr. J. P. Choate for Mr. B. Gale).—Refused.

**Width of Way, Lines of Frontage, and Deviation from Certified Plans.**

**Finsbury, Central.**—A block of flats on the eastern side of St. John-street, Clerkenwell, to abut also upon Rawstone-street (Mr. A. Ke for Mr. G. E. Chamberlain).—Consent.

**Lines of Frontage and Construction.**

**Kensington, South.**—The retention of a cycle house of a temporary character in front of No. 1, Victoria-road, Kensington (Mr. D. F. Pennant).—Consent.

**Clapham.**—The retention of a cycle house of a temporary character erected in front of No. 1, St. Peter's-avenue, Battersea (Mr. J. W. Mead).—Consent.

**Finsbury, Central.**—Three iron gangways connect at the first, second, and third floor levels Nos. 87, 88, and 89, Turnmill-street, and No. 1, Printers'-buildings, Broad-way, Finsbury (Mr. R. A. Jack for Messrs. R. S. Murray & Co.).—Consent.

**Holborn.**—Two iron gangways connecting the first and second floors of buildings on the north and south sides of Kennedy-court, Newton-street, Holborn, and two inclined iron gangways at an iron ladder in front of the buildings on the south side of the same court (Mr. J. Walters).—Consent.

**Hackney, North.**—Retention for a further period of a wood and iron covered way of temporary character at the entrance to No. 1, Stamford-hill, Hackney (Mr. F. Tite).—Consent.

**Westminster (detached).**—Two iron and glass shelters in front of the Hyde-park Hotel, Knightsbridge (the Crystal Manufacturing Company, Ltd., for the Hyde-park Hotel, Ltd.).—Refused.

**Formation of Streets, &c.**

**Norwood.**—A deviation from the plans approved for the formation or laying-out of new streets for carriage traffic, upon the Highview-park estate, Canterbury-grove, West Norwood, so far as relates to the formation or laying-out of the street known as Broxholme-road, where it adjoins Leigh Court-road of a less width than 40 ft., for the purpose of strengthening the retaining wall on south side of that street (Mr. J. C. Radford for Mr. J. Wilson).—Consent.

**Norwood.**—That an order be issued to Messrs. Douglas, Young, & Co., sanctioning the formation or laying-out of a new street for carriage traffic to lead from Brixton-hill to Lyham-road, Norwood (Messrs. F. W. E. Hookley, W. J. P. W. Kear, and R. W. Brading).—Consent.

**Wandsworth.**—That an order be issued to E. J. Partridge sanctioning the formation



laying-out of new streets for carriage traffic upon the Roehampton-lodge estate, Upper Richmond-road, Putney, and in connexion therewith the widening of Upper Richmond-road and Roehampton-lane (for Mr. H. J. Hawkins).—Consent.

Greenwich.—That an order be issued to Mr. C. Draper, sanctioning the formation or laying-out of a new street for carriage traffic to lead from Blackwall-lane to Grenfell-street, East Greenwich, and in connexion therewith the widening of Grenfell-street (for the South Metropolitan Gas Company).—Consent.

Greenwich.—That the Council in connexion with its sanction to the formation or laying-out of new streets for carriage traffic upon the Page estate, Vanbrugh-fields, Greenwich, to lead out of the south side of Westcombe-park-road and the eastern side of Park-wall, do permit the erection of buildings on the plot of land coloured red on the plan submitted by Mr. W. J. Kemp with his application on behalf of Mr. C. H. Polhill, for a modification of the conditions upon which such streets were sanctioned).—Consent.

Lewisham.—That an order be issued to Messrs. Norfolk & Prior, refusing to sanction the formation or laying-out of streets for carriage traffic to lead out of the east side of Ravensbourne-park, and the north side of Westdown-road, Lewisham (for Mr. A. E. Ruddy).—Refused.

Woolwich.—That an order be issued to Mr. C. Henery, refusing to sanction the formation of a street for foot traffic only at the rear of houses on the east side of Godfrey-street, Woolwich.—Refused.

Deviations from Certified Plans.

Marylebone, East.—Deviations from the plans certified by the district surveyor, under sect. 43 of the Act, so far as relates to the proposed erection of a building on the site of No. 11, Welbeck-street, No. 1, Little Welbeck-street, Marylebone (for Mr. F. M. Elgood for Mr. W. Hughes-Payne).—Consent.

Helborn.—Deviations from the plans certified by the district surveyor, under sect. 43 of the Act, so far as relates to the proposed erection of buildings on the site of Nos. 8 and 10, Parker-street, Drury-lane (Messrs. Davis & Emanuel for the Society for Improving the Condition of the Labouring Classes).—Refused.

Space at Rear.

Peckham.—A modification of the provisions of sect. 41 with regard to open space about buildings, so far as relates to the erection of Nos. 169 and 170, Piccadilly, with an irregular space at the rear (for Mr. W. Woodward for Messrs. Leon).—Consent.

Working-Class Dwellings.

Camberwell, North.—Dwelling-houses to be inhabited by persons of the working-class, and proposed to be erected on a site at the rear of dwellings on the south side of Picton-street, Camberwell (J. A. J. Woodward & Sons for Mr. D. Dennis).—Refused.

Dwelling-Houses on Low-Lying Land.

Peckham.—A dwelling-house on low-lying and situated at Culmore-road, Peckham (Mr. J. P. House for Mr. S. Bryant).—Consent.

The recommendations marked † are contrary to the views of the local authority.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS.—Mr. C. H. Heathcote lectured, on the 14th inst., before the Manchester Society of Architects, on the lessons that are to be learned from America in the erection of buildings. Only one superiority in building methods, he said, had ever been claimed for the American—the claim of speed in construction. It was an important claim, and a just one, but its importance and justness had been exaggerated. The methods adopted by Americans were not a general vogue amongst English contractors, and yet many English firms, in a quiet English way, achieved just as much as any American, and on similar lines. But in a general sense English contractors and English architects might learn much from America, particularly as to the value of speeding up the work. Architects should strive especially to improve their drawings early, for contractors would realise that it was an all-round advantage to complete work as soon as possible. Mr. Heathcote guarded himself carefully against appearing as an advocate of hustling, but he thought that a walk down Whitehall and a visit to a five-story building that had taken eight years to construct and still had no roof would make one feel rather ashamed of English contractors' methods. He denied that American workmanship can hold its own with British; in New York the best brickwork is that done by English bricklayers; and he suggested as an ideal combination the quiet, self-respecting determination of the

English contractor's methods, coupled with the better organisation that the Americans have mastered. To encourage this there must be inducements—the proprietor must realise that it is to his advantage to get work speeded up, and must be ready to pay for it, so that contractors and architects and workmen all along the line may have added keenness in their work. It is the offer of an incentive, Mr. Heathcote says, that keeps up the enthusiasm of the American in his work, and the absence of incentive leaves the young Englishman comparatively listless. "Where will you find a building-construction clerk so anxious about his work," Mr. Heathcote asked, "as he is about the result of a football match?" On important works, he urged, there should be bonuses for completion before time at the same rate as the penalties for delay of completion, so that the contractor would have some real inducement to perfect his organisation and get the best possible results from those whom he employed. The greater freedom of workmen in America from trade union restrictions Mr. Heathcote considered to be a distinct advantage, and he argued that labour organisations made a grave mistake when, by disciplinary action, they blocked economic progress.—*Manchester Guardian.*

LEANS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At the rooms of this Society, on Thursday, the 14th inst., Mr. H. W. Willis read a paper on "The Architectural Planning of Public Buildings." Mr. G. B. Bulmer, President, in the chair. Architects, he said, often lost sight of possibilities open to them of planning the skilful arrangements of masses of building so as to appeal to the imagination and to produce those effects of beauty and interest which form an essential feature of great architectural works of all ages. Greek architecture, perfect as it was in its limited field, had given them few lessons in planning, while, on the other hand, in some Egyptian temples they found conceptions not surpassed in their mystery and grandeur by any mediæval cathedral. It was Roman work—it's basilicas, baths, theatres, amphitheatres, and palaces—which showed most clearly how far a magnificent and poetical conception might obliterate their sense of dissatisfaction at indifferent and other coarse architectural detail. None of the mediæval churches were so fruitful in suggestions for modern use as were the Basilican and Byzantine types of planning. Wren's ability as a planner could be best judged by his smaller churches, and it was difficult to imagine why Wren's interiors had not been taken as models for Dissenting chapels, in place of the hideous nightmares often afforded by such chapels, especially in Wales. Italian palaces afforded valuable lessons in planning, and the courtyard principle might be well adopted in many modern buildings. Some of the most valuable lessons in stately planning were found in the works of English architects, from the time of Wren and Inigo Jones to that of Sir William Chambers. Curiously enough, it was in designs of a domestic nature that they frequently found most fertile suggestions for public buildings. Greenwich Hospital he instanced as one of the finest groups of buildings in this country. There had been a great advance in the planning of libraries, especially in some of the recent American designs. In dealing with small schemes for public buildings, they should refrain from using all the site, and adopt a concentrated group of buildings, which were more convenient.

SHEFFIELD SOCIETY OF ARCHITECTS.—The monthly meeting of the Sheffield Society of Architects and Surveyors was held in the Lecture Hall of the Literary and Philosophical Society, Leopold-street, on the 14th inst., Mr. E. Holmes, President, in the chair. Mr. S. E. Fedden, A.M. Inst. C.E., general manager of the Sheffield Corporation Electric Supply Department, delivered a lecture dealing with "The Uses of Electricity in Modern Buildings." Speaking of lighting by electricity, he remarked that the invention of the electric incandescent lamp gave a great impetus to electrical illumination. The modern incandescent lamp was the result of many years of patient labour on the part of inventors and manufacturers, and the number now used per annum in the United Kingdom must be in excess of fifty millions. The majority were home-made. It paid the consumer to purchase a good incandescent lamp,

which had many advantages over a cheaper, second-rate article. For effective illumination, lamps should be hung so as to be easily avoided by the eye. The amount of light required to produce a satisfactory illumination could not easily be stated by any particular rule. Although shades stopped some of the light emitted by the lamp, they tended greatly to heighten the illuminating effect by shielding the eye from the direct rays, and thus allowing the pupil to open to greater extent. In the arrangements of the lights and switches lay the greatest possibility of economy in the use of electricity, and it would pay every intending consumer to consult his architect on the matter. Mr. Fedden proceeded to show how the electrical installation should be placed in the various rooms of an ordinary dwelling-house, detailing the varying positions for the lamps in the different rooms. He mentioned that in the electric lighting of a dwelling there was great scope for scientific and artistic work. The lighting of shops, although very varied work, always calling for change and novelty, had not yet in any sense become an exact science. A walk down the principal streets of Sheffield would enable anyone to obtain an idea of what could be done in that direction. One of the most successful fields for electricity was in the lighting of places of worship. The lights were placed only where required, and the method was effective and economical. After alluding to the various kinds of arc lamps, the lecturer proceeded to speak of electricity as used in heating and cooking. Apart from its many other great advantages the cost of electrical cooking was extremely low. The cost of heating one pint of water to boiling-point was approximately one-fiftieth of a penny. The time taken to cook food varied very much with the food, but a kettle giving 90 per cent. efficiency and taking half a unit per hour would raise 1½ pints of water from 60 deg. F. to boiling-point in twelve minutes. Three or four heats were obtainable on all cooking apparatus. The heating of rooms and buildings could be accomplished by either radiant or convected heat. With the former method heating was effected by the agency of glow-lamps, and with the latter method by resistances working at comparatively low temperatures. The difference between the two methods of heating was a very wide one, the best method to employ depending entirely on the nature of the work for which the heaters were required. It was necessary in deciding which type of heater would give the most satisfactory result to know the purpose for which it was to be used, and the conditions under which it would work. The glow-lamp was suitable for use out of doors and in balconies, owing to the heat being unaffected by air currents. Heating by electricity was not costly, the estimated cost of burning a four-lamp heater being 1d. per hour. The electric stove possessed great advantages over either coal or gas. They were very suitable for chimneys which had down draughts, and for places where it was impossible to have flues, whilst for bedrooms and sick-rooms the electric stove was practically indispensable. Of the many electrical medical appliances, the one most likely to be widely used was the radiant heat bath, a sort of artificial solarium. It consisted of a cabinet lined with mirrors, with electrical lamps fixed inside. The heat was reflected upon the patient, thus producing perspiration. Owing to the heat being dry, temperatures of three times that of a moist heat could be borne by the patient. The question of electric ventilating had received much attention from architects. For this purpose electric fans were eminently suited, owing to the ease with which they could be fixed to run in any position, and the little attention they required. They were now being largely used in all classes of workshops and factories. Electrically-worked elevators promised soon to displace every other form, being economical to work and reliable. The lecturer proceeded to quote figures showing the saving effected in the cost of running suitable machinery by electricity as against coal, and concluded by hoping that, when his audience heard the oft-repeated statement that electricity was in its infancy, they would think of the power of the future, they would think of the many uses to which it was put at the present time.—A hearty vote of thanks was accorded on the proposal of Mr. E. Holmes, seconded by Mr. W. C. Fenton.



**YORK ARCHITECTURAL SOCIETY.**—On the 15th inst. the annual dinner of the York Architectural Society was held in the Davy Hall Restaurant, Davygate. Mr. Arthur Pollard, President, in the chair. The Lord Mayor gave the toast of "The Royal Institute of British Architects and the Allied Societies." After sketching the inception and progress of the Institute, he said he understood that during the past entry to the Institute was to a great extent by examination. Still it was possible for Associates to be elected without the test. He was very pleased to learn that after December of next year it would be impossible for anyone to become an Associate of the Institute without passing an examination to show their fitness. He thought this was a step in the right direction, and those already associated with the Institute would agree that it should be made a little more difficult for others to join. He congratulated them upon having such a strong Institute, and he wished it further success. He did not know any place so badly off for houses between 50l. and 100l. a year as York, and that was a great pity, because people who came to York might settle down if they saw such dwellings. Mr. E. T. Hall, in reply, said that when the Government brought in the last Public Health Bill it was sent down to the Royal Institute for suggestions, which were gladly given, therefore the Institute did something salient for the benefit of the health of the public. He would have them join in thinking that the profession of architecture was one of the noblest. What would we know of Egypt but for its monuments? It was by the architecture that we knew what manner of people they were, and what grand things they did. Mr. Butler Wilson, also replying, said there had been a gradual evolution in the history of the Institute from the voluntary to the compulsory condition, and the chapter would be dated from 1834 to 1906. Mr. Belcher, the President, had suggested that they set to work to educate the public. It was obvious that side by side with the more systematic training of the architect more should be done to enlighten the public. But another suggestion was made, and that was the question of registration. He believed that there were men who would have the doors of the Institute closed to them, although they would be quite entitled to practice as architects. Was it desirable that they should be left outside? Was it fair that unqualified and uneducated men should be allowed to compete with qualified and educated men? Certainly not. He was very glad that there was a committee of the Royal Institute, of which he was a member, considering this matter, and it was particularly pleasing to observe the interest which the provincial members took in the business of the meetings. Mr. J. C. Butcher, K.C., M.P., submitted the toast of "The York Architectural Society," and congratulated the members on the successful career of the Society. It was founded nearly twenty-five years ago for the purpose of facilitating architectural and cognate studies. It had gone on increasing its membership, and had furthered its objects by various valuable methods. They were fortunate in Yorkshire in having the opportunity of studying almost every variety of architecture that existed in the land. There were many things which architecture had solved, but he believed there were still unsolved mysteries of the art. There were the round towers of Ireland, on the subject of which he had scarcely heard two people have the same opinion. The Chairman, in response, said the Society was sound financially, but, unfortunately, the area of operation in the county which had been allotted them by the Institute was mainly an agricultural one. They were not favoured with very many large towns, and their membership was scarcely equivalent to the area. He believed it did not include all the architects in the area, and he hoped these gentlemen would recognise the importance of the Society and join. He was sure that the registration of architects would lead to a better class of architecture. Mr. A. B. Burleigh proposed "The Archbishop of York, Clergy and Ministers of all Denominations," and said that if there was any fault to be found with the flying buttresses on the Minster it was not the fault of Mr. Bodley, but the fault of the designer in the first instance.

The Rev. H. Robinson responded. Mr. H. Davis proposed "The Guests," to which the Sheriff of York replied. He deplored the advertisements which defaced York, and he wished the Corporation would do something to remove these things, which marred the beauty of the city. Alderman H. V. Scott acknowledged also, and expressed the hope that many pupils would attend the architectural classes provided for them by the Education Committee.

**NORTHERN ARCHITECTURAL ASSOCIATION.**—A meeting of the Northern Architectural Association was held, on the 13th inst., in the meeting-room, Higham-place, Newcastle, the President (Mr. J. T. Cackett) presiding. The assessors' award was given by Messrs. Cackett and H. C. Charlewood in connexion with the "Measured Drawings" and "Sketches" competition. In the "Measured Drawings" competition Mr. Wilfred Lawson, of Gateshead, was given the first award, and Mr. Wm. Riddle, of Newcastle, was placed second. In the "Sketches" competition Mr. Arnold A. Constable, of Stockfield-on-Tyne, was placed first, and Mr. G. E. Matkin, of Sunderland, second. A lecture was given by Mr. Thomas Preston, ex-President, of Burnley, entitled "Italian Art and Travel." The lecture was illustrated, and Mr. Preston pointed out many of the beauties and features of Italian architecture and art.

**EDINBURGH ARCHITECTURAL ASSOCIATION.**—At a meeting of the Edinburgh Architectural Association, held on Wednesday, the 13th inst., Mr. H. O. Tarbolton, President, occupied the chair, and Mr. T. J. Querette, Newcastle-on-Tyne, delivered a lecture on "Ferro-concrete Construction." The lecturer referred particularly to the Hennebique ferro-concrete, and explained its uses, advantages, and various applications to buildings, bridges, bad foundations, reservoirs, etc. The lecture, which was illustrated by lantern slides, was followed by a discussion.

#### ENGINEERING SOCIETIES.

**INSTITUTION OF CIVIL ENGINEERS.**—At the ordinary meeting on Tuesday, the 19th inst., Sir Alexander Binnie, President, in the chair, the paper read was "Heat Economy in Factories," by Mr. H. A. Mavor, M.Inst.C.E. The following is an abstract of the paper.—In an investigation undertaken in 1898 on the comparative costs of power in factories in the United Kingdom, the author found great difficulty in obtaining accurate data owing in many cases to the fact that the fuel consumed was applied for heating as well as for power. This circumstance appeared to offer inducements for further examination of the question, and the paper is an account of a method of inquiry which has resulted in the simplification of the problem and in the acquisition of useful results. The method consists in dealing with the heat-production and distribution by a system of double-entry accounts, in which the boilers are debited with the heat represented by the coal and credited with the heat represented by the steam. These credits are carried to the debit of accounts dealing with the various uses to which the steam is put in the factories. These accounts, again, are credited with the work performed, the balances being carried to a balancing account, which brings out the efficiency of the prime movers and separates out the useful work and the losses in such form that the losses can be divided into necessary and avoidable losses, the whole giving a comprehensive view of the conditions of efficiency in terms of British thermal units. Six specimen balance-sheets are given in the paper, and the accounts are shown in detail, the cases chosen being:—

- (a) A factory in which there is a small amount of heating and a number of steam-engines.
- (b) A factory where the power is obtained from one large engine and the heating occupies a prominent place.
- (c) A similar factory where there are many engines and a scattered and complicated heating system.
- (d) A factory where there are a number of engines of various sizes and a considerable amount of heating and boiling.
- (e) A factory similar to (d).
- (f) A blast-furnace plant.

The balancing accounts in each case are discussed in detail, and indications are given of the methods of arriving at the results, showing the bearing which the ascertained efficiencies have upon existing methods of working and proposed modifications thereof.

#### COMPETITIONS.

**BRANCH LIBRARY FOR GREENWICH.**—Monday, the Libraries Committee of Greenwich Borough Council reported that a number of drawings had been received from architects in response to the advertisement inviting designs for the branch library. They had instructed the Town Clerk to communicate with the assessor as to the amounts to be made for adjudicating upon and exhibiting the designs.

**SCHOOL, NORTHAMPTON.**—Competition designs were invited by the Northampton Borough Education Committee for the Council school, which it has been decided to erect fronting St. George's-street and W. terrace. Twenty-five sets of plans were in by architects, and the assessor was H. O. Creswell, F.R.I.B.A., who placed the plan marked "P," sent in by Mr. Math. H. Holding, A.R.I.B.A., and second plan marked "W," the joint authors of which were Messrs. Herbert Norman and W. Gibbins. According to the specifications boys' department of the new school contain seven classrooms, each of fifty places thus providing accommodation for scholars. In the girls' department there also be seven classrooms, of fifty places each. In the infants' department provision is made for seven classrooms, of fifty places each, one classroom of sixty places, making total accommodation for the three departments 1,110.

**LIBRARY IN OLD KENT-ROAD.**—Southampton Borough Council is to invite designs for erection of a branch library in the Old Kent-road. Provision is to be made for a large department, a newsroom, a reference magazine room, and three rooms for a taker. Premiums of 50l., 30l., and 20l. are to be offered for the three best designs submitted.

**HOUSES, PORT SUNLIGHT.**—Mr. W. Lever some time ago instituted a competition among members of the Liverpool Architectural Society, gentlemen in practice invited to design seven cottages and assist to compete with plans for five cottages winners in each competition will carry out the designs by building houses at Port Sunlight, the second being awarded a premium of 20l. The premiums have been awarded by a committee of architects as follows: Architects—1, Messrs. Deacon & Horsfield; 2, Mr. T. Taliesin Rees, Assistants—1, Hazeby Adams; 2, Mr. T. J. Miller Reid.

#### BOOKS RECEIVED.

**HINTS ON BUILDING A CHURCH.** By H. Part Maskell. (Church Bells Co. London. 5s.)

**BUILDER'S WORK IN ITS LEGAL ASPECT.** Edited by Paul N. Hasluck. (Cassell & Co. 6d.)

**STATISTICS OF PUBLIC EDUCATION IN IRELAND AND WALES.** (Wyman & Sons. 2s.)

#### Correspondence.

##### IRON AND STEEL FOR CONSTRUCTION.

SIR,—Having been engaged on the design, construction, and maintenance of iron and steel structures, I should like to make a statement as to the life of these materials. It is taken as an axiom that all metals as they are taken from the earth are more lasting than which man has refined, consequently cast iron is more lasting than wrought-iron, and wrought-iron more lasting than steel. We have arrived at a time when all wrought-iron structures built about the year sixty of last century, before, should be carefully inspected and calculated for the loads they have to carry where the iron is subject to more than 2½ per cent superficial inch in tension, these structures should be strengthened in all members in tension. The members in compression are not so much affected by corrosion, and in fact, the power to do its work so quickly as that in tension. Engineers and architects have for many years been apt to treat cast-iron as a material out of date for constructional purposes, prejudice has arisen from a "scar" or "reliability," which was caused by the failure of a railway bridge near London, the reason of this failure was due to heavier passing over at greater speed, added to which had not been properly inspected before it was taken down; the outcome being that, on the ground of the Board of Trade, all cast-iron bridges on railways were to be replaced by iron or steel. In some cases



new bridges are not so strong as the old ones, and certainly they will not be so lasting.

It is to be sincerely hoped that this scare is near its end, and that engineers and architects will look with more favour on cast-iron, particularly in cases where the structures cannot be properly maintained.

Cast-iron structures are practically as strong today as they were sixty years ago. The Crystal Palace is nearly all constructed of cast-iron, and is a grand example of the use to which this durable and useful material can be put.

W. H. TOMKINS, A.M.Inst.C.E.

#### STANDARDISING QUANTITIES.

SIR.—The suggestions contained in the letter from Mr. Henry Riley, published in your issue of December 16th, must, I think, commend themselves to all surveyors who take a keen interest in their profession, for no doubt a definite and uniform system of measuring has long been desired by many of us. I believe that in one of the large provincial towns a system was some years ago agreed between the surveyors and builders.

I think that the manner in which Mr. Riley suggests that the method of measuring in the various trades should be dealt with is eminently practical, but I suggest that it would be desirable to include a representative of the building trade in each committee. To attempt to obtain uniformity throughout the whole of the country would, I fear, be a hopeless task, and I presume, therefore, that whatever was agreed upon would be known as "The London System."

L. A. FRANCIS, F.S.I.

SIR.—I think Mr. Riley, in his letter on this subject in *The Builder* of December 16, has opened a discussion of considerable interest to architects, quantity surveyors, contractors, and the building trades generally.

Without at present going into details, I desire to express my agreement with his views as to the desirability of arriving at some standard system in the preparation of bills of quantities for architectural works, and hope that others interested will avail themselves of your columns to express their views with the object of bringing the proposal to a successful issue. FREDR. BROWN, F.S.I.

#### HOLLOW WALLS.

SIR.—There is an opinion expressed in your most interesting article on "Rural Housing, etc.," in your issue of December 2, that would not, I think, hold good down here in South Devon. It is with regard to hollow brick walls, and your objection to them is because of the inaccessibility to the cavity except by vermin.

I have had considerable experience in the building of cavity brick walls, and have lived for seven years in a house so built myself, but have never heard of a single instance of the cavity being the source of trouble in any way.

There is an architectural feeling that a solid wall is better than one not solid. I myself would rather build solid walls, though only brick thick. I consulted that feeling alone, but they would keep out the wet, in this neighbourhood, even if rough cast in Portland cement. The bricks in these parts are not of the best, I admit, but I have yet to learn that a brick of good quality in a 9-in. solid wall rough cast in Portland cement would ensure a dry house. I feel convinced of the impossibility of making the house as dry as a wall like as a year round as a 9-in. cavity without the rough cast. It does not matter how the wind blows, or the rain beats during weeks of unoccupation, it keeps perfectly dry and habitable all the time, and the contents remain uninjured.

It is quite true, as you say, that "you can never be sure that weak points will not develop in process of time," but that remark applies to all methods and all things, and I myself feel quite happy on that score about the cavity as about the solid wall, but I should like to know the opinion of others.

T. ROGERS KITSELL.

Plymouth.

\* In saying that your remark that "weak points will develop in course of time" applied to all methods, Mr. Kitself surely overlooks the real point of our criticism. If weak points develop where you can see them, the mischief can be remedied; but if they develop where you cannot see them or get at them, it is a very different matter. That is the basis of our objection to concealed hollow spaces of all kinds; we cannot tell what goes on there. Seven years is not a very long test for hollow walls. As to 9-in. brick walls, our opinion has always been (and still is) that no exterior brick wall should ever be less than 14-in.; but the people who desire to build cheap cottages seem to have all given this up as an economic impossibility, so the only point is now preaching; all we can say is that all events give 9-in. walls some external coating.—Ed.

#### FIRE-RESISTING STONE.

SIR.—In reply to "Clerk of Works" enquiry in your issue of the 16th inst., probably the stone

that will suit him is a "firestone" from Godstone, in Surrey; it belongs to the upper green sand formation, and is a soft, calcareous sandstone, with fine siliceous grains; colour, greenish light brown, weight 110 lbs. to the cubic foot.

It is used for building purposes, but chiefly for the floors of glass furnaces, for which it is well adapted, as it resists the action of heat in a similar manner to the ordinary fire brick.

It is not a good weather stone, and therefore should not be used for external work, although stones from the vicinity of Godstone and Reigate, known by the various names of Reigate stone, Goston stone, Monstham stone, etc., are used in several churches and modern buildings in the neighbourhood.

Thick bedded stones are not available in the "firestone" series, 12 in. being about the maximum thickness.

There is also another stone which is spoken of as having fire-resisting properties, namely "Minera" stone, from Berwig quarries, near Wrexham, Wales. It is a fine, close-grained sandstone, resembling Darley Dale stone in colour and appearance; weight, 142 lb. per cubic foot. This stone was used at Liverpool Municipal Offices by Mr. T. H. Wyatt, Manchester; Owens College, by Mr. Alfred Waterhouse; and, notably, at the National Safe Deposit Company's building, near Mansion House, London, by Mr. James Whichcote, who in 1876 wrote: "After seeing and testing various samples of sandstones I decided upon adopting the Minera stone for its fire-resisting qualities; a block of it about 6 in. cube was put into the middle of a furnace, where it remained for about an hour and a half. It was then taken out quite perfect, and on being plunged into cold water it neither cracked nor calcined in the least degree. Its cost in London was about the same as Portland stone, and it was no harder to work."

The beds of Minera stone run from 1 ft. to 5 ft. in thickness, and blocks of any reasonable size can be obtained.

It should be stated that it is also used as a fire-resisting stone in furnaces.

W. R. PURCHASE.

#### SPECULATIVE BUILDING.

SIR.—With reference to Mr. Forsyth's paper on this subject, the remedy for all the evils caused by this class of building rests almost entirely with the public. The utterly depressing appearance of our suburbs, thousands of acres of which are covered with houses of the most atrocious and vulgar appearance, is a serious social evil, and is primarily the result of a section of the public requiring at the hands of the purveyor of houses shoddiness combined with cheapness as a *sine qua non*. With houses, as with furniture, the simplest are not always the cheapest, generally the reverse. Simplicity implies and demands good workmanship.

The application of meretricious ornament covers a multitude of sins, and is the great majority of speculative (formerly called jerry) building the whole of the joinery is purchased by the erector (I won't call him the builder) from firms executing or importing ready-made joinery, and the catalogue patterns of doors, windows, etc., are chosen from on the principle of most show for least money, the brickwork openings being made to suit the stock joinery.

The combination of stock joinery, stonework "carved" to stock pattern, lurid leaded lights, and startling plaster and cement work in gables, ceilings, etc., make a *tout ensemble* appealing to most of the speculative builders' clients. The remedy lies with them. Being so, neither the County Council, the Borough Surveyor, nor the Royal Institute of British Architects shall prevail. The case is hopeless.

ARTHUR R. MAYSTON.

#### COMPETITIONS.

SIR.—In the matter of competitions and competition reform, which we see discussed *ad nauseam* in the building papers, I think it is time that a word was said on the other side of the question. There are a number of members of the architectural world who seem to conclude that if their own efforts in a competition are unsuccessful, the said competition must have been badly assessed. A good, or rather a bad, example of this kind of thing is a letter from which I give the following selection:—"In this competition Mr. J. S. Gibson was the assessor, and the exterior of the successful scheme was strongly reminiscent of the Hull Free Library, both in detail and of the Hull Free Library opinion (and I feel sure many will agree with me in this) is that the more the work of our young architects is influenced by such buildings as the Hull Free Library, the more hope there is for the successful development of a national style."

Such letters as the one from which I have quoted, and my ill-conditioned spirit that they show, must injure the prestige of the profession, and probably prevent many a building committee

from adopting an assessor's decision, or even from appointing an assessor at all.

VAN MYER.

\* \* We entirely agree with the general spirit of Mr. Myer's letter. The manner in which competing architects who have not been successful constantly set up a cry of unfairness, and an endeavour to upset the assessor's decision, is very discreditably. It is like disputing the umpire's word at cricket, which is considered to be a thing no gentleman would do.—Ed.

#### SOLIHULL CHURCH.

SIR.—The mortuary chapel at Solihull parish church is now being restored, and the floor brought to its original level, and in digging down the workmen have come across an arched fireplace with fine and chimney. The date of the chapel is 1290, and the question arises—what use could have been made of the fireplace in such a position?

Could the chapel have been occupied by a church watchman? This is the only solution that occurs to me. The chapel is on the north side of the chancel, and the original floor is below the level of the chancel floor.

I should be greatly obliged for any light you can kindly throw upon the matter.

Solihull.

J. BAGNALL.

#### COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday, last week, the Lord Mayor presiding.

**Charing Cross Accident.**—The Streets Committee reported that as a result of this accident they had at once instructed the Town Clerk to write to the various railway companies, urging the importance in the public interest of at once obtaining a report as to the stability and safety of the stations in the City.

**Paving Works.**—It was agreed, on the recommendation of the same Committee, to accept the tender of Messrs. Muirhead, Greig, & Matthews for paving a portion of Union-row with stone for the sum of £561., and to rescind the resolution of June 22 last, accepting a tender of Messrs. Watson & Co. for the said work; also that the Val de Travers Asphaltic Company be called upon to maintain the carriageway pavement of Mansion House-street at 2s. 8d. per yd. super, per annum, and of Leadenhall-street (eastern end) at 1s. 6d. per yd. super, per annum, for a further period of fifteen years, in accordance with the terms of their contract. The Court also decided to carry out, at an estimated cost of 1,500l., the paving works necessary in consequence of the improvement recently completed in Royal Mint-street.

**Pollution of the Thames.**—A report was presented by the Port of London Sanitary Committee as to the outstanding references before the Committee relative to the pollution of the estuary of the Thames, and submitted correspondence with the War Office authorities as to the discharge of sewage from military establishments into the Thames, and also as to representations made by the Committee to other authorities on the subject of sewage discharge. Mr. Blake said that one of the excuses of the War Office for not having carried out the work was that they had not sufficient money to do so. Mr. Morton stated that the Thames Conservancy had served the War Office with a threat to prosecute. As a result the work was done. He hoped the Corporation would do the same.

**War Memorial.**—The City Lands Committee reported on a reference as to the proposed memorial in the Guildhall of the Royal Fusiliers; and recommended that a memorial in bronze by Mr. Pomeroy should be allowed to be erected on the internal south wall in the three panels of the bay west of the main door, the cost, about 500l., being borne by the applicants. This was agreed to.

**Store-Room and Dwellings.**—The Bridge House Estates Committee were authorised to expend an additional sum of about 350l. in connexion with the erection of store-room and dwellings at Tower Bridge.

**The "Student's Column."**—Owing to pressure of other matter this week, we are compelled to hold over our "Student's Column" article. In our next issue the two concluding chapters will be given.

**QUEEN'S JULIEN HOSPITAL, EARL'S-COURT.**—The new out-patients' department was opened on December 2. The building includes, upon one floor, a new surgery, four consulting-rooms, dispensary, and operation theatre, erected at a cost of 2,500l., after plans and designs by Mr. Blackford. The former out-patients' department will be cleaned and renovated for its conversion into a ward to receive nine in-patients. The board of management have in view, if their resources will admit, an extensive scheme for a general enlargement of the hospital in Richmond-road, at an estimated outlay of some 20,000l.



## OBITUARY.

Mr. H. H. COLLINS.—Mr. Hyman Henry Collins, of No. 31, Old Broad-street, and No. 39, Fenchurch-street, died at his residence, Frankfurt House, Randolph-road, Maida Vale, on December 18, aged seventy-two years. Mr. Collins was elected an Associate in 1859, and in 1877 a Fellow, of the Royal Institute of British Architects. He was a Fellow of the Surveyors' Institution, District Surveyor for the City of London, Eastern Division, and a District Surveyor for Buildings and Dangerous Structures to the Corporation of the City of London. He was a member of Council, British Fire Prevention Committee; member of Council, Architects' Benevolent Society, 1903-5, and was re-elected for 1905-6 and Alderman and Chairman of the Public Health Committee, Paddington Borough Council, having been first elected as Alderman for the new borough in November, 1900, and he had been during many years an active member of the old vestry. Of Mr. Collins's principal architectural works we have illustrated the following:—The Captain Lazarus, S. Magnus Memorial Synagogue, Upper Beakley-street, the interior in a Byzantine manner, in High-street, Chatham (September 10, 1870; interior); a large warehouse, for Mr. Fairbank, at the corner of St. Mary Axe and Canonville-street, E.C. (September 7, 1878); the Westminster Jews' Free School, Hanway-place, W. (October 6, 1883; with two plans); and St. James's Institute, Devon-square, thirty-three tenements, in Silver-place and Ingestre-place, Golden-square (March 27, 1886; view, plans, sections, etc.), for which his designs were selected in a limited competition; and the premises in Haymarket at the corner of Coventry-street, after the French Renaissance manner (September 3, 1887). He was the architect of the West London Synagogue, Upper Beakley-street, and the Church of the North London (Lofing-street, Barnsbury, 1868, Borough New (Heygate-street, Walworth), 1867, and Abbey-road (St. John's Wood) 1880, Synagogues—the last-named being in a free treatment of the Byzantine style; Nos. 8-9, Arundel-street, Coventry-street, W.; three blocks of working-class dwellings in Brady-street, White-chapel, for Messrs. N. & R. Davis, with the laying-out of a new street between Brady-street and the dwellings; new premises in Fetter-lane (east side), at the corner of West Harding-street, for Messrs. E. Bernard & Sons, silversmiths (1898), and in that year he was invited, with seventeen others, to submit designs for artisans' dwellings upon part of the Millbank, Westminster, estate, for the London County Council, for Messrs. N. & R. Davis he also formulated an extensive scheme for the making of a new thoroughfare, Teesdale-street, leading out of the north side of Bethnal Green-road, and the widening of Blythe-street and Old Bethnal Green-road, together with the erection of 141 houses fronting on Blythe-street and the new street for 1,622 persons, and similar schemes for widening parts of Langdale, William, James, and Samuel streets, Stepney, with the erection of about thirty new houses therein (1900-3). Mr. Collins prepared the plans and designs for a block of twelve residential flats upon a site between Brompton-road, S.W.; premises in Backchurch-lane, Whitechapel, for Messrs. Kinloch & Co., at a cost of some 25,000l. (1894); the block of offices and shops in Fenchurch-street between No. 119 and Cullum-court; premises for Messrs. R. Waygood & Co., lift manufacturers, at Falmouth-road, S.W.; premises at the corner of St. Paul's-churchyard and Dean's-court; new buildings on the site of Boord & Son's distillery, Bartholomew-close, E.C.; and a building for the Committee of the Home for Incurable Children, North-court, Finchley-road, N.W. With Mr. Marcus E. Collins he was architect of Audrey House, erected after the Renaissance style freely treated, upon a site of 14,000 ft. superficial, on the west side of Ely-place, Holborn, two years ago; No. 14, Avenue-road, St. John's Wood, N.W., at a contract for 16,575l.; and No. 39, Bishopsgate-street Within, for the Transvaal Gold Fields Company (1896-7); and the recent rebuilding of No. 23, and Nos. 26-7, St. James's-street, S.W. In April, 1904, Messrs. H. H. & M. E. Collins won the first premium in a competition limited to six architects for the rebuilding, at an estimated cost of 20,000l., of the City of London Lying-in Hospital, upon the old site in City-road, E.C. In conjunction with the late Professor Banister Fletcher Mr. Collins was architect of the block of buildings in Oxford-street, at the corner, east, of Wardour-street, for the Oxford-street Land Investment Company. In 1863-4 he was joint architect with E. Bassett Keeling for the erection, on the site of the New Exeter Change, of the Strand Music Hall, designed by Keeling, and remarkable for what the architect claimed to be the "Continental Gothic" of its brick facade, and for the method of artificial lighting from a chamber beneath the roof. The music-hall gave place to the (old) Gaiety Theatre.

Mr. O'CALLAGHAN.—The death is also announced of Mr. J. J. O'Callaghan, R.I.A.I.

and A.A.I. of Dublin, aged sixty-seven years. In 1894-5 Mr. O'Callaghan made drawings for the improvement of St. Macculin's R.C. Church, Lusk, and for the high altar and two side-altars: in 1898 he carried out some extensive alterations and improvements of the Burlington Hotel and Restaurant in St. Andrew-street, Dublin. He was architect of the College at Mullingar, Co. Westmeath, for the Bishop of Meath, and of many Roman Catholic churches and chapels, seminaries, convents, and similar institutions in Ireland. Mr. O'Callaghan was elected a member of Council, Royal Institute of the Architects of Ireland in December, 1900, and member of the Committee, Architectural Association of Ireland for the session 1903-4.

## GENERAL BUILDING NEWS.

CHURCH OF ST. JAMES, BARTON HARTSHORNE, BUCKS.—This church has just been reopened after renovation. The total cost of the work, which consisted of the entire renovation of the whole fabric, was 600l. The church originally consisted of a nave and a chancel, probably built, as indicated by the details of the architecture, in the nave, about A.D. 1230. In A.D. 1843 the old chancel was pulled down, and the church extended eastwards, the present chancel and shallow transepts built, and the whole fabric covered with a very low-pitch slated roof. The restoration commenced in June last, and it included the removal of the old chancel, and its flat plastered internal ceiling, added to the church in 1843, the whole being much out of repair, and the substitution of a new trussed rafter roof in seven bays, covered externally with red tiles, bringing back the external and internal proportions of the church to their ancient effect. New two-light windows have been inserted in the transept ends, and also a three-light window in the east wall of the chancel, and stone arches have been erected dividing the transepts from the nave. The high pews have been removed throughout the building, and new oak seating placed in their stead. The whole of the floor area within the walls has been covered with cement concrete, upon which has been laid hard stone paving in the chancel and gangways, and wood block flooring under all seating spaces. The new chancel screen, pulpit, reading-desk, and lectern have been executed in oak, and the church has been heated by Mr. John Grundy, of London. New brass chandeliers, made after an old example, have been provided to light the church. The altar hangings and frontal, designed by the architects, have been supplied by Messrs. G. Munter & Son, of London. The whole of the structural alterations, chancel, pulpit, seating, and other fittings have been executed from the designs, and under the superintendence of Messrs. P. H. Fielking and W. G. Horsman, architects, of Piccadilly, London, by the contractors for the work, Messrs. G. Tombs & Sons, builders, of Buckingham.

ST. MARGARET'S CHURCH, HUNTLY, N.B.—This church was re-opened on the 5th inst., after having undergone various internal improvements. The work was designed and carried out by Messrs. Earley & Co., of Dublin. Mr. Joseph Bligh was the foreman of the decorators. A new pulpit and communion rail, both of oak, have also been placed in the building, the former having been executed by Mr. James Antin, Huntly, and the latter by Messrs. Garvie & Sons, Aberdeen.

ST. JAMES'S CHURCH, CLARE, S.W.—The consecration of the new choir stalls, clergy desks, and organ, has just taken place here. The stalls, wall panelling, and organists' gallery, are all worked in oak in the late Decorated style, freely treated. The work is very massive, the book-boards and seats being 4 in. thick. Messrs. South-Smith & Monro were the architects, and Messrs. J. & P. Patrick the contractors.

NEW CHURCH OF ST. WILFRED, LIDGET GREEN, BRADFORD.—The plan of this church is of simple character, all the requirements being included in a parallelogram, containing a nave and chancel and two aisles, all at the four corners. Divisions contain respectively. Two porches at the west end, and clergy and choir vestries at the east end. The chancel continues from the nave without altered width or height, but is raised some three steps above the nave level, and the altar (raised some seven steps above the nave) is well in sight from all parts of the church. The whole church is rooled in with one unbroken roof from east end to west end, so that the space above the ceilings of the four corner divisions above mentioned, while adding to the spaciousness of the interior, serve as galleries should such be needed. The church is buttressed all round on the inside, arches being carried from buttress to buttress over the aisle windows, and so giving these last the effect of being deeply set in very thick walls. This treatment carried across the east end of the church gives a passage across the church behind the altar, connecting the north and south sides. The north and south nave arcades are buttressed from the internal aisle buttresses by a transverse arch carrying the aisle roof opposite each pier. The church seats some

620 people. A slightly sunk chamber at the east end of the church approached from the outside accommodates the furnace for the heating apparatus, and chamber for fuel, and also a water-closet and lavatory, etc. A plain panelled wall lining along each aisle carried up to near the bottom of the windows, and there finished with a wide projecting capping or shelf with a moulded coping along its top surface, takes the hot water pipes without their being exposed to the view, supplemented by a battery of pipes for the galleries formed by the two vestry ceiling efficiently and healthily warm the church without draught and without the aid of the dirty and very insanitary sunk trenches which so often cut up and disfigure the floors of a church. The church walls generally are plastered internally and faced externally with the local stone. The roof of the nave is covered with tiles and the roof of the aisles at a somewhat lower pitch are covered with the stone slates from the Fall Top Quarries. The church is paved with local stone flags, and the pews beneath the seats are boarded. The seating is of the new and elegant dressing, generally is in Weldon stone, and the side arcades and internal work generally is in local stone. The cost of the church without fittings was about 8,600l. The architect is Mr. Temple Moore, of London. The general contractors are, Messrs. John Thompson & Co. (Peterborough), the heating is by Messrs. John Jeffreys & Co., and the electric lighting contractors, Messrs. Belshaw & Co. Mr. J. Crowe, jun., was clerk of works.

WESLEYAN CHURCH, RUMNEY, NEAR CARDIFF.—The enlarged Wesleyan church at Rumney, has just been opened. The building has been modernised, a new school-room and vestry have been built. It has been built by Mr. John Chades, of Rumney, from the designs of the architect, Mr. H. P. Sanders, of Cardiff.

PRESBYTERIAN CHURCH, MARYLEBONE.—The new buildings adjoining the church in Upper George-street, Portman-square, were opened on December 15. They comprise a large hall on the ground floor, a hall in the basement for Sunday school work, a room on the top floor for social meetings, and smaller rooms for the church office bearers. The plans and designs were made by Mr. W. Flockhart.

ROYAL ARTILLERY THEATRE, WOOLWICH.—A play-house for the troops quartered at Woolwich has been erected on plans designed by Mr. W. G. R. Sprague. The theatre will accommodate some 1,100 persons, and can, upon occasion, be utilised as a ballroom.

MOTOR GARAGE, KENSINGTON.—The motor garage just completed in James-street, Kensington, has been erected after designs by Messrs. Croft & Co., of Victoria-street, S.W. It is built on a plot of 180 ft. to the street, and a depth of 45 ft., with accommodation for 200 cars. The basement forms an engineer's shop for repairs, a hydraulic lift communicates with each floor, and dressing-rooms and a bathroom are provided for the customers' use. The building is warmed with hot water throughout.

REBUILDING OF THE BRANCH BANK, 133-5, REGENT-STREET.—Messrs. R. B. Cross, Morrison & Son have been appointed architects by the London Joint Stock Bank for the rebuilding of their branch bank, Nos. 133-5, Regent-street. The two houses, at the corner north, of Heddon-street South, form part of a block on the west side of Regent-street, which was erected, it seems, after the designs of Sir John Soane.

REBUILDING IN CHEAPSIDE.—The new buildings for the Scottish Temperance Life Assurance Company are by Mr. Rowntree. They are Nos. 2, 3, and 4, and occupy a part of the old site as re-arranged after the recent widening of the street between the east end of Newgate-street and the corner of St. Paul's-churchyard.

UNITED SERVICE CLUB, PAUL MALL.—During the recess extensive alterations and improvements have been carried out under the directions and superintendence of Messrs. Isaacs & Florence. The additions comprise an enlargement of the ground floor smoking-room, and new lavatories, a new bar, a new room in the basement floor, which has been remodelled and provided with a staircase from the entrance-hall and a lift rising to the first floor. Improvements have been effected in the coffee-room and the kitchen and in the arrangements for ventilation and sanitation throughout the building. The Office of Woods Mr. George Green, of the Wolverhampton Borough Surveyor, prepared the plans, and the cost is estimated to work out at about 18,000l.

WORKSHOPS FOR THE BLIND, NEWCASTLE.—Workshops for the adult blind have just been opened at Newcastle. The new buildings are erected on a site of about 600 sq. yds, fronting the Victoria street, and a side street leading from City-road. On the ground floor a wood-chopping



shed and workrooms for bedding and mattress-making, etc. are provided, as well as store-rooms for straw and other materials. The general contractor for the building was Mr. Thomas Westhert; heating, Messrs. Emley & Sons; plumbing work, Messrs. Allinson & Sons, Gateshead; electrical lighting, Mr. Ernest Leng. The designs were prepared by Messrs. Little & Brown, architects, Newcastle-on-Tyne, and the work has been carried out under their supervision. The premises are heated by hot-water apparatus, with radiators, and ventilated by trunks leading to an extract ventilator in roof. The system of lighting is electric.

**Flour Mills, ELLENBERIE POINT.**—The Imperial Flour Mills at Ellenberrie, which have just been opened, were erected from the plans of Mr. John Clarke. There is accommodation for two complete milling plants, capable of producing about fifty sacks of flour per hour, but for the present only one plant has been installed. Messrs. Lister & Co., of Brunswick, provided the machinery.

**Post-Office, RIPON.**—New post-office buildings have been erected in North-street, Ripon. They are English Renaissance in style, the ground story being executed in Kentish rag stone, from the Quenland Quarry, the second of thin coursed brickwork, and the third, or attic, story is within a mansard roof covered with Butternere slates. The heating is partly by hot water and radiators, assisted by open fireplaces. The ventilation consists of fresh air inlets and exhausts opening into the streets. The architect is Mr. J. H. Burrell, Durham, the principal contractors being Messrs. Barker Bros., Hamphreys, & Co., Leeds; and the sub-contractor for carpenters' and joiners' work, Mr. J. H. Goldbeck, Ripon. The carving is by Mr. J. W. Milburn, York, and the plumbing and gas work by Mr. W. W. Warrington. The wood block flooring is executed by Messrs. Greary, Walker, & Co., of London.

#### SANITARY AND ENGINEERING NEWS.

**Water Supply, STRANRAER.**—At a meeting of the Stranraer Town Council on the 11th inst., the question of the water supply was considered. Previously the Council had resolved to spend £6,000, at the waterworks on the recommendation of Mr. Gilbert Thomson, C.E., Glasgow, and called in another expert. The names of three firms were submitted, and the committee decided, after a division, on Messrs. Hill & Hogg, Manchester. At the meeting it was proposed that this minute be rescinded, and that Messrs. Crouch & Hogg, Glasgow, being the cheapest, should be appointed to inspect the reservoir. On a vote, the recommendation of the committee in favour of Messrs. Hill & Hogg was carried.

**DRAINAGE BY-LAWS.**—The Public Health Committee of Addington reported on Monday the receipt of a letter from the Local Government Board forwarding copy of a communication from the Public Health Committee of the London County Council with reference to a suggestion made by the Royal Institute of British Architects that in cases of reconstruction, etc., of existing drains, a block plan of the premises and a written description of the drains to be reconstructed, etc., to be used was sufficient, and that the by-laws made by the London County Council under the Metropolitan Management Amendment (By-laws) Act, 1889, should be amended accordingly. The Public Health Committee of the London County Council stated that they had caused inquiries to be made, and had ascertained that the majority of the Borough Councils were opposed to the proposal. The Committee further stated that the London County Council had received no complaints as to the excessive stringency of the by-laws beyond that of the Royal Institute of British Architects, and that the views of the Royal Institute were carefully considered when the by-laws were in draft. The Committee added that they were not prepared, having regard to all the circumstances, to recommend the London County Council to alter the by-laws as suggested.

**SOIL AND DRAIN PIPES AND THE LONDON COUNTY COUNCIL.**—The attention of the London County Council is to be called to the fact that under the drainage by-laws made by the Spring Gardens authority it is required by By-law 8(4) that a ventilating pipe of a soil pipe or drain shall have an internal diameter of not less than 4 in., whereas by By-law 11 (paragraph 2) the minimum size of a soil pipe may be 3½ in., and by By-law 4 (paragraph 10) the minimum size of a drain pipe may be 3 in., so that sanitary inspectors are obliged to compel builders to put 4-in. ventilating pipes to 3½-in. soil pipes and 3-in. drain pipes.

#### FOREIGN.

**FRANCE.**—A temporary Salon for the Chamber of Deputies is to be formed in the Cour d'Honneur of the Palais Bourbon, pending the erection of the permanent building, the plans of which are being prepared by M. Nénot in collaboration with M. Buquet, the architect to the Palais

Bourbon. The new Salon will occupy nearly the space position as the old one. A Committee has been formed for the erection, at Colmar, of a monument to the late sculptor Bartholdi. A new general hospital is to be built at Verdun, in place of the establishments of St. Hippolyte, St. Nicholas, and St. Catherine, which are old-fashioned and defective. M. Laloux has been commissioned to carry out a monumental Hôtel de Ville at Roubaix, on the site of the existing building. The new Claude Bernard Hospital has recently been opened in the XIXth arrondissement of Paris; M. M. Renaud and Desbrosches are the architects. M. Nénot has been elected President of the Société Centrale des Architectes. The Conseil Supérieur de l'Ecole des Beaux-Arts have nominated M. Olivier Merson as professor at Ecole des Beaux-Arts in place of M. Bonnat. The Fine Art Committee of the Paris Municipality have accepted M. Bernard's four sketches for the decoration of the cupola of the Petit Palais. The designs symbolise respectively Ancient Art, Secular Art, Religious Art, and Modern Art. M. Leroy, architect, of Versailles, has been elected President, for 1906, of the Society of Architects of the Seine and Oise department. A transporter-bridge is to be established over the Seine at Quillebeuf, to take the trains of the new line from Havre to Pont-Audemer. The Marseilles Docks Company are about to construct a new graving dock which will take ships up to 220 metres in length.

It is proposed to hold at Lyons an exhibition of materials and processes connected with the Hygiene of Cities. The exhibition of Provençal art is to be held next year at Marseilles. The two days of the Cronier sale have produced receipts to the amount of more than 5 million francs. One picture by Fragonard, "Le Billet-doux," brought 420,000 fr.; and "La Mare dans le Forêt," by Rousseau, went for 110,000. The death is announced, at the age of 70, of M. Ernest Beaumont, architect, a member of the Société Centrale des Architectes. The death is announced, at the age of 74, of M. Adolphe Martial Thabard, sculptor. He was a pupil of Duret, and exhibited for the first time at the Salon of 1883, his work being entitled "Jeune Fille portant une Vase." Subsequently he devoted himself entirely to decorative sculpture, in which he had great success. Among his works may be named two bas-reliefs for the veterinary school at Lyons—"Une Léon de Clinique" and "Une Léon d'Anatomie"; "Le Génie de la Force," for the City of Pesh; "Le Pêcheur," for the Sorbonne; and "Justice," "Prudence," "Strength," and "Temperance," for the Church of St. Eustache. During many years he did not again exhibit at the Salon. He obtained a silver medal at the Exhibition of 1889, and was Chevalier of the Legion of Honour.

**THE PORT OF ANTWERP.**—Modifications have been necessary in the Government scheme for extending the port of Antwerp, described in our article of September 2 last, owing to the opposition of a section of the Belgium Chamber. The objections entertained refer to the military and not to the commercial portion of the project, and seem to be quite reasonable. For a small country like Belgium, 4,320,000 fr. is a large sum to expend upon the additional fortification of a single city, and we feel sure that the Government have acted wisely in deciding to reduce the amount to 2,850,000 fr., or less than three-fifths of the first estimate. By the compromise now effected the outer line of forts will stand as proposed in the Bill, but the inner line of fortification is to be replaced by a zone capable of being flooded at will, a device which is traditional in the Netherlands. The constructional details of the entire scheme will be referred to a mixed commission, including members of the Chamber and engineering experts nominated by the Government, but we believe that the commercial part of the programme will remain as originally settled.

**DISCOVERY OF LIMESTONE IN NORTH NIGERIA.**—Sir Frederick Lugard, High Commissioner of Northern Nigeria, in his annual report to the Colonial Office, just issued as a Parliamentary paper, writes:—"Professor Dumstrey's report upon the examination and valuation of the specimens secured by his mineral survey party has not yet been presented. So far as it appears that limestone of excellent quality, suitable for mortar, which will replace the costly import of Portland cement for all masonry work, occurs in many districts bordering the Benue. It remains to locate it at some point on the river's bank, where it can be easily shipped to all parts of the Protectorate. I may add that during my tour we verified the existence of limestone outcrops on the Gonzola rich at Gubja, near Gubja, and there were discovered deposits near Katagum, and most important of all, at a point on the Zungeru-Zaria road, not far from Zaria, and on the Wateri river, near Kano. I regard this discovery of limestone as of the utmost importance, and second only to a discovery of coal in its value for the internal development of the Protectorate. The construction of bridges, culverts, and buildings of

all kinds will, by its means, be greatly cheapened, and it is possible that its excavation, burning, and transport to the place where it may be required may become a native industry similar to that in Natron, which is now so widely extended."

**SOUTH AFRICA.**—A new parish hall, in connexion with St. Mary's Church, Johannesburg, was recently inaugurated. The new building marks the completion of the first instalment of the extensive church building programme in Johannesburg and in the diocese. The building was erected by Messrs. Templar Bros., the clerk of the works being Mr. E. T. Price. A fine new church is in course of erection in Thaba Ntshi, under the designs of Messrs. Kallenbach & Reynolds, architects, and under the immediate supervision of Mr. W. H. Ford. The contractor is Mr. L. de Waard, of Pretoria.

Estimates for the erection of a new Dutch Reformed Church in Newcastle, Natal, were being sent in when the last mail left. Already forty tenders from builders had been received, some coming from as far off as Cape Town. This, according to a local correspondent, emphasises the fact that the building trade is suffering very much from the general depression. The Lieut.-Governor of the Orange Free State recently laid at Edenburg the foundation-stone of a new Anglican Church. It is expected that the St. James's Mansions, situated at the corner of Eloff and Bree streets, Johannesburg, will be completed early in January. The building, which is four stories high and designed in the English Renaissance style, is for the African City Properties Trust, Ltd. The architects of the building, which will cost 50,000 l., are Messrs. McIntosh & Moffat, the builder being Mr. Joseph Pitts.

**UNITED STATES OF AMERICA.**—According to a report recently made to his Government by the German Consul at Seattle, stocks of American cement there were almost exhausted at the beginning of October, and contractors were obliged to purchase the imported article at 2-50 dollars per sack, or 50 cents advance on the price of the home product. Although the increased import trade which resulted gave an impetus to the building of cement works in the States of California and Washington, the demand for cement is considered likely to keep ahead of the supply by reason of the great activity in building projects in Seattle, Tacoma, and other growing places in Puget Sound, especially Everett and Bellevue.

**SWITZERLAND.**—The new Casino at Berne is to be built from designs by MM. Lundt and Hoffmann. The Church of St. Paul at Berne, designed by MM. Curgel & Moser, was consecrated on December 3. The new Astronomical Observatory is to be built at Zurich at a cost of about 1,650,000 francs. The old school at Berne, which was originally a Franciscan monastery and dates from the XVth century, is to be demolished.

#### MISCELLANEOUS.

**ARTS AND CRAFTS EXHIBITION SOCIETY.**—The eighth exhibition of this society will be opened early in January at the Grafton Hotel. It will consist of contemporary work in design and handicrafts (limited to the last twenty years, and not having been previously shown in London), such as designs, cartoons, and working drawings; decorative painting; textiles and needlework; glass, stained glass, enamel, pottery, jewellery, metal work, carving and modelling; plaster work, cabinet work; book decoration, calligraphy, illumination, printing and binding; wall papers, leather work, and other kinds of work at the discretion of the committee. A section of the exhibition will be devoted to a group of selected work from the leading schools of design and handicraft. The receiving days will be Thursday and Friday, December 28 and 29.

**MONUMENT TO SIR JOHN STAINER AT OXFORD.**—A monument to the memory of Sir John Stainer has been placed in position on the east wall of the ante-chapel at Magdalen College, Oxford. It is the gift of Lady Stainer, and consists of a mural tablet of brass framed in alabaster, executed by Messrs. Kett, of Cambridge, after a design by Mr. G. F. Bodley, R.A. **REFUSE DESTROYER FOR SOUTH AFRICA.**—Messrs. Manlove, Alliott, & Co., of Nottingham, are now engaged in shipping to Pernambuco the ironwork, firebricks, and other material required for the erection of a refuse destructor to the order of the Government of that State. The installation consists of seven cells or furnaces, one of which is specially arranged to take the carcasses of diseased animals. A water tube boiler is being supplied for the utilisation of a certain amount of the heat generated, and forced blast will be supplied alternatively by means of a combined fan and engine on Manloves' principle, and by steam jets. Hoisting apparatus is provided for dealing with the carcasses. The contractors are also shipping the ironwork for the roofs, tipping platform, refuse storage platform, etc., etc., rendering the plant complete with the exception of the ordinary building work, which will be done by local labour.



**THE LIGHTNING RESEARCH COMMITTEE.**—The Lightning Research Committee, having achieved the objects with which it was formed, that of collecting facts and publishing a report on the best means of providing against injury from lightning, held its final meeting at the Institute of Architects on Friday, the 8th inst., Mr. John Slater in the chair. The statement of income and expenditure during the five years of the Committee's existence was presented by the secretary. The Chairman, having made appreciative reference to the services of the secretary, Mr. Northover, who had conducted the very extensive correspondence of the Committee, prepared the various press notices, interim reports, and abstracts of documents, and rendered material assistance in the compilation of the final report, proposed that the balance of their funds, amounting to 25*l.* 5*s.* 9*d.* be paid over to the secretary, pointing out that this sum added to what he had previously received would bring his remuneration up to an average of a little over 20*l.* a year for the five years his services had been at their disposal. The proposition having been formally put from the chair was unanimously agreed to. The Chairman acknowledged the indebtedness of the Committee to Sir Oliver Lodge for the practical demonstrations he had so kindly given them in connexion with their inquiry, and for the preface to the report, and also to Mr. Gavey for the time, thought, and labour he had so freely given to the Committee, especially in the preparation of the report. A vote of thanks to Sir Oliver Lodge and Mr. Gavey was thereupon passed by acclamation. A vote of thanks was also passed to Mr. Killing-Hedges (to whom the inception of the Committee was due) for his gratuitous services as hon. secretary. The business concluded, the chairman formally declared the committee dissolved.

**MEMORIAL TO G. F. WATTS, R.A.**—On December 13, Sir William Richmond, R.A., unveiled a memorial to the late G. F. Watts in the churchyard of St. Botolph's, Aldersgate. The memorial consisted of a mural tablet 3 ft. high, containing a statuette of the late painter, executed in terra-cotta, and designed in the school of arts and crafts established by Mr. and Mrs. Watts. It is to Mr. Watts that we owe the erection of the cloister in the churchyard, latterly known as the "Postmen's Park," and its dedication by him as a memorial of deeds of heroic self-sacrifice which have signalled the lives of private individuals in the discharge of their duty or in the aid of others. The cloister was designed by Mr. Ernest George six years ago in the form of a covered way with a sloping roof supported upon light pillars, and Mr. Watts further undertook to decorate the sheltered wall with painted tablets to record and illustrate the acts of bravery thus commemorated. The memorial bears an inscription: "In memoriam, George Frederic Watts, who, desiring to honour heroic self-sacrifice, placed these records here." At the top are his own words: "The utmost for the highest."

**METROPOLITAN WATER BOARD.**—The Board have decided to accept a tender of 136,561*l.* 12*s.* 6*d.* from Messrs. J. Munro & Son, of Westminster, for the completion of the construction of a covered reservoir at Honor Oak. The highest of the thirty-nine tenders amounted to 260,480*l.*

**PRESENTATION AT NEWCASTLE.**—A complimentary dinner and presentation to Mr. Stephen Easton, chairman of the Tyne and Blyth Districts Building Trade Employers' Association, was held at the Hotel Metropole, Newcastle, on the 14th inst. Mr. Alexander Pringle occupied the chair, and Mr. R. Heslop made the presentation.

**FORMAN MEMORIAL, REPTON SCHOOL.**—The Bishop of Southwell recently visited Repton School for the purpose of unveiling the memorial in the chapel to the late Rev. A. F. E. Forman. The school chapel has been practically doubled in size during the last two years by the addition of an ante-chapel, a north aisle and a north transept for ladies, surrounded by an oak screen. The memorial to Mr. Forman falls in with the scheme, having been designed by Mr. T. B. Carter, the architect for the extensions, and the oak pulpit and vestry screen, with hand carving.

**PUBLIC LIBRARIES IN ST. PANCRAS.**—The Libraries Committee of St. Pancras Borough Council reported on Monday that they were continuing their inquiries in regard to sites for branch libraries in the vicinity of Euston-road, Camden Town, and Gospel Oak. They were also conferring with the Borough Engineer and the Borough Librarian as to the design for the branch library to be erected in Chester-road. The plans would be ready shortly. A deputation had been received from ratepayers asking for the erection of a branch library in the neighbourhood of Regent's Park-road and Gloucester-gate. The Committee had the matter under consideration.

**THE T-SQUARE CLUB.**—This Club appears to have been dissolved and re-constituted. At the first general meeting of the new Club, on the 14th inst., the chair was taken by Mr. C. W. Stephenson, and it was proposed by Mr. T. W. Aldwinckle,

and seconded by Mr. W. H. Webber, "That the T-Square Club as at present constituted be wound up." This being carried unanimously, it was then proposed by Mr. A. G. Pomeroy, and seconded by Mr. F. D. Clapham, "That the funds at present in the hands of Mr. F. C. Simpson, the Hon. Treasurer of the late T-Square Club, be paid over to Mr. W. H. Webber to defray the expenses incurred by the Suspension Committee, and that the balance be carried to the credit of the new T-Square Club." This being carried, it was proposed by Mr. T. W. Aldwinckle, and seconded by Mr. W. J. H. Leverton, "That a new club be formed to be called the 'T-Square Club,' and that all members of the same shall be members of the architectural or other recognised professions, and shall be solely engaged in professional practice." This was carried, and also a resolution fixing the subscription at that of the old Club—one guinea. The Suspension Committee, consisting of Mr. T. W. Aldwinckle, Mr. Arthur G. Pomeroy, Mr. W. J. H. Leverton, and Mr. W. H. Webber, were unanimously elected as the Executive Committee, with power to form a full committee and any sub-committee. Mr. W. H. Webber (7, Great James-street, Bedford-row, W.C.) was elected Hon. Secretary, and Mr. T. W. Aldwinckle Hon. Treasurer. The first annual meeting of the Club will be held on January 22.

**INCORPORATED INSTITUTE OF BRITISH DECORATORS.**—The Council of this Institute has decided to offer the following medals for the encouragement of colour decoration viz:—A gold medal to be awarded yearly or at intervals of not more than three years for either one of the following forms of distinction:—1. Executed decorative work of notable excellence. 2. Published work of conspicuous value to decorators. 3. Scientific invention or improvement in the manufacture of pigments or of new materials used in decoration. These medals to be open to Great Britain, Ireland, Canada, and British Colonies. The award will be made by a special vote of the General Council. A small committee will be appointed to examine into and report on the cases which appear to them worthy of this distinction. As each medal will be awarded to one person only, any firm whose work may be considered will be required to declare the name of the individual to whom the merit of the work, as a whole, is chiefly due. Silver medals will be awarded annually to students in the following painting training classes, namely:—(a) Training classes of the London technical schools. (b) Such technical classes (or students) as may from time to time be nominated by the National Association of Master Painters of England and Wales. (c) Such technical classes (or students) as may from time to time be nominated by the National Association of Master Painters in Scotland. (d) Such technical classes (or students) as may from time to time be nominated by the National Association of Master Painters in Ireland. One such medal to be awarded in each of the four above-mentioned district divisions for each of the following subjects:—A. To the student who shows the best general knowledge of the principles of architecture in relation to design. B. To the student submitting the most satisfactory scheme of decoration as applicable to the interior of some existing building. Further particulars can be obtained from the Secretary of the Institute of British Decorators, Painters' Hall, Little Trinity-lane, E.C.

**SCARBOROUGH MASTER BUILDERS' ASSOCIATION.**—The annual dinner of this Association was held at the Albemarle Hotel, on the 15th inst., Mr. R. H. Carr (President) occupying the chair, and being supported by Councillor Mansfield, J. P., of York (ex-President of the Yorkshire Federation of Building Trade Employers), Mr. A. W. Sinclair (who was the previous evening at the annual meeting at Hartgate, elected Vice-President of the Yorkshire Federation of Building Trade Employers), Mr. Oxley Smith (Vice-President of the Scarborough Association), and Mr. Fred Hardgrave (Secretary). Mr. A. W. Sinclair proposed "The Yorkshire Federation of Building Trade Employers." Councillor J. Mansfield (York) responded, and congratulated the proposer of the toast on the honour paid to him in electing him the previous day Vice-President of the Yorkshire Federation. "The Scarborough Master Builders' Association" was submitted by Mr. Oxley Smith, and responded to by the Chairman, and Mr. Chris. Peckett gave "The Architects and Surveyors," for whom Mr. F. A. Tugwell replied.

**GOWBARROW FELL.**—It is with great satisfaction that we are able to record that the money for the purchase of Gowbarrow Fell, as a gift to the public in perpetuity, has been secured in time to complete the purchase. The thanks of the public are due to the National Trust for having by their energetic action secured this beautiful district from being sold and destroyed. The National Trust have still the option, for five years, of purchasing some further land adjacent to the Glen and Lake, and would be very glad to have further subscriptions towards this end, and towards meeting the legal expenses already incurred. Any communications

can be addressed to the Secretary, Mr. Nigel B. 25, Victoria-street, S.W.

**COST OF PUBLIC WORK.**—A deputation presenting the Association of Master Plasterers and Painters of Manchester district waited the 18th inst. on the Lord Mayor of Manchester (Councillor J. H. Thewlis). Mr. W. G. Sutherland, the Association considered they had grievances in that most of the public work connected with their trade, such as the painting of public halls, the Town Hall, public libraries, parks, etc., and in connexion with the transport, and other departments of the Corporation, is now done by the Corporation and not by tender. In the absence of trained supervision it was done so economically as it might be, in the opinion. The Lord Mayor pointed out that the works committee of the Corporation had now to be formed to look into such matters. He would be obliged if the deputation could find specific instances where work done by the Corporation had been done at a greater cost than it had previously been done by tender.

**STAIRCASES FOR THE TUBE RAILWAYS.**—St. Pancras Ironwork Company have received an order from the Underground Electric Railways Company of London for spiral staircases to be fixed at all the stations on the following tube railways:—Baker-street and Waterloo; Chancery Lane, Finsbury, and Brompton; Chancery Cross, Euston, and Hampstead. There are upwards of forty stations, and each staircase about 18 ft. diameter, is mounted in a vertical shaft connecting the underground with the surface, and varies from 50 ft. to 200 ft. in height, according to the position of the station. The surface of the treads and landings are covered with new brass by Messrs. Theobalds. The staircases, built entirely of steel, and were specially designed by the St. Pancras Ironwork Company for the Underground Electric Railways Company, London. The design is stated to involve an entirely new principle in staircase construction, combining strength with economy of material. The staircases are to be made by the following members and associates have been elected during the present month:—*Members*—J. Booth-Clarkson (Natal); A. G. R. Came (Worthing); J. E. Cooke (Tollington Park); H. H. Crabb (Beckenham); E. H. Harris (Wandsworth Common, S.W.); J. R. Thacke (Eastbourne); E. B. Tubb (London). *Associates*—A. D. C. Amos (Shipley); E. R. Arnold (Birmingham); W. Bell (Sunderland); A. Beale (Hornsey, N.); Miss E. M. Clibbens (Ripley); J. C. Cook (Darwen); J. R. Copping (Darlington); A. Dorin (Hexham-on-Tyne); L. Edwards (Sheffield); R. Edwards (Dolgely); H. H. Audley; Miss Alice E. Hall (Liverpool); E. L. Hargrave (Pretoria); C. R. Innes (Durham); W. H. Jackson (Hull); M. W. Kinch (Acton, W.); J. H. Knight (Northampton); Charles A. L. (Belford); R. Lea (Newcastle-on-Tyne); A. Moakins (Lynton); A. Ogston (Newcastle-Tyne); J. B. Pointon (Merton); J. W. P. Sandgate; H. H. Stazielski (Preston); R. S. Searcove (Barnsley); J. R. Tossman (Whitby); M. Turnbull (Durham); J. Walker (Ashbourne); C. W. Ward (Hog Kott); B. S. Williams (Swindon).

**DRAWING PENCILS.**—Mr. F. E. Potter says two assorted packets of the "Koh-i-noor" drawing pencils manufactured by the Anstey firm of Haslemuth. They are not cheap pencils now go, being 4*d.* each or 3*s.* 6*d.* dozen, but they seem to be worth their price being not only firm and clear in their markings, but possessing also the merit of rubbing out without which for architects is important. They range through seventeen degrees of quality: "A" to "B" and from "H" to "F" with "HB" and "F" between. We do not use the use of so many normal shades of soft hard, some of which it must be difficult to distinguish without the lettering, and which only troublesome to the possessor; three shades of "hard" and four of "black" are as much anyone wants in practice. But they undoubtedly first-rate pencils.

#### CAPITAL AND LABOUR.

**STATE OF THE BUILDING TRADES.**—Employment in the building trades continued dull during November, and on the whole was a little worse than a month ago. Plumbers and electricians in England reported a slight improvement, but with bricklayers, painters, and carpenters and joiners in England employment was rather worse. Compared with a year ago employment was, on the whole, much the same. With masons and painters in England, and with masons and plasterers in Scotland, employment, however, rather worse. The percentage of trade union plumbers in England reported a slight improvement in November was 8.3, as compared with 8.0 cent. a month ago, and 10.1 per cent. in November 1904. The percentage of trade union plumbers unemployed at the end of November was 1.1 as compared with 12.0 a month ago, and 10.1 year ago.—*Labour Gazette.*



**Legal.**

**FLEET-STREET NUISANCE CASE.**

Is the Court of Appeal consisting of Lords Justices Vaughan Williams, Stirling, and Cozens-Hardy, on the 14th inst., a considered judgment was delivered in the case of *F. Rushmer v. F. & A. Albert, Ltd.*, on the defendants' appeal from a decision of Mr. Justice Warrington.

In this case the plaintiff, a dairyman, carrying on business and residing in Gough-square, Fleet-street, claimed an injunction to restrain the defendants, their servants and workmen from working their engines and machinery, and from carrying on their printing-works in Wine Office-court as by reason of noise or otherwise cause a nuisance and annoyance to the plaintiff as lessee or occupier of his premises in Gough-square. The defendants are letterpress art printers and publishers, and last September went into occupation of No. 10, Wine Office-court and set up and began working printing machinery in the basement of the premises, which immediately adjoined those of the plaintiff. The plaintiff's case was that the defendants' machinery caused such a noise both night and day as to be an intolerable nuisance both to himself and family. The defence was a general denial of the plaintiff's allegations, the machinery being, it was said, of a modern type, and almost noiseless. The main point, however, taken was that the plaintiff's premises were situate in the heart of a district which was almost entirely devoted to the printing and allied trades, and having regard to all the circumstances of the locality, and in particular to the nature of the business usually carried on there, and the noises and disturbances existing prior to the commencement of the defendants' operations, the action was not maintainable. Mr. Justice Warrington held that the question he had to answer was whether the defendants by working the machinery seriously interfered with the comfort physically of the plaintiff and his family and the occupants of his house according to ordinary notions prevalent among reasonable English men and women. His lordship answered this question in the affirmative, and granted the plaintiff a perpetual injunction restraining the defendants in general terms from working their machinery in such a way as to cause a nuisance to the plaintiff. From that decision the defendants now appealed.

Mr. Duke, K.C., Mr. Hinde, and Mr. Couch appeared for the appellants, and Mr. H. Terrell, K.C., and Mr. Coote for the respondent.

Their lordships accepted Mr. Justice Warrington's findings of fact and his enunciation of legal principles, and dismissed the appeal with costs.

It is understood that the defendants intend to appeal to the House of Lords.

**ACTION AGAINST BUILDERS.**

The case of *Lilly v. Wontner & Co., Ltd.*, came before Mr. Justice Bray and a common jury at the King's Bench Division on the 18th inst., an action brought by the plaintiff, Mr. W. G. Lilly, against the defendant company to recover £20,000, the sum alleged to be due for work and labour done.

Mr. Lewis Thomas appeared for the plaintiff, and Mr. Ellis Hill for the defendants.

Mr. Lewis Thomas, in opening the case, said the plaintiff had had about thirty years' experience in the building and decorating trades, and in 1904 defendants engaged him to prepare estimates in respect of certain work defendants desired to tender for. The terms of remuneration were that, on the acceptance of the tenders, Mr. Lilly was to supervise the work and receive 10 per cent. of the profits. Plaintiff sent in altogether sixteen tenders to different places and three of them were accepted, among which was a contract for the decoration of the Union Infirmary in Leam-road, Rotherhithe. The contract was accepted at the sum of £1,987, and the profit to the contractors was estimated at the sum of £200, of which 20 per cent. was £40, the sum the plaintiff claimed to be entitled to. The plaintiff was astonished to receive a communication from the managing director of the defendant company that they did not propose to go on with the work, and the defendant company did not proceed with the work.

The plaintiff was called and gave evidence in support of his case. In cross-examination, he stated that the managing director of the defendant company did not say that, if the work was proceeded with, it would be a financial loss.

At the close of the plaintiff's case Mr. Thomas Wontner Smith, the managing director of the defendant company, gave evidence to the effect that he told the plaintiff that he had been to the Rotherhithe Infirmary and had come to the conclusion that the price was too low.

In the result the jury returned a verdict for the plaintiff for 55%, and judgment was entered accordingly.

**ACTION AGAINST THE HAMMERSMITH BOROUGH COUNCIL.**

The hearing of the case of *Thompson & Jackson v. Hammersmith Corporation* concluded before Mr. Justice Buckley in the Chancery Division on the 19th inst., an action by the plaintiffs, tailors and outfitters, carrying on business at No. 98, King-street, Hammersmith, for an injunction to restrain the defendants from taking a portion of their premises by proceeding upon a notice to treat to acquire so much of the property as was required for street widening purposes. What the defendants wished to take was a portion of the frontage of the building abutting on the north side of High-street, varying in depth from 5 ft. 2 in. to 7 ft. 2 in. The case for the plaintiffs was that the defendants could not take the part required, but must take the whole.

Mr. Buckmaster, K.C., and Mr. Waggett appeared for the plaintiffs; and Mr. Astbury, K.C., and Mr. Courthorpe Munroe for the defendants.

Mr. Justice Buckley, after hearing evidence and the addresses of counsel, in giving judgment, said the question he had to decide was whether the defendants were entitled to proceed under a notice to treat dated June 16, 1905, in respect of a house, No. 98, King-street, Hammersmith. It was a notice to treat by which the defendants desired to acquire a strip off the front of the premises varying in depth from 5 ft. 2 in. at the eastern end to 7 ft. 2 in. at the western end. First as to the law. Sect. 80 of Michael Angelo Taylor's Act did, and sect. 82 did not, after referring to houses, buildings, lands, tenements, and hereditaments, use the words "or any part thereof." Defendants' rights were not, in his opinion, enlarged by any intended alteration which the plaintiffs were to make or were under covenant to make. This did not justify the defendants saying the plaintiffs should make further alterations. That being the law, the facts were as follows:—Plaintiffs on May 16, 1905, took a lease of the house, and at that time had seen a tracing and knew that a widening scheme was proposed and was in contemplation as regards this house. The plaintiffs obtained a leasehold interest in the house as it was then. The question he had to decide was what rights did the Act give the defendants, and had they the right to take the strip in question? In view of the authorities the question for him to decide was, whether the strip was separable from the house so that it could be removed without destroying the house as a house. By taking the strip the defendants would destroy the whole of the fire-places which warmed the house and the house would not be such a house as it was before. The fact that plaintiffs intended to remove the fire-places, in order to enlarge the premises, was immaterial. He did not think that the defendants were entitled to say, "We will take part of your house and now tell you to build a house further back." Unless the premises on either side of the plaintiffs' premises were set back, the plaintiffs would be prejudicially affected. For these reasons he arrived at the conclusion that the strip the defendants proposed to take was such that the part was not separable from the house so that it could be removed without destroying the house as a house. He held, therefore, that the notice to treat could not be maintained, and he granted the plaintiffs the injunction as prayed, the defendants to pay the costs of the action.

**FOLKESTONE PAVING DISPUTE.**

The case of the Mayor, etc., of Folkestone v. Marsh and Others came, on the 20th inst., before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Lawrance and Ridley, on a special case stated by magistrates under the Private Streets Works Act, 1892.

Mr. Macmorran, K.C., Mr. C. Glen, and Mr. Bethune appeared for the appellants, the Mayor, etc., of Folkestone; and Mr. Scholefield for the respondents.

Mr. Macmorran, in opening the case, said that the real question at issue was whether the particular road or part of a road was, under the Act in question, a highway repairable by the inhabitants at large. The case was a peculiar one, and turned upon an agreement arrived at in 1879 between the then owners of the land abutting on the road and the local authority. The place in question was the Shorncliffe-road, Folkestone, and the respondents were the frontagers. They had been called on to contribute to its making up, and they set up that in 1880 it was dedicated to the public and accepted by the local authority, and was now repairable by them. It was also contended that this road had taken the place of an old road stopped up, and being a substituted road, it was a highway repairable by the public road authority.

It was admitted that the local authority had always repaired the roadway. The magistrates held that, as the road was dedicated to the public and accepted by the appellants, and was in substitution of an old road, there must be judgment for the respondents.

In the result the Lord Chief Justice, in giving judgment, said he thought the view taken by the

magistrates was correct: He thought the road in question was nothing more than a substituted road for the old one closed, and carried with it the old obligations, and was repairable by the inhabitants at large.

Justices Lawrance and Ridley concurred, and the appeal was accordingly dismissed.

**PATENTS OF THE WEEK.**

**APPLICATIONS FOR PATENTS.**

26,895 of 1904.—C. J. JONES and W. M. SELL: *Water Heating Apparatus.*

This relates to a water heating apparatus wherein the gas supply is regulated by a thermostatic gas regulating device formed with water and gas chambers, respectively forming part of the water circulating pipes and the gas supply pipe, and having said chambers separated by an expansible vessel or the like adapted to regulate a valve controlling the passage of gas through said chamber.

27,030 of 1904.—F. J. CARL and H. G. CARL: *Window Sashes.*

This relates to the combination in a window of sliding and swinging upper and lower sashes, the sashes carrying hinge sockets or plates, and stationary hinge pivots being provided upon the frame engaging said sockets or plates in both the upper and lower positions of the sashes.

384 of 1905.—J. LINLEY: *Means of Securing Door Frames in Position.*

This relates to means of securing door frames in position, and consists of a socket or shoe of cast iron, or other suitable metal made with a dovetail to enter a hole in the floor or threshold, and adapted to receive the lower end of the door frame or post, so as to secure it to the floor or threshold, in such a way as to strengthen the door frame in its position.

1,111 of 1905.—W. T. ROBERTSHAW: *Hinges for Draught-Excluders, Doors, and the like.*

This relates to a hinge for draught-excluders, doors, and the like, to which an automatic opening or closing movement is given by means of a coil spring attached to the hinge in such a manner that one end rests upon one half of the hinge and the other end upon the other half of the hinge.

1,998 of 1905.—C. L. G. BISSON and C. S. BISSON: *Chimney Cowl.*

This relates to a chimney cowl, and consists in the combination of flanged pipe fixed in the chimney or in the chimney pot, a pipe rotating round same above the flange, a circular or other suitably shaped piece of metal forming a hood secured to the rotating pipe so as to rotate therewith, wind vanes secured to the said hood or to the rotating pipe to keep the back of the cowl to the wind and means for supporting said rotating pipe and hood.

6,106 of 1905.—W. NICKOL: *Chimneys and Ventilating Appliances for Buildings and like Structures.*

This relates to a ventilating appliance for buildings and like structures, comprising a crown or equivalent shaped open structure secured at the top part of the chimney or shaft, in combination with a vertical rod free to oscillate on a ball or movable piece, said rod carrying radial plates or equivalent projections at its upper end, and a swivelling or movable shield or its equivalent at the lower end.

6,917 of 1905.—W. H. TONKS: *Emergency Exit Fastenings or Panic Bolts for Doors and Windows.*

This relates to emergency exit fastenings or panic bolts for doors and windows, and consists in providing the handle of the panic bolt operating mechanism with a double bevil pinion like boss gearing with bevil quadrants attached to or forming parts of links jointed to the sliding bolts whether the operating handle is actuated directly by pressure thereon or by pressure on a crush bar jointed to the handle.

7,105 of 1905.—P. A. NEWTON (New Jersey Wire Cloth Co.): *Fireproof Constructions.*

This relates to a centring construction for flanged beams of the class having the centring supported by clips from the bottom flanges, and consists in the use of a centring support consisting of a soffit board positioned below the beam to provide space for concrete between the board and bottom of the beam, and supported from the clips by hangers extending through the soffit board.

9,496 of 1905.—O. BORNE and J. G. HERMANN: *A Process of Preparing Wood for Polishing Purposes.*

This relates to a process for preparing wood for polishing purposes, and is characterised by filling the pores of the wood with a dry material in the form of a powder capable of binding well and making the mass filled in insoluble by moistening with an alcoholic solution of shellac.

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



### 11,544 of 1905.—R. L. YOUNG: *Fire-Places, Ranges, and the like.*

This relates to kitchen ranges and the like, and consists in the combination of a removable solid plate, which rests on and completely covers the bottom of the grate so as to prevent any air getting up through the bottom, with a second inclined perforated plate or grating so arranged as to reduce the fire or coal space and also form a combustion chamber in front of and under the boiler.

### 26,403 of 1904.—C. G. ROBINSON and J. KIRKAW: *Basement Structures for Buildings and other similar places.*

This relates to basement structures for buildings and other similar places, consisting in forming the sides of the basements by steel or iron stanchions supported on suitable extended bases, cantilevers projecting from said stanchions, a second series of vertical stanchions or columns at a distance from the first series of stanchions, horizontal beams to which the second series of stanchions and cantilevers are connected and a masonry, brickwork, concrete, asphalt, or like filling between the second series of stanchions and the beams.

### 28,234 of 1904.—J. WHITEHEAD: *Construction of Sectional Wood Paving Blocks for Floors, Roadways, Pavements, and the like.*

This relates to a sectional wooden paving block formed of wooden sections secured together by corrugated metal plates driven into saw cuts in the sides of the sections and extending across the joints of the same, with or without similar corrugated plates driven into the ends of the sections across the joints of the same.

### 28,683 of 1904.—E. ROBINSON: *Apparatus for Heating, Humidifying, Cooling, Air for Warming, Drying, or Humidifying Purposes.*

This relates to an apparatus for heating, humidifying, or cooling air, for warming, drying, or humidifying purposes, and consists of a tubular cylinder with spiral diaphragm, in combination with a fan or blower and any suitable system of blast pipes for distributing either heated or cooled air in buildings or other enclosures.

### 28,684 of 1904.—E. ROBINSON: *Apparatus for Drying and Screening Sand, Minerals, and Other Substances.*

This relates to an apparatus for drying and screening sand, minerals, and other substances, and consists of the revolving drying cylinder fitted internally with a continuous spiral having diaphragm lifters arranged so as to restrict, regulate, and control the movement of the material being dried, such cylinder revolving in a horizontal plane over a furnace and flue together with a jacketed chimney for heating air by the escaping gas and utilising the same by means of an exhaust fan. The drying cylinder terminates in rotary screen, thus the drying, screening, and finishing is accomplished in one operation.

### 3,094 of 1905.—J. R. PRESTON: *Flushing Devices.*

This relates to a flushing device, and consists in the arrangement of a bell connected to a siphon pipe and containing a float normally held down by a trigger or catch device, which float on being allowed to rise, carries or pushes the water up the bell and over the siphon, thus completing the siphon.

### 12,242 of 1905.—J. N. GOODALL: *Coupling Devices for Conduits.*

This relates to a coupling device for connecting two separated conduits ends, said coupling device comprising a barrel-member which is shorter than the distance between the ends of the conduit to be coupled, and which has a central portion of enlarged diameter and reduced ends, one of which is internally screw threaded, and the other of which is adapted to be connected to one of the conduit ends, and a pipe section telescoping within the barrel-member and non-detachable therefrom, said pipe section having on its inner end a screw-threaded head to engage the interior screw threads of the barrel-member, and having its other end adapted to be connected to the other conduit.

### 14,694 of 1905.—S. R. DRESSER: *Coupling for Spigot and Socket Pipes.*

This relates to a coupling for spigot and socket pipes in which the socket ends of the pipe sections are formed with two successive balls or sockets, both of which are parallel with the periphery of the spigot end of the pipes, one of the clamping rings having a sleeve provided with a V-shaped end fitting over the spigot end of the pipe section.

### 16,166 of 1905.—W. E. HASSAM and C. K. PEVEY: *Pavement and Process of Laying the Same.*

This relates to a process of constructing a road or pavement and consists in laying a layer of uncoated stone, compressing said stone until the voids are small, then grouting with a mixture of cement, sand, and water until all the voids in the stone layer are filled, adding the thicker grout of cement, sand, and water, spreading fine stone upon said grout, and compressing it into the surface of the said grout before it is set.

### SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

December 4.—By HARRY SMITH (at Brighton), Clayton, Sussex.—"Povey's Farm," 17 acres, f. £1,000

December 7.—By HAMPTON & SONS, with WATERS & RAWLINSON (at Salisbury), Salisbury, Wills.—"Milford Hill," "Easton," f. p. 1,800

By WEBB & NIELSON (at Enfield), Enfield.—"Chase Side," "Beech House" and 2 r. 25 p., f. y. 45l. 885

December 8.—By O. E. GRIZZARDS (at Burwell), Burwell, Cambs.—"Goose Hall Farm," 81 a. 3 r. 3 p., f. y. 35l. 085

By R. M. ENGLISH & SON (at Selby), Greenock, Yorks.—"Greenock Hall Estate," 218 acres, f. 3,270

December 11.—By BRODIE, TIMMS, & CO. Highgate.—5, 6, and 7, Lansdown-ter., f. w. 124l. 12s. 790

By W. MARQUESS-JONES, f. w. r. Mile End.—83 and 85, St. Dunstan's-rd., f. w. r. 475

By T. B. WESTGOTT, Camden Town.—15 and 16, Rochester-ter., u. 980

By R. B. CUNY, u. 100l. Rochester-ter., l. g. rents 49l., u. 38l. yns., g. r. 11l. 897

Rochester-ter., l. g. rents 11l., u. 38l. yns., g. r. 11l. 897

St. Paul's-rd., l. g. rents 90l., u. 44l. yns., g. r. 11l. 804

Canterbury-rd., l. g. rents 52l., u. 44l. yns., g. r. 11l. 1,652

St. Augustine's-rd., l. g. rents 21l., u. 44l. yns., g. r. 11l. 979

December 12.—By BATCHELOR & SONS, Bromley, Kent.—"Barnesdown-rd.," "V. Gann," f. e. 58l. 475

By GREEN & LINES, New Cross.—37 and 39, Casella-rd., u. 51l. yns., g. r. 10l. y. 72l. 790

By ROBERT CUNY, u. 100l. Mile End.—78, 80, and 117, Grafton-st., u. 20l. yns., g. r. 7l. 10s., y. 104l. 2s. 580

By EDWIN EVANS (at Battersea), Battersea.—12, Harbord-rd., u. 73 yns., g. r. 6l. 15s., y. 32l. 815

60, Mallinow-rd., f. e. 36l. 815

Tooting.—165 and 167, London-rd., also "Royston Cottage," adjoining, f. y. 104l. 12s. 1,500

By H. & E. L. COBS (at Battersea), 27, Selkirk-rd., u. 73 yns., g. r. 6l. y. 25l. 12s. 250

Strood, Kent.—1, 3, 5, and 7, Bryant-rd., f. e. 94l. 2s. 8d. 770

Gillingham, Kent.—43 to 49 (odd), Higgins-lane, and 29 to 41 (odd), Wykes-st., f. 1,075

Cliffe, Kent.—"Swingate Farmhouse," cottage and 3 a. 3 r. 31 p., f. 1,075

Enclosures of land, 12 a. 3 r. 31 p., f. 820

December 13.—By HAROLD GRIFFIN, Clapham.—39, Killyon-rd., u. 37 yns., g. r. 8l., e. 42l. 420

By HEARS, ROY, & LEEVE, Edmonton.—St. Mary's-rd., l. g. rents 61l. reversion in 91l. yns., g. r. 10l. 1,050

69 to 79 (odd), St. Mary's-rd., u. 91l. yns., g. r. 40l., w. r. 17l. 12s. 800

By SALTER, REX, & CO., Holloway.—32, Grafton-rd., u. 47 yns., g. r. 6l. 6s., e. 36l. 255

Kenish Town.—45, Garston-rd., u. 39 yns., g. r. 6l. y. 48l. 360

By J. T. SKEDDING, Kingsland.—40, Downham-rd. (s.), and stabling, u. 15l. yns., g. r. 3l. y. 66l. 885

St. Mary's-rd., two freehold built plots f. 180

December 14.—By CHESTERSON & SONS, Kennington.—51, 53, and 55, Campden Hill-rd., u. 48l. yns., g. r. 50l., y. 840l. 9,400

Paddington.—12, St. Mary's-rd., and 2 and 4, St. Mary's-rd., u. 33l. yns., g. r. 20l., y. 175l. 1,450

Kennington.—25, Russell-rd., f. y. 95l. 1,000

By E. H. HENRY, City.—145, Upper Thames-st., l. e. 130l. 2,550

Tooting.—5, 7, 9, and 11, Bellow-st., u. 83 yns., g. r. 14l., w. r. 104l. 750

By JENKINS, SONS, & CO., Deptford.—16, Deptford-green, f. w. 16l. 18s. 135

62, Watergate-rd., f. w. 18l. 4s. 140

By C. C. & T. MOORE, Mile End.—1 and 2, Salmen-st., u. 41 yns., g. r. 7l. 6s., w. r. 62l. 8s. 250

Bethnal Green.—29 to 37 (odd), Punderson's-gdns., f. w. r. 137l. 16s. 1,200

13 to 23 (odd), Punderson's-gdns., l. w. r. 124l. 16s. 900

Stepney.—10, Dukin-rd., f. w. 20l. 16s. 860

Limchouse.—15, Brenton-st., f. w. 27l. 8s. 235

By NEWBORN, EDWARDS, & SHEPHERD, Dillington.—3, Kilmote-rd., u. 47 yns., g. r. 8l., y. 44l. 320

Dalston.—12, Doves Park-rd., u. 978, g. r. 6l., y. 36l. 360

Holloway.—15, Duncombe-rd., f. e. 32l. 380

Stoke Newington.—88, Newington Green-rd. (s.), u. 44 yns., g. r. 5l. y. 30l. 700

By MARLER & MARLER, Victoria Bazaar Co.—Leases, goodwill, fixtures, and stock-in-trade of business in London and the provinces (as going concern), f. 3,500

By SIMMONS & SONS, Hackney.—33, 35, and 37, North-st., f. w. r. 75l. 8s. 750

16, Selman-st., u. 47 yns., g. r. 10l. 10s., w. r. 34l. 8s. 100

6, Dagmar-ter., u. 39 yns., g. r. 10l. 36l. 175

Deptford.—Deptford-bridge (s.), u. 55 yns., g. r. 40l., y. 140l. 1,430

Mitcham, Surrey.—7 to 12 Cecil-ter., u. 66 yns., g. r. 15l., w. r. 81l. 18s. 200

By H. J. BURNS & SONS, Pimlico.—201, Vauxhall Bridge-rd. (s.), u. 18l. yns., g. r. 8l. y. 30l. 520

Bethnal Green.—18 and 19, Heron-cp., f. w. r. 71l. 10s. 4

21 and 23, Sale-st., u. 29 yns., g. r. 8l. 6s. 8d., w. r. 45l. 10s. 1

6, Roman-rd. (s.), u. 26l. yns., g. r. 3l. 8s., w. r. 44l. 4s. 1

Row.—1 to 19, 35 to 37 (odd), Ordell-rd., u. 318l., also l. g. r. 7l., u. 42l. yns., g. r. 38l. 10s. 1

Victoria Park.—14, 21, 23, and 25, Olga-st., u. 54l. yns., g. r. 10l. 4s., w. r. 163l. 10s. 1

129, Grove-rd., u. 88l. yns., g. r. 6l. y. 48l. 8

Hackney.—3, 26, 27, 29, and 32, Leslie-rd., u. 78 yns., g. r. 32l. 10s., w. r. 170l. 1,6

Honington.—1 to 5, Rosina-cottages, f. w. r. 100l. 8s. 7

By FOSTER & CRAWFIELD (at Croydon), Croydon.—119 to 129 (odd), Oval-rd., f. w. r. 153l. 1,4

87 to 93 (odd), Oval-rd., u. 44 yns., g. r. 20l. 2s., y. 92l. 18s. 1,4

12 and 14, Wellesley-gr., f. y. 135l. 1,7

Lower Addiscombe-rd., "Clairville," f. y. r. 209l. 16s. 8

Croydon.—27 to 37 (odd), Croydon-rd., u. 81 yns., g. r. 54l. 10s., w. r. 209l. 16s. 1,0

85, George-st. (s.), u. 61l. yns., g. r. 16l. y. 60l. 1,2

90, Wellesley-rd., u. 54l. yns., g. r. 14l. 5s., y. 100l. 8

Ashtedown-rd., u. 58l. yns., g. r. 58l. 57

By CECIL HOBDAV (on the premises), Putney.—"Upper Richmond-rd.," "The Hollis," and 1 acre, u. 58 yns., g. r. 20l. 16s., p. 2,0

December 16.—By J. BOTT & SONS, Brixton.—32 and 34, Arlingford-rd., u. 60 yns., g. r. 15l., y. 70l. 4s. 44

Stockwell-rd., u. 89 and 95, Harcourt-st., u. 84l. yns., g. r. 18l. 10s., w. r. 122l. 8s. 95

By BUNCH & DUKES, Bow.—79, Grove-rd. (s.), u. 62l. yns., g. r. 6l. 10s., y. 46l. 50

9, Lyall-rd., u. 40 yns., g. r. 6l. 6s., y. 36l. 28

10, Abbeystone-rd., u. 45 yns., g. r. 6l. 5l. 30l. 28

By E. MILLARD, Brixton.—Sudbourne-rd., "The Branksome Arms," p. h. l. g. r. 55l., u. 61l. yns., g. r. 8l. 1,04

By RAY & MURRELLS, Chelsea.—49, Cadogan-st., u. 37l. yns., g. r. 8l., y. 80l. 95

Contractions used in these lists.—E.g., for fresh ground-rent; l. g. r. for leasehold ground-rent; l. g. r. for improved ground-rent; g. r. for ground-rent; f. for rent f. for freshhold; c. for copyhold; l. for leasehold; p. for possession; a. r. for estimated rental; w. r. for weekly rental; q. r. for quarterly rental; y. r. for yearly rental; u. r. for unexpired term; p. a. for per annum; y. for years; l. a. for lane; s. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; ora. for crescent; av. for avenue; gds. for gardens; yd. for yard; g. for grove; h. for house; p. h. for public-house; o. for offices; a. for shops; c. for court.

### MEETING.

SATURDAY, DECEMBER 23.  
Edinburgh Architects' Association.—Associate Annual Dinner.

### TERMS OF SUBSCRIPTION.

"THE BUILDER" Published Weekly is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum (63 numbers) PREPAID. To all other parts of Europe, Asia, New Zealand, India, Ceylon, etc., 2s. 6d. per annum. Back numbers (payable to J. MORGAN) should be addressed to "THE BUILDER," 25, Abchurch-lane, London, E.C. 4. SUBSCRIBERS IN LONDON and the SUBURBS, by prepaying at the Publishing Office 12s. per annum (13 numbers) or 6s. 6d. per quarter (13 numbers), can ensure receiving "The Builder" by Friday Morning's Post.

### PRICES CURRENT OF MATERIALS.

\* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.	
	£ s. d.	
Hard Stocks	1 7 0	per 1000 alongside, in river
Rough Stocks	1 4 0	" "
Grizles	1 4 0	" "
Flaming Stocks	2 0 0	" "
Shippers	2 0 0	" "
Flattons	1 5 6	at railway depôt.
Bed Wire Cuts	1 11 0	" "
Best Farnham	3 12 0	" "
Best Red Pressed	5 0 0	" "
Rushton Facing	5 0 0	" "
Best Blue Pressed	4 1 0	" "
Staffordshire	4 1 0	" "
Do. Bulloane	4 6 0	" "
Best Stourbridge	3 15 6	" "
Fire Bricks		
Glazed Bricks		
Best White and Ivory Glazed		
Stretchers	12 0 0	" "
Headings	11 0 0	" "
Quoins, Bulloane		
and Flats	16 0 0	" "
Double Stretchers	16 0 0	" "
Double Headers	6 0 0	" "
One Side and two Ends	19 0 0	" "

[illegible]



## CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## CONTRACTS.

Nature of Work or Materials.	By whom executed.	Forms of Tender, etc., supplied by	Tender to be delivered to
Edinburgh.—Materials (Tells Scheme, Contract 47).	Edinburgh & Dist. Water Trustees	W. A. Tait, C.E., 72A, George-street, Edinburgh.	Dec.
Salford.—Cast-iron pipes, etc., at Sewage Works.	Salford Corporation	Borough Engineer's Office, Town Hall, Salford.	do
Walsall.—Mortuary and Urinal, Portland-place.	Walsall Corporation	W. V. Minstear, Town Clerk, 28, Sandhill, Newcastle-on-Tyne	do
Edinburgh.—Granite Slabs, for Road.	Edinburgh Corporation	G. Newton, Town Hall, Manchester.	do
Rochdale.—Stores	Rochdale Canal Co.	C. R. Dykes, Secretary, 80, Dale-street, Manchester.	Dec.
Wimslow.—New Cemetery (Chapel, House, etc.).	Wimslow U.D.C.	C. T. Taylor, Architect, 10, Clegg-street, Oldham.	do
Cowdenbeath.—Printers' Work, New Burnh Bldgs.	Cowdenbeath Burgh Commissioners	T. H. Orr, Architect, 43, Carnegie-street, Dunfermline	do
Edinburgh.—Road, 200 yds. of Oil	Manchester Education Committee	G. Newton, Town Hall, Manchester.	do
Crompsall.—Rain-water Pipes, Delaunay's-road	Prestwich Guardians	E. W. Ogden, Clerk, Union Offices, Cheetham Hill-rd.	do
Burghed.—Cottages	Bristol Guardians	J. Witlet, Architect, Elgin	do
Eastville.—Porter's Lodge and Ref. Depot, etc.	Merthyr Tydfil Education Committee	J. J. Simpson, Clerk, St. Peter's Hospital, Bristol.	Dec.
Merthyr Tydfil.—& Co. Ltd., for Girls' School	do	J. Llewellyn Smith, Architect, Cornwal-chambers, Merthyr Tydfil.	do
Merthyr Tydfil.—Lathrines, etc., Troedyrhiw Girls' Sch.	do		do
Powey.—Alterations, etc., to Commercial Hotel	Mr. W. Hicks	T. H. Andrew, Architect, Market-hill, St. Austell	do
Longton.—Sewage Disposal Works	Longton Town Council	J. W. Wardle, Borough Surveyor, Court House, Longton, Staffs	Dec.
Carlton.—Re-building Brass Sykes Bridge	North Riding County Council	W. G. Bryning, County Surveyor, Northallerton.	do
Caerswile.—2 Semi-detached Villas	do		do
Gravesend.—Advertisements to Engine House, Suffolk-road	Gravesend Town Council	J. T. Dennis, o.c. W. E. Jones, Lakenfeld House, High-st., Caerswile	do
Grays.—Relating to White Horse Bridge	West Riding Education Committee	Borough Surveyor's Office, Town Hall, Gravesend	do
Wombwell.—Broomhill Paved, Sch. (Hing. Apprs.)	do	J. Vickers-Edwards, County Architect, County Hall, Wakefield	Jan.
Denholme Lodge Gate Provided, Sch., near Keighly	do		do
Malden.—Road Materials	Malden and Croydon U.D.C.	do	do
Malden.—Slates	District Surveyor, Council Offices, New Malden		do
PORTLAND CEMENT			
Leyton.—Nine Miles of Double Tramway Track	Metropolitan Borough of Poplar	Borough Surveyor, Council Offices, High-street, Poplar	Jan.
Manchester.—Underground Telephone Pipes	Leyton U.D.C.	W. Dawson, Surveyor, Town Hall, Leyton	do
Brighol.—Road, 100 yds. of	Manchester Education Committee	City Surveyor's Office, Town Hall, Manchester	Jan.
NEW SORTING OFFICE AT FOREST HILL	Brighol U.D.C.	City District, Wakefield	do
Dartford.—Making-up Private Streets	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	do
ARTIFICIAL FLAG PAVING	Dartford U.D.C.	T. E. Tiffin, Surveyor, Council Offices, Dartford	do
WAT-AND-PAVING WORKS	Willenden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	do
East India.—Deck Bridges	East Indian Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	Jan.
Bootle.—Painting, etc., Municipal Offices, Trinity-rd.	Bootle Corporation	Borough Engineer's Office, Town Hall, Bootle	do
Totnes.—Cast iron Socket Pipes	Totnes R.D.C.	F. K. Windett, 19, High-street, Totnes	do
Brighol.—Road, 100 yds. of	Plymouth Corporation	W. Farrington, Surveyor, Council Offices, Woodford Green	Jan.
Woodford.—70 yds. of Pipes Sewer, Salway-hill	Woodford U.D.C.	C. C. Doig, Architect, Elgin	do
Elgin.—Dwelling-houses, Culbard-street	Burton-upon-Trent Corporation	G. T. Lynam, Borough Engineer, Town Hall, Burton-upon-Trent	Jan.
Burton-upon-Trent.—1,600 yds. of stoneware sewers	Manchester Education Committee	C. Nickson, Town Hall, Manchester	do
Dunelm.—Fire-alarm, 100 yds. of	do		do
Manchester.—Four Purifiers, etc., at Gaythorn	Atham R.D.C.	R. A. Wilson, Surveyor, 24, St. John's-hill, Shrewsbury	Jan.
Atham.—750 yds. of 4-in. Iron Pipe	Essex Education Committee	F. Whitmore, Architect, Duke-street, Chelmsford	do
NEW SCHOOL, EXT. LITTLE BROMLEY	Burley U.D.C.	W. H. Radford, C.E., Abdon-chambers, Nottingham	Jan.
Brighol.—Road, 100 yds. of	Manchester Education Committee	Education Offices, Deansgate, Manchester	do
Ardwick.—Manchester.—Mansfield-street School	Crompton U.D.C.	T. Mitchell, Sewage Works Superintendent, Shaw	Jan.
Crompton.—Sludge Pressing Machinery	do		do
Crompton.—Gas Engines	Carlisle Corporation	J. Mansergh & Sons, Engineers, Victoria-st., Westminster, London	do
Castle Cocks.—Attendants' Cottages	do		do
Cumwhinton.—Attendants' Cottages	Shepley U.D.C.	T. Aird Murray, C.E., Independent Buildings, Sheffield	do
Shepley.—Main and Branch Sewers	Basingstoke Corporation	F. R. Philips, Borough Surveyor, Town Hall, Basingstoke	do
Basingstoke.—Five Miles of Water Mains	Bradlington Corporation	H. E. Stilgoe, Borough Engineer, Maison Dieu House, Dover	do
Brighol.—Road, 100 yds. of	Dover Town Council	H. Bemey, Architect, 104, George-street, Croydon	do
DOVER.—Sewers and Surface Drains	Croydon Union	H. H. Humphries, Engineer, Public Hall, Erdington, Birmingham	Jan.
ELECTRIC FIRE ALARMS AT INFIRMARY	Erdington U.D.C.	W. H. Radford, C.E., Abdon-chambers, Nottingham	do
Erdington.—21,000 sq. yds. of Wood Block Paving.	Great Central Railway	E. W. Mountford, Architect, 17, Buckingham-street, W.C.	do
NEW TOWN HALL, LANCASTER	LANCASTER CORPORATION	G. H. Featherston, Town Hall, Worskop	Jan.
Workop.—2,000 tons of Slag	Workop U.D.C.	57, London-street, Norwich	do
Melton Constable.—Alterations, etc., to School	Norfolk Education Committee		do
Claydon.—School, Alterations, etc., to School	do		do
Walsoken.—Enlargement of School	Berkshire Education Committee	T. M. Korrige, Architect, Club-chambers, Old Market, Wisbech	do
NEW SCHOOLS, COOKHAM RISE	Edinburgh Corporation	E. Fisher, 10, York-buildings, Adelphi, W.C.	do
Midhurst.—Granite, etc.	Edinburgh Corporation	A. G. Goss, Surveyor, Council Offices, London	Jan.
Claydon.—School, Alterations, etc., to School	Trustees of Nysa Calvinistic Church	W. J. Radford, C.E., Abdon-chambers, Nottingham	Jan.
Yatradynalys.—Chapel	Ipswich Education Committee	W. Jones & W. D. Morgan, Architects, Victoria-chambers, Penton	do
Ipswich.—Ranelagh-road Council School	Ramswold U.D.C.	J. A. Schenemann, Architect, 23, High-street, Ipswich	do
Ramswold.—Sewage Disposal Works	Woods Water Comm. Committee	P. Platts, Engineer, High-street, Rochester	Jan.
Walsoken.—Sewage Disposal Works	Uxbridge Guardians	Accused Chapman, Fruiting-bushes, Facklow, Leeds	do
WORKHOUSE EXTENSIONS	Hampstead Borough Council	W. L. Eves & J. F. Stow, Architects, Uxbridge	Jan.
WORKS, MATERIALS, AND SERVICES	Longford County Council	Borough Engineer, Town Hall, Havestock Hill, N.W.	do
NEW SCHOOL BUILDING AT LLANDUDNO	Longford County Council	County Surveyor, County Court House, Longford	do
Longford.—Road, 100 yds. of	Maldstone Corporation	G. R. Strachan, Engineer, 9, Victoria-street, Westminster, S.W.	do
Maldstone.—Sewage Disposal, Allington & Ayleford	Oakenegates U.D.C.	R. E. W. Berrington & Son, Engineers, Bank Bldgs., Wolverhampton	Jan.
Oakenegates.—Waterworks	Shell U.D.C.	J. Drake & Son, Engineers, Queensbury, near Bradford	do
Shell, near Bradford.—Sewerage, etc., Works		W. H. Radford, C.E., Abdon-chambers, Nottingham	do
Chickenshire.—Lithical Clay		W. H. Radford, C.E., Abdon-chambers, Nottingham	do

## PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	App to
*HEAD MASTER	Leeds Education Committee	200l	Da
*BUILDING AND DRAINAGE INSPECTOR	Twickenham U.D.C.	22. 15s. per week.	Ja
*SECOND-CLASS ENGINEERS, G.P.O.	Civil Service Commission.	Not Stated	Ja
*SURVEYOR AND INSPECTOR OF NUISANCES	Dawlish U.D.C.	150l	Ja

Those marked with an asterisk (\*) are advertised in this number.

Competitions. —

*Contracts*, iv, vi, viii, x.

Public Appointments, xvii.





LONDON.—For supply of lime for the treatment of sewage, for the London County Council:—

	Delivered alongside jetty.		Delivered alongside jetty, discharged and unloaded into stores.			
	At Barking, 14,800 tons.	At Crossness, 9,000 tons.	At Barking and Crossness, 23,800 tons.	At Barking, 14,800 tons.	At Crossness, 9,000 tons.	At Barking and Crossness, 23,800 tons.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Formby's Cement Works Co., Ltd. ....	—	11 8	—	—	—	—
C. Christopherson & Co. W. Fletcher, lime & chalk Works, Gravesend* ..	—	—	—	—	—	{ (5,000 tons) 12 9
Associated Portland Cement Manufacturers (1900), Ltd., 72, Fenchurch-street, E.C.4 ..	12 4	12 7	12 4	*13 8	13 11	13 8
New Lime Co., Ltd. ....	13 3	—	—	14 9	—	—
Buxton Lime Firms Co., Ltd. ....	14 3	—	—	15 8	—	—
L. Sommerfeld .....	14 5	14 5	14 5	15 11	15 11	15 11
Valere Mabilie .....	15 9	15 8	15 7½	17 0	16 9	16 10½
L. Sommerfeld .....	—	16 0	—	—	17 6	—
Current contract prices ..	—	—	—	15 0	14 5	—

**NORTH MUNDHAM.**—For alterations and erecting new classroom, etc., at North Mundham Council School, near Chichester. Mr. G. C. Vernon-Inkpen, architect, 40, Commercial-road, Portsmouth:—

J. Cross .....	£1,325 0	F. J. Privett .....	£1,045 9
P. J. Durrant .....	1,123 9	Rowland Bros., 52, East-street, Horsham .....	1,019 0
I. Waters & Sons .....	1,067 0		
W. Potter .....	1,050 0		

**PENDERYN.**—For 4,200 yds. of 6-in., 9-in., and 12-in. pipe sewers, etc., at Hirwain, for the Vaynor and Penderyn Rural District Council. Mr. R. C. Jenkins, Engineer and Surveyor, Cein Coch, near Merthyr Tydfil. Quantities by Engineer:—

J. Sutherland, Abercynon, Glam., £2,748 18 7

**SETTLE.**—For sewerage scheme, for the Rural District Council. Messrs. Barber, Hopkinson, & Co., engineers, Craven Bank-chambers, Keighley:—

Baasington Bros. & Corney, Bridge End, Settle, Yorks. £4,505  
[Twenty-seven tenders were sent in.]

**SOUTHAMPTON.**—For private street works at Shirley and Portwood, for the Corporation. Mr. J. A. Crowther, Borough Engineer, Municipal Offices, Southampton. Quantities by Borough Engineer:—

	Portwood.	Shirley.
E. H. King .....	£3,310 2 3	£3,536 11 2
J. Butt .....	2,984 7 5	2,700 0 0
J. Douglas .....	2,599 0 0	2,390 10 0
Dyer & Sons .....	2,590 0 0	2,520 0 0
F. Orman, Southampton* .....	2,300 0 0	2,060 0 0

**THORNTON HEATH.**—For erecting a school for 1,250 children, Winterbourne-road schools, for Croydon Education Committee. Mr. H. Carter Pegg, architect, Thornton Heath:—

Hughes & Stirling £21,126	Kerridge & Shaw ..	£18,526
C. Wall, Ltd. ....	20,294 J. & M. Patrick ..	18,409
Marricott & Slater ..	20,050 F. G. Minter .....	18,334
G. Everitt .....	19,990 E. J. Saunders .....	18,289
Dean & Co. ....	19,912 G. Wales & Co. ....	18,247
Boven & Cons. ....	19,837 W. Smith & Son ..	17,983
E. P. Bulled & Co. ..	19,797 Spencer, Sano, & Co. ....	17,907
Graco & Marsh .....	19,705 Co. ....	17,848
Jones & Andrews ..	19,641 Gann & Co. ....	17,780
J. Shelbourne Co. ..	19,325 G. E. Wallis & Co. ....	17,753
Wilcock & Co. ....	19,300 Sons .....	17,400
H. Kent .....	19,220 B. E. Nightingale ..	17,286
Norman & Burt .....	19,180 Gethercole Bros. ....	16,994
W. Johnson & Co. ..	19,171 A. Faulks .....	16,930
Oak Building Co. ....	18,985 W. Lawrence .....	16,877
J. Smith & Sons .....	18,888 Son .....	16,780
Foster & Dickson ..	18,888 R. Cook & Son .....	
Drowler & Co. ....	18,860 A. Hudson & Co. ....	
J. E. Johnson & Son ..	18,692 W. Moss & Sons .....	
Martin, Wells, & Co. ..	18,570 Loughborough* .....	

**WAKEFIELD.**—For the erection of new imbecile wards and lavatories, for the Board of Guardians, Wakefield Union. Mr. J. Day, architect and surveyor, Central Buildings, Marygate, Wakefield:—

Builder: T. Lee* .....	£182 5 0
Joiner: W. Stead* .....	81 0 0
Plumbers: Lockwood Bros.* .....	46 0 0
Plumbers: Stratford Bros.* .....	64 17 1
Slater: J. W. Hingworth* .....	9 17 1
[All of Wakefield.]	

**WALKEND.**—For road works, Church-bank, for the Corporation. Mr. G. Hollings, Borough Surveyor, High-street, Wallend:—

J. W. Robson, Akenside-terrace, } Schedule of prices.

**WORMINGTON (Gloucestershire).**—For providing and laying galvanised piping for water supply to College Farm, Alesers, R. Ragland & Son, architects and surveyors, Oxford:—

A. Estcourt & Sons, Gloucester\* ..... £144

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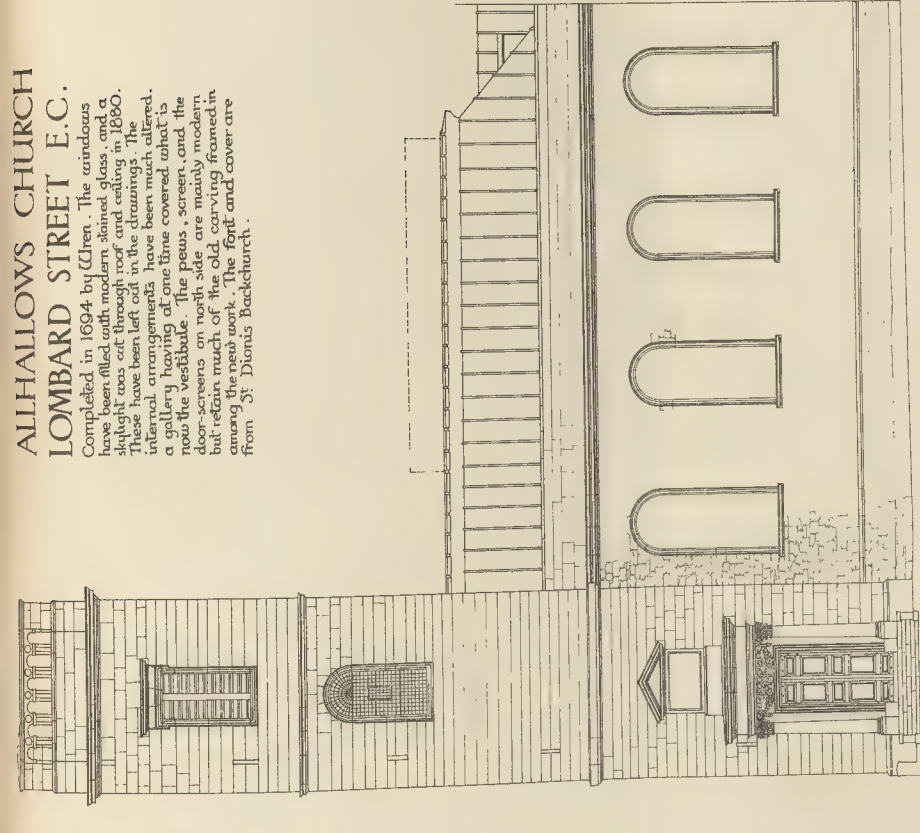
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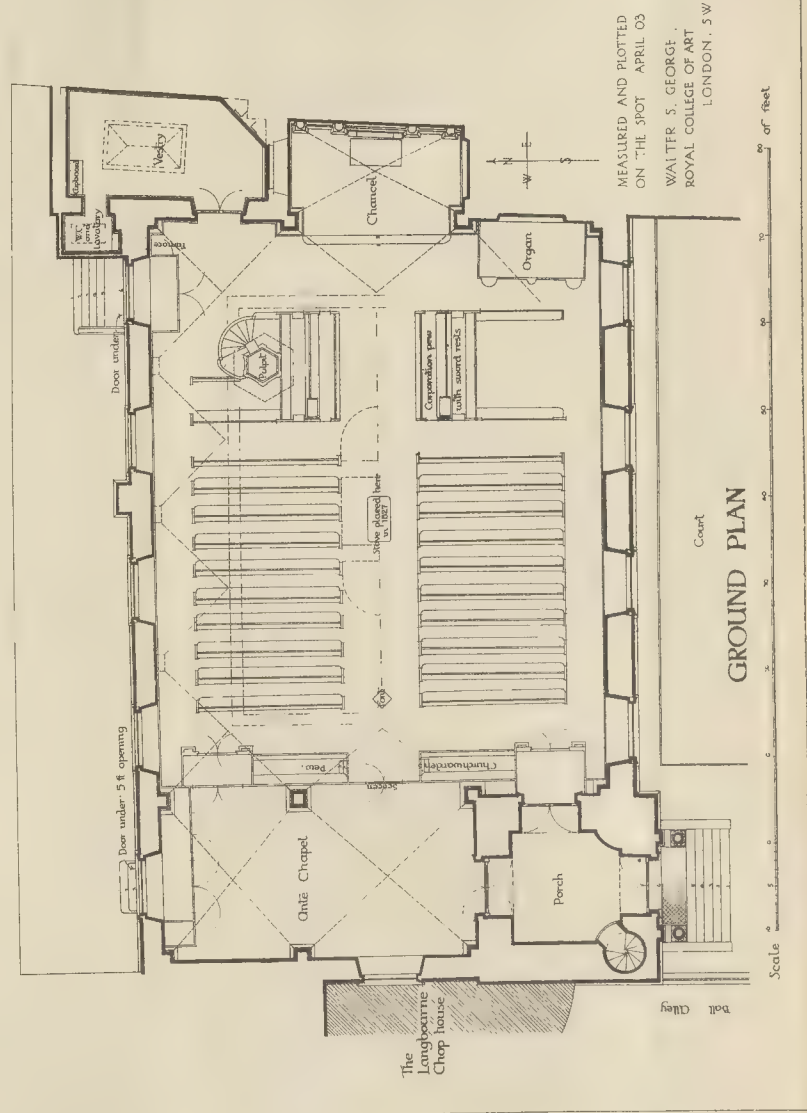


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Completed in 1894 by Allen. The windows have been filled with modern stained glass, and a skylight has been cut through roof and ceiling in 1890. These have been left out in the drawings. The internal arrangements have been much altered. a gallery having of one time covered what is now the vestibule. The pews, screen, and the door-screens on north side are mainly modern but retain much of the old carving framed in among the new work. The font and cover are from St. Dionis Backchurch.



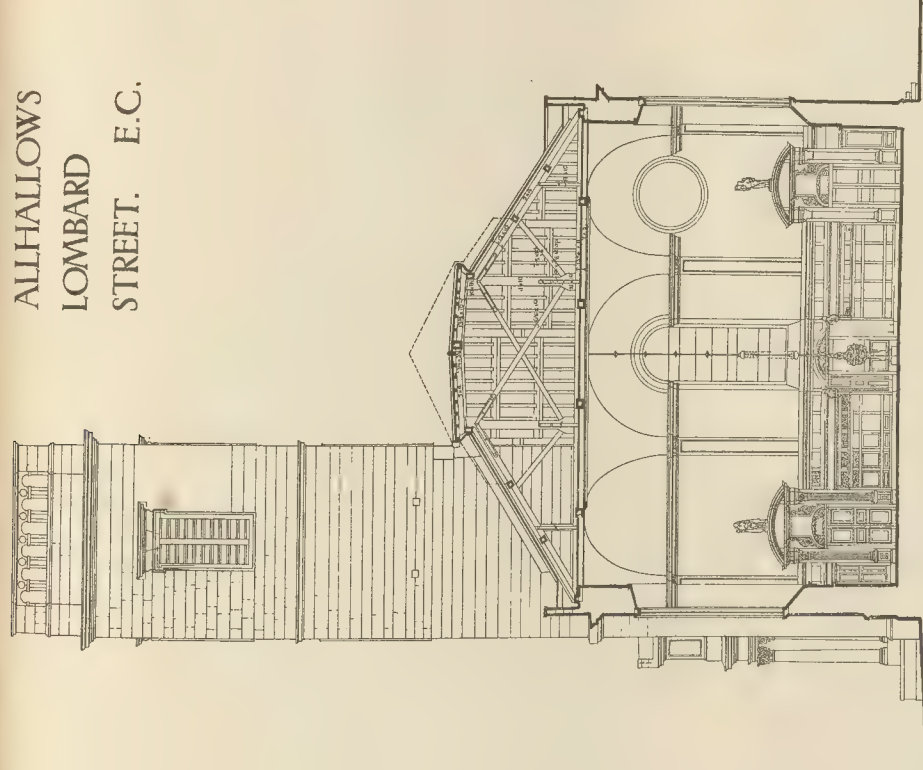
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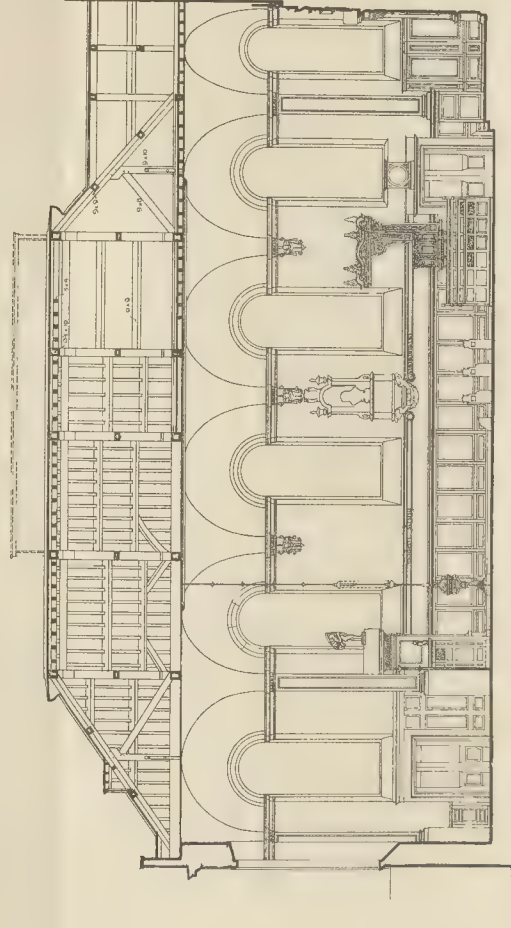




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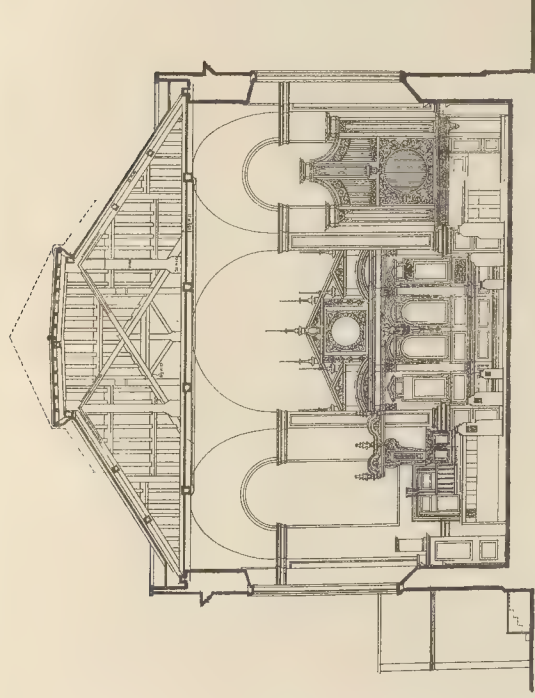
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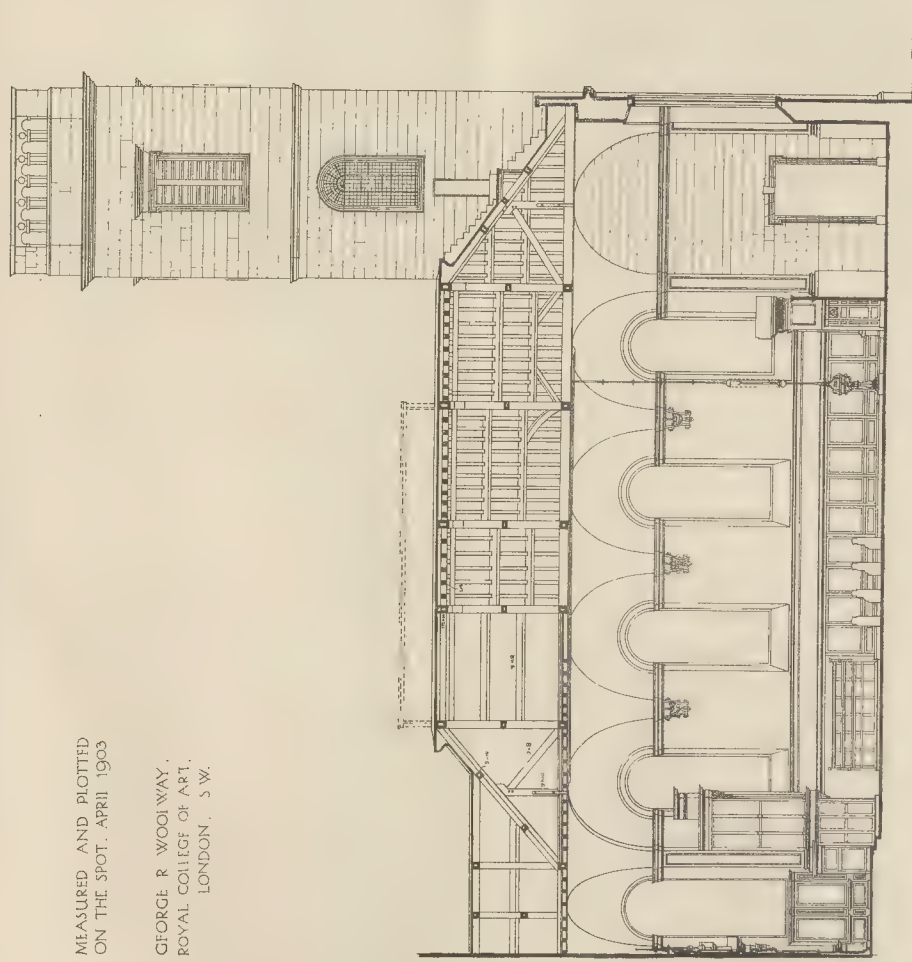
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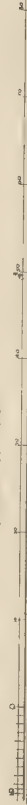
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SECTION LOOKING SOUTH

Scale of Feet.







# The Builder.

VOL. LXXXIX.—No. 3282.

DECEMBER 30, 1905.

## ILLUSTRATIONS.

"Commerce": Design for the Decoration of a Public Building.....By Mr. J. H. Amschwitz.  
London Temperance Hospital .....Messrs. Rowland Plumbe & Harvey, Architects.  
Sword Rest and Details of Font, All Hallows, Lombard-street.....Drawn by Mr. Arthur Kidd.

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### Recent Discoveries in Rome.



HE Forum has not been of late the scene of striking discoveries, and the work of excavation is not being carried on upon so large a scale as it was a few years

ago. The transformation of the monastery of S. Francesca Romana into a building which will contain the Forum museum and the necessary offices for the director is, however, progressing steadily, and when this work is completed, it will be possible to continue the exploration of the Basilica Emilia.

In the meantime work is confined to the open area of the Forum. To the south-west of the base of the equestrian statue of Domitian remains of a structure of a later date than it have been discovered—a foundation of concrete, upon which rest fragments of a pavement of various coloured marbles and a layer of tiles, upon some of which are fragments of the stucco decoration, belonging to the vaulted roof of a chamber of no very great size. Behind this are brick foundations; two rooms, which were originally paved with marble slabs, can be distinguished; the site of one of them was, in later days, occupied by the third (from the south-east) of the line of square brick bases which run parallel to the front of the Basilica Julia.

The identification with the imperial tribunal and the theory that this is the

site upon which stood the well-known Trajanic reliefs, with views of the Forum upon one side and figures of animals for sacrifice upon the other, are, in the present state of the excavations, premature. The supposed representation upon one of these reliefs of the emperor seated upon the tribunal with a female figure approaching him is, more probably, a reproduction of a group of statues—the emperor being, perhaps, not Trajan (who is seen upon the rostra) but Nerva, who was the founder of the alimentary institutions which Trajan largely extended.

The examination of the arch of a drain of a somewhat curious shape (narrowing like a funnel), which was blocked up by the foundations of the Arch of Tiberius and by another drain following the line of the Vicus Jugarius, has shown that the shape is due to the fact that it was intended to receive the contents of two drains which joined at an acute angle. It contained fragments of pottery, coins of Augustus and Tiberius, etc.

The official reports continue to deal with the archaic necropolis to the south-east of the Temple of Faustina. The fourth report has just appeared, after an interval of more than a year (*Notizie degli Scavi*, 1905, 145-193). Of the five tombs described one alone presents a case of cremation, and it has been cut by two of the four later tombs, in all of which the body was buried unburnt. This report is fully illustrated, and forms a remarkably complete record of the discoveries made; but at least one, and perhaps two, more will be required before the publication even of that

part of the cemetery which has been explored is complete. In the meantime, practically no reports on any other portion of the excavations have appeared since 1902 in the *Notizie*, so that we are without official information as to much of the work of several years back; and it is naturally difficult for writers who are not in possession of all the essential facts to form theories with regard to them without exposing themselves to the risk of being proved to be wrong (through no fault of theirs) when the official reports at length appear. The most important contribution to the literature of the Forum is a long article by Prof. Hülsen in *Römische Mitteilungen*, 1905, 1-119.

Turning to other parts of Rome, we may note that excavations for the opening of a new road have led to the discovery and almost simultaneous destruction of another portion of the huge necropolis which lay to the west of the Via Salaria. (*Not. Scav.*, 1905, 12 sqq., 81 sqq., 142 sqq., 200 sqq.; *Bull. Comunale*, 1905, 188 sqq.) In one of the tombs was found a terra-cotta plaque, with decorations in relief, still retaining the original colouring. It represents the stage of a Greek theatre with a scene from a tragedy being performed upon it.

A report also appears (*Not.*, 1905, 102 sqq.) of the recent discoveries in the catacomb of Commodilla, near the Church of S. Paolo fuori le Mura, on the Via Ostiensis. The catacomb was entered in 1720, but a landslip soon rendered it inaccessible once more, and it has only been explored during the last and the



present year. Interesting paintings of the Vith century have been found, representing the martyrs Felix, Adauctus, and Emerita, who were buried here. The inscriptions discovered belong to the IVth, Vth and Vith centuries.

The construction of an electric tramway to the Alban Hills has led to the discovery of remains of some importance. At the point where it crosses the line of the great aqueducts (near the so-called Porta Furba) the cutting was not carried deep enough for the discovery of the channel of the Anio Vetus; but in the course of excavations (to provide earth for an embankment) which were made some way further to the north, the road connected with the service of the aqueducts, and a *cippus*, or terminal stone, belonging to one group of them (the Marcia, Tepula, and Julia), and bearing the number 71, and an inscription recording its erection by Augustus, were discovered. The numbering began from Rome, and not from the springs.

A very fine mosaic pavement was discovered in making the foundations of the bridge by which the tramway crosses the railway to Naples. Only about one-third of it could be removed, as the rest lay under the main line. It is in black and white, with geometrical designs and groups of figures in octagonal panels (a drawing is given in *Not. Scav.*, 1905, 72). Further up the line, beyond the place where the tramway crosses the railway to Frascati, some 10 miles out of Rome, the high road, which the tramway has followed for some miles, ascends so steeply that the tramway takes, for two miles or so, a more devious course through the vineyards. In making this portion of the line the remains of several large villas, and especially of the enormous substructures of concrete upon which the villas themselves rested (the majority already in part visible), were laid bare and in part destroyed, but no discoveries of much importance were made. One obtained, however, a good idea of the massive construction of these buildings, and details of archaeological interest could be noted.

An account of inscriptions previously discovered in this district is given by Professor Lanciani, in *Bull. Comunale*, 1905, 129 *sqq.* There was, between the seventh and twelfth miles of the Via Latina, an almost continuous line of habitations, and no less than four different centres are known to us—a village near the seventh mile, the name of which is not known; a post station at the tenth mile (*Ad Decimum*) at the point of junction of an important cross-road, the inhabitants of which were called *Decimenses*; a village immediately beyond, called the *Vicus Angusculanus*; and another at or near the twelfth mile, the name of which is also unknown.

Before Grottaferrata is reached a line diverges to Frascati, and beyond Grottaferrata is the junction for Albano in one direction and Rocca di Papa in another. The former line follows the high road, but the latter zigzags through the vineyards. Here, however, the discoveries have been few, only one large villa having been discovered rather less than a mile below Rocca di Papa; and, as the work is nearly finished, there is hardly any prospect of more.

## REPAIRS AND DILAPIDATIONS.

HERE is not a more important subject in connexion with buildings than that of Repairs and Dilapidations, for it is one which constantly arises, not only in the relations of landlord and tenant, but of trustee and tenant for life, and very frequently also in regard to ecclesiastical buildings. Fresh cases arise from time to time, but as a rule they are illustrative of well-formed principles which in themselves are comparatively elementary. Any one who peruses Mr. Jackson's book, "Law of Repairs and Improvement, including Ecclesiastical Dilapidations,"\* will see at once what an immense quantity of judicial decisions exist illustrative of general principles. The difficulty of the subject arises because it is filled with so much detail; that is to say, the application of a principle is overburdened, as it necessarily must be, with numerous examples.

Non-repair, the allowing of premises to deteriorate through wear and tear, is in law known by the name of "waste," and liability on the part of a tenant arises in respect of it either by express covenant or by an implied covenant arising out of the relationship of landlord and tenant. The object of the law is to hold an even balance between these two parties—on the one hand, that the premises of the landlord may be kept up to a reasonable standard, and on the other that the tenant shall not have an undue burden placed on him. Like most legal principles, this is one easy to understand in theory; when it is applied to concrete facts, numerous, and often very detailed, it is apt to be lost. This difficulty will be apparent to a reader of this useful work almost at any place where he may open it. Take, for example, this passage (p. 122):—"A tenant from year to year must keep the premises watertight." This is a plain sentence enough, but then the question arises, how much work is to be done in order that this legal duty may be fulfilled? Even the well-equipped author of this treatise has, after years of legal decisions, to answer it in a somewhat doubtful manner. "This does not," he says, "necessarily mean that he must replace broken glass by new panes, but possibly it would not be enough to keep the rain out by means of boards or tarpaulins: he certainly need not make substantial repairs, such as a new roof, but he must protect buildings from decay." Here we at once see the practical difficulty of the subject of repairs and the reason why so many disputes arise upon it. The landlord naturally takes a severer view of the tenant's obligation than does the tenant himself. "To keep this house watertight a new roof is necessary," says the landlord; "a few tiles will be sufficient," replies the tenant—the truth generally lying all the time between the two extremes.

Having regard to these circumstances, probably the most interesting and useful chapter in this book may be considered to be that which is headed "Quality and Quantity of Repairs." Here, again, we are at once faced with the difficulty

already referred to. For at the beginning of the chapter we read:—"A general covenant to repair is satisfied by the lessee keeping the premises in substantial repair, according to their nature and age, and a literal performance of the covenant is not required unless where the language points to any particular matter." But before premises can be kept in substantial repair they must be in a certain state of efficiency, and so it is the law that a covenant to keep premises in good repair has often been held to involve the putting them into it, because if he intended not to put them into a proper state a tenant might have contracted accordingly. So that we get this result—one which sometimes takes a tenant by surprise—that such a covenant "presupposes both to put in repair, and also that during the whole term the premises will be in repair." Next we get the matter complicated by the fact that regard must be had to the age and class of the premises. Strange as it may seem, it was not till 1890 that some of the results of this principle were expounded in the case of *Proudfoot v. Hart*, which for the surveyor is a very interesting and important case, because the judgment states judicial opinions on practical points with great clearness. It is impossible here to do more than give one quotation:—"With regard to paper, I cannot see how in any case a man can be bound to put new paper on the walls simply because the old paper which was on at the time when he took the house or which he has subsequently put on the walls is 'worn out.' . . . With regard to this point, again, I can only repeat that painting is decoration, and that it is not necessary for the tenant to paint the woodwork inside when it is only required for the purpose of decoration." More we cannot quote, but what has already been quoted will show how clearly principles are applied by the judges in this case to everyday facts.

And this case leads us to express the wish that the Surveyors' Institution would commission a competent lawyer and surveyor to prepare a code on the subject of repairs and dilapidations. It could not be absolutely exhaustive, and it could not cover every possible contingency. But it could give laymen a statement of the law on these subjects easily to be understood, and what is more, easily accessible. At present, in order to find the solution of practical questions on these daily points, it is necessary to grope through legal treatises and judicial decisions, for it is hardly ever safe on this subject to rely too much on general principles. When a new Parliament is in existence it should be possible to pass such a code into law. The perusal of the useful book which has suggested the foregoing remarks will, we think, show at once the propriety and the possibility of such a code.

Nos. 12, 14, and 16, BISHOPSGATE-STREET WITHIN.—This property, extending from the Wesleyan Mission Hall towards Messrs. Baring's Bank, and facing the junction of Threadneedle-street, was recently disposed of by auction. The present buildings will be pulled down very shortly and new premises will be erected, providing on the ground floor and basement accommodation for a banking firm, and on the upper floors offices. Mr. Paul Hoffmann is the architect for the new building.

\* "The Law of Repairs and Improvement, including Ecclesiastical Dilapidations," By J. H. Jackson, M.A., Barrister. London: Butterworth & Co. 1905.

## SMOKE-ABATEMENT AND LOW-GRADE GAS.

THE most noteworthy feature of the recent Westminster Conference on Smoke-Abatement was the general recognition of the fact that it is no longer necessary for hygienists to advocate the use of smokeless fuel for cooking purposes in our large towns. So long as the exponents of the advantages of gaseous fuel were merely leading men of science and medical practitioners the public would have none of it, but since cook discovered its manifold uses every peace-loving citizen has hastened to become a smoke-abater. For centuries the people of London have been calling for legislation to restrict the emission of smoke from domestic chimneys, but it has been reserved for the present generation to see smokeless fuel voluntarily and almost universally adopted as a substitute for bituminous coal for cooking purposes.

As evidence of the recognition of the value of gaseous fuel in restaurants the statement of Dr. H. Des Vœux that Messrs. Lyons, the well-known restaurateurs, spend 10,000l. per annum on gas for cooking may be quoted. Sir George Livesey's figures, showing that more than half a million gas-cookers are in use in that portion of London which is supplied by the three metropolitan gas companies, are sufficient indication of the popularity of gas for domestic cooking in London, especially when it is remembered that his estimate does not include many hundreds of thousands of ring-burners which do not rank as cookers, but which, nevertheless, are much used for cooking on a small scale.

For the heating of dwelling-rooms, however, the open coal fire still ranks first in popular esteem. The principal reasons for this preference for the coal fire are (1) it is cheaper than a gas fire when used for many consecutive hours; (2) it forms a very convenient crematory for private correspondence and other inflammable household waste; and (3) it is believed to be more conducive to good health.

With regard to the third point it may be said that a certain amount of prejudice against gas fires has been created by the sale of many fires of bad design, and sometimes by the faulty fitting of good fires; also through the common delusion that it is a satisfactory practice to connect a gas fire to a flue which has proved unusable with a coal fire owing to persistent "smoking." Well-designed gas fires connected to flues with a satisfactory up-draught are free from all objectionable features. Hundreds of gas fires are in use in the neighbourhood of Harley-street, W., in the houses of leading physicians and surgeons, and gas fires are commonly fitted in every bedroom in nursing homes. In most rooms it is necessary, in order to ensure good ventilation, to have a highly-heated current of air flowing up the flue. It is the so-called waste heat which makes an incandescent coal fire so efficient a ventilating agent, and in many cases it is the endeavour to economise by preventing the escape of waste heat up the flue which has created prejudice against gas fires. Unless special ventilating arrangements are provided the products of gas combustion

should enter the flue in a highly-heated condition, and where gas is expected to perform the ventilating duties of a coal fire all forms of flueless and condensing stoves should be avoided.

With reference to the convenience of the coal fire as a waste-destructor, it may be remarked that gas may be adapted to serve the same purpose. It would be easy to design a gas fire having a removable vertical fireclay muffle, in which embarrassing correspondence and cigar-ends could be destroyed as readily as in a coal fire. It is merely a matter of cost.

The real obstacle to the universal use of gas fires as substitutes for coal fires is the higher cost of the former when used daily for several consecutive hours, and smoke-abatement advocates and gas engineers are now confronted with the task of devising a practicable scheme for the sale of gas at a cheaper rate.

At the recent Conference Mr. Ackermann advocated the distribution of producer-gas. The heating power of this gas is only about one-fourth that of coal-gas, and it contains fully fifty per cent. of incombustible gases. Mr. Ackermann stated that producer-gas can be manufactured, even on a small scale, at 3½d. per thousand cubic feet. This is true, but when to this sum is added the 3½d. per thousand for rates paid to local authorities by the Gas Light and Coke Company, and the necessary 8d. per thousand to cover the cost of distribution, management charges, interest on capital expended, etc., it will be seen that even producer-gas could not be profitably distributed in the metropolis to ordinary householders at a price below 1s. per thousand, which is equivalent to coal-gas at 4s. per thousand, a price much in excess of that charged by any of the metropolitan gas companies.

The only practicable method of reducing the price of gas supplied to the general public, without unduly affecting its value for domestic purposes, appears to be that of supplying gas of lower illuminating power, as has been proposed by Sir George Livesey, Mr. H. E. Jones, and other eminent gas engineers. At present the least objectionable method of effecting this is, in the writer's opinion, the conversion of some of the coke produced in the manufacture of coal-gas into plain water-gas (94 per cent. combustible), and the admixture by a suitable process of this water-gas with the coal-gas.

Unless, however, cheaper coal becomes available, or the by-products of coal distillation increase largely in value, there is little prospect that, even after the proposed alteration in the illuminating power of the gas, the charge to small consumers will fall below 1s. 6d. per thousand in any part of London. But at this price gas with a net calorific value of not less than 450 B.T.U. could be used with economy as a substitute for coal, even for the daily heating of dwelling-rooms. Gas of this quality would also be quite suitable for cooking and for incandescent lighting.

## NOTES.

OWING to the condition of the pinnacles and cornices at the West front of Winchester Cathedral the authorities have found it necessary to close the three western doors, leaving only the southern door open as a public entrance to the building. The effect of frost during the past few weeks has no doubt increased the somewhat perilous condition of some architectural details of the cathedral, but in view of the measures already taken for the auxiliary support of the walls threatened by subsidence of the foundations, there probably is no immediate danger of any alarming developments. We fear that the appeal for funds issued by the Dean has not met with so generous a response as could have been desired, and take this opportunity of expressing the hope that at the season when good resolutions abound the people of England will determine to aid in the work of preserving one of the most noteworthy landmarks in the history of the nation.

GENERAL satisfaction will be felt by the travelling public, and by those taking an interest in the artistic appearance of the metropolis, that the directors of the South-Eastern and Chatham Railway have decided to substitute a new roof of modern type at a lower elevation, in place of the partially decayed and monstrous structure hitherto disfiguring the view along the Victoria Embankment. We have at present no details of the new design, but it will probably be somewhat on the general lines adopted in the enlargement of Victoria station, although, of course, Mr. Percy Tempest, with the invaluable co-operation of Sir Benjamin Baker and Sir John Wolfe Barry, will not be guided in matters of detail by any existing structure, and should be able to give us a thoroughly distinctive example of station roof construction. Quite apart from the initial cost of building wide and lofty roof spans, the difficulty and expense of maintenance, and the element of danger in such to the public, a lower type of roof is far more favourable for the escape of steam and injurious gases from locomotives, for the admission of natural light, and for the dispersion of sound waves. Preliminary works are now in active progress for the removal of the old roof, and it is hoped that matters will be so far advanced by February next that the station will then be re-opened for traffic.

In a recent letter to the *Times*, Mr. Jackson, R.A., gave further currency to mistaken rumours to the effect that Portland cement does not afford reliable protection against the corrosion of iron and steel. It is true that the writer carefully abstained from supporting the view in question, but the fact that it has been thought worthy of mention by so eminent an architect is sufficient to give it a false importance in the minds of the uninitiated. For this reason we were glad to see a reply from Mr. Sachs, pointing out that rumours prejudicial to the preservative properties of Portland

RETIREMENT OF EDINBURGH ROAD SURVEYOR.—Mr. David C. Proudfoot recently resigned his position as City Road Surveyor to the Edinburgh Corporation. He had been in the service of the corporation for thirty-six years.



cement can only be based upon the experience of those who have employed inferior qualities of cement in an unsuitable manner. We have repeatedly given data showing the valuable effect of Portland cement and concrete in preserving from corrosion any metal enclosed therein, and it is not necessary to cite particular instances on the present occasion. We may, however, remind our readers that the process of decay, commonly described as rusting, can only take place in the presence of three agents—oxygen, water, and acid. Oxygen is a necessary constituent of the atmosphere, water in moderation is a desirable constituent, and acids are necessary and desirable according to their nature and the proportion they bear to the volume of the air in any particular place. By excluding any one of these agents from the surface of metal, the activity of corrosion is very small, and by keeping away all three it is entirely prevented. Portland cement, being almost impervious to penetration by gaseous bodies, will effectively protect steel from the action of oxygen, aqueous vapour, and acid gases; any water brought into contact with the metal by the wet cement or concrete is absorbed by the protective material, and the alkaline nature of the cement is sufficient to neutralise any acid seeking to gain access to, or accidentally present upon, the surface of the metal. These facts point conclusively to the reason why Portland cement compounds are so particularly suitable for the preservation of iron and steel.

**Recent Tests of Concrete-Steel Beams.** OWING to the extensive employment of reinforced concrete on the Chicago, Milwaukee, and St. Paul Railway, the Bridge and Buildings Department of the company have found it necessary to make a thorough study of existing data relative to the strength of concrete-steel beams. For the purpose of the tests undertaken thirty beams were prepared with the width of 12 in. and of depth varying with the number and diameter of the reinforcing bars so as to preserve the uniform proportion of steel at 0.75 per cent. of the sectional area of the beams. Three special types of patented bars were used as well as plain round bars, and the concrete had the uniform proportions of 1 part Portland cement, 2 parts clean sand, and 5 parts crushed limestone of 2-in. gauge. The beams were tested in a 90-ton machine providing a clear span of 12 ft. The detailed results of the tests will be found in a recent issue of the *Engineering Record*, and are too lengthy even for summarised reference in this note. The following are among the chief conclusions to be drawn from the investigation:—(1) That properly designed diagonal reinforcement is desirable to develop the full strength of the beam and to guard against the risk of sudden failure; (2) that small bars are better than large bars as reinforcement; (3) that the ultimate strength of a beam is attained when strain on the reinforcement reaches the elastic limit; (4) that with 0.75 per cent. of reinforcement and an average quality of concrete the neutral axis is situated at about one-third the distance from the centre of the steel to

the top of the beam; (5) that very little error results from taking the stress area as triangular instead of parabolic.

#### The Water Main Burst.

THANKS to the substantial manner in which all the details of waterworks undertakings are executed it is very seldom that any failure occurs similar to that which caused so much inconvenience, and did so much damage, on Tuesday, in St. Martin's-lane. Considering the enormous power latent in water under the head necessary for the supply of high buildings, and the voluminous discharge capacity of a large water main, it is not at all surprising that the street pavement should have been displaced and the whole street converted into a stream. At present we do not know what was the responsible cause of the accident. Even if defective or wasted away by corrosion, water pipes do not usually burst in the absence of some sudden shock. The rupture of mains that have been in use for a considerable time is almost invariably due to the too rapid closing of a valve, an operation that should be performed very gradually, especially towards the end. The necessity for extreme care in this direction is a sufficient reason for the circumstance that the torrent pouring down St. Martin's-lane continued for a period of some ten minutes. There is really no means of shutting off the water in less time than this without the certainty of causing failure elsewhere along the pipe line. Automatic stop valves are always provided at places where serious inconvenience would follow the fracture of a main, but the closing of such a valve cannot be effected with safety in much less than a quarter of an hour.

#### Leakage Electricity and Lead Poisoning.

A SOMEWHAT alarming case of lead poisoning has recently occurred in a cottage on the Twyford Lodge estate in Hants. A sample of water taken from the cottage was found to contain 0.14 of a grain of lead per gallon, although an analysis of the water supplied by the company was perfectly satisfactory. The case was investigated by Mr. B. Latham, who has published the results of his researches in a paper read to the British Association of Waterworks Engineers on December 16. He found that the presence of lead in the water was entirely due to electrolysis, current having leaked into the lead pipe from the private electric lighting plant of Twyford Lodge. This points out a danger in connexion with electric lighting of which, so far as we are aware, this is the first properly authenticated instance. In the early days of electric traction in America, when practically no care was taken to bond together the rails which carry the return current, very considerable damage was done both to the water mains and to the service pipes and fittings. In these cases there must have been a considerable amount of carbonate of lead formed in the drinking water, and it would be useful to know if American medical men had noticed any cases of lead poisoning before the extensive corrosion caused by the leakage currents forced electricians to take the necessary precautions. This new danger is another reason why electric

supply companies should use the greatest endeavours to maintain the insulation resistance of their net-works as high as possible. We found out some ten years ago that the insulation resistance to earth of some of the net-works of the London Supply Companies was only a few ohms, and that consequently their leakage currents are measured in amperes. Under these circumstances it is highly probable that evidence of electrolytic corrosion will be found sooner or later.

#### Fires on Underground Railways.

THE Fire Brigade Committee of the London County Council have asked the Board of Trade to amend some of the minimum requirements for guarding against fire in underground electric railways. The recommendations made are due to the Chief Officer, who has recently inspected a station fitted with the "efficient hydrants, hose and fire prevention appliances" required by the regulations. He has suggested that the supply pipe must be at least 4 in. in diameter, and be connected with high-pressure water mains. He has also suggested that there must be at least two hydrants on each platform of a low-level station, and that extinguishers be supplied to each carriage and to each lift. Whilst agreeing in general with his recommendations we should like to emphasise the duty of railway companies to render a repetition of the dreadful accident which occurred in Paris on August 10, 1903, an impossibility. The loss of life on that occasion was due mainly to suffocation from the fumes of the burning materials. We think, therefore, that only fireproof materials, such as asbestos fibre, magnesium silicate, etc., should be used for insulating the electric wires used on the motors and for the lighting of the trains. We should like fireproof material to be universally used, as it is a protection not only against fire panic, but against explosions. Again, passengers waiting at the stations notice the great draught through the tunnels, and it is this draught which is a great source of danger in case of a fire. Possibly methods of stopping the draught in a tunnel in the case of fire have been devised; if they have been it would certainly increase the confidence of passengers if they were made known. If a screen could have been lowered across the tunnel at the time of the Paris accident there need have been no loss of life. We think also that automatic sprinklers might be provided at some of the low-level station platforms; in America the sheds used for tramway cars are often provided with them. Although a railway-station may not be considered a very hazardous risk by an insurance company, yet, in this special case, it is right that no precaution should be neglected.

#### Waterworks and Land Subsidence.

THE decision in the case of *Fletcher v. Mayor, etc.*, of Birkenhead is one of importance to owners of house property. The plaintiff was the owner of a dwelling-house and land, and the defendants, acting under their Gas and Water Act, had sunk a boring tube on land acquired by them for the purpose about 180 yds. from the plaintiff's house, and had been

pumping large quantities of water from this source. The subsoil which supported the plaintiff's property was a bed of wet running silt, and these pumping operations had caused a subsidence. In an arbitration the plaintiff had been awarded 1,200*l.* damages. The defendants contended that he was entitled to no damages, either at common law or by virtue of the statutory powers conferred upon them. The Court held that the plaintiff's property was "injuriously affected," and but for the statutory powers there would have been grounds for an action for nuisance at common law. Then as regards the statutes the judge held that sect. 12 of the Waterworks Clauses Act, 1847, was not confined, as the defendants contended, to the period during which the works were under construction, but applied to the water taken "from time to time" for the purpose of supplying the district. The Court also intimated that even if this section had not such an application, and that, as the defendants contended, they had general powers under their private Act, then sect. 6 of the Waterworks Clauses Act would still enable the plaintiff to claim compensation, since this section qualifies the powers conferred by the special Act by introducing the provisions of the Land Clauses Act as to compensation.

**Creosoting Timber.** A PAPER of practical value relative to the inspection of treatment for the protection of timber by the injection of creosote will be found in the current number of the *Proceedings* of the American Society of Civil Engineers. The author deals chiefly with the quantity of oil necessary for enabling timber to resist the process of decay and the attacks of sea worms. A point worthy of note in connexion with the creosoting treatment is that the protection afforded is directly governed by the depth of penetration and the quantity of oil injected. As, however, the depth of injection appears to be limited by the proportion of sap to heart wood, it follows that comparatively soft timber is most suitable for treatment, and that the most efficiently treated timber is least suitable for purposes involving abrasion. One weak point connected with creosoting is that the purchaser is rarely in a position to ascertain with any approach to accuracy the weight of oil injected and the uniformity with which the preservative agent is distributed in the various pieces of timber in a given consignment. The author argues that, if weight of creosote is the basis for contract, weight is the logical basis for treatment and its inspection. Hence three unit weights should be available—the weight of the green timber, the weight of the timber after the vacuum process, and the weight of the treated timber. The difference between the first and second represents the weight of the sap removed, and the difference between the second and third is the weight of the oil injected. Some useful hints are given in the paper, as well as a specification proposed for governing the creosoting of green timber. If the recommendations here made are generally approved the practice of firms engaged in this method of preservation

will have to be modified so as to give better opportunities of inspection during the successive stages of the operations conducted.

**Sanitation in India.** A USEFUL summary of the many reports issued by Imperial, provincial, and municipal authorities in the Indian Empire is to be found in the annual Blue-book published last week. We are sometimes apt to forget that our great possession in the East includes some 300,000,000 persons, and the immense difficulties that have to be overcome in persuading so huge a congregation of conservative-minded people that the measures proposed for their benefit are really calculated to do good. Unfortunately, sanitary science seems to have had but little effect in checking the ravages of the plague, but in other directions there are satisfactory indications of substantial progress. One of the most striking proofs of the benefits conferred by the British administration of India is furnished by the statement that at the present time some 2,500 hospitals and dispensaries are in existence, where more than 372,000 indoor and about 22,400,000 outdoor patients were treated during the year to which the reports refer. In various large cities considerable attention is being devoted to the problems of water supplies and drainage, and in Calcutta satisfactory progress has been made with the important works of sweeping away insanitary areas, opening up new thoroughfares, providing additional open spaces, and improving the water supply and drainage systems.

**Nottingham Castle and Museum.** THE City Council have applied to the Local Government Board for sanction to borrow 10,000*l.* for the repair and reconstruction of the castle museum, upon the lines of a scheme framed by Mr. F. B. Lewis, City Architect. In 1831 the Reform Bill rioters burned the mansion which William (Cavendish), first Duke of Newcastle, had built in 1670-6 upon the castle hill; the fabric, designed after the Classical style, remained in ruins until about thirty years ago, when the corporation obtained a 500 years' lease from the trustees of Henry (Clinton), sixth Duke, conditionally upon their undertaking to preserve the castle as a national monument and to expend 15,000*l.* in restoring the main structure and appurtenant premises, for purposes of a museum of science and art, with music hall, reading and lecture rooms, etc. The present proceedings are the outcome of protracted negotiations, which have at length assumed a definite shape, and the corporation propose to devote a part of the loan to a restoration of the gateway and the strengthening of the bastions and walls. The original fortress, which had been rebuilt in 920 after a predatory incursion by the Danes, gave way to one erected by William the Conqueror, on the summit of the eminence rising above the River Leen. That stronghold, as re fortified in the reigns of Edward IV. and Richard III., ultimately fell into the hands of the Parliamentarians, and, having been dismantled by Cromwell, was pulled down

by William, Duke of Newcastle, who had bought it from the Duke of Buckingham. The museum contains the late Felix Joseph's bequests of Wedgwood ware, and drawings and designs by T. Stothard, R.A., Lord Savile's gift of classical antiquities from Italy, the Jacoby collection of old hand-made lace, and some oil-paintings given by the widow of G. Jones, R.A., including views of Rome, Nuremberg, and Frankfurt, and of Edinburgh Castle from the Grassmarket.

**Cromwell House, Highgate.** THE leasehold interest of this property, which covers about  $1\frac{1}{2}$  acres, and has an unexpired term of thirty-three years, will shortly be offered for sale. The house, standing on the east side of Highgate-hill, opposite Waterlow Park, has lately been occupied as a convalescent home of the Great Ormond-street Hospital for Sick Children. It is generally believed that Cromwell either built or bought the house and gave it to his daughter when she married General Ireton. It contains many interesting features, amongst them being the carved woodwork, and the fine staircase, which is ornamented with figures carved in oak, and wearing the uniforms of soldiers of the Parliamentary forces.

#### THE PROBLEM OF RURAL HOUSING.\*

THERE are two great difficulties in the way of getting good cottages built for country labourers which might be removed by the spread of knowledge. One is the prevailing belief that you cannot put up a presentable and well-built cottage for less than 250*l.*, or at least 200*l.*, and the other is a lamentable ignorance of the practical requirements of those who are to live in the cottages. Both of these are matters in which a Society like this can do excellent work by mere propaganda.

To take the first difficulty. I believe there is quite a large number of landlords who are still firmly persuaded that you cannot build a five-roomed cottage under 500*l.* for the pair; while there are yet more who, though admitting that 300*l.* for a pair is a possible price, think that such cottages must necessarily be mean-looking, jerry-built houses such as we see put up in streets in the factory districts, and they naturally hesitate to disfigure the countryside with such buildings.

Indeed, the question of appearances is one of the importance of which must be recognised even by those who might be prepared to neglect it altogether in favour of mere utility, for, until we can dispel the false impressions that prevail on this point, we shall always have a strong opposition to the increase of cheap cottages. For this reason, therefore, if for no other, I think it is very desirable to demonstrate that it is possible to build for a cost of about 150*l.* a country labourer's cottage with all reasonable requirements, which shall at the same time be well built and shall not be an eyesore on the landscape.

And first of all as to price. The sum of 150*l.* is fixed upon as being somewhere about the capital outlay which will admit of a reasonable rent to cover a low rate of interest and depreciation. It is a common error to say that agricultural labourers' cottages can only be built at a loss. The truth is that the provision of cottages at nominal rents is part of a complicated system of payment of wages in kind. If you will examine carefully the estate system which prevails throughout the greater part of the country you will find that the general custom is for the landlord to provide cottages at low or nominal rents, in order to secure cheap labour for himself and his farm tenants. This is, of course, a great check upon the

\* A Paper read at the Annual Meeting of the Rural Housing and Sanitation Association, November 21, by Mr. Fairfax Chalmers.



building of cottages by others, and a hindrance to putting in force the building powers of district councils and other public bodies. But it is absolutely erroneous to argue from the existing rents that labourers' cottages cannot be built to pay a reasonable rent.

Supposing we are able to produce the required cottage for 150l. or thereabouts; it would be possible to get from 3s. to 4s. per week for them from labourers whose wages were 1l. per week, which is the average earning of ordinary country labourers in some parts of England where they are properly paid. It may be open to employers to pay 16s. per week or less, and give in the cottages for nothing or for a nominal rent, but it is unreasonable to argue from that that cottages cannot be built to pay.

However, I do not propose to enter into a controversy now on the question of how you are to alter such a bad system, nor even to argue in favour of my opinion that it is a bad system; I merely wish to clear the ground for assuming that 150l. or thereabouts is the sort of sum which we should aim at as the cost for a country labourer's cottage.

Now it has been very justly remarked that it may be easy enough to build a cottage for 150l., or even less, but that such cottages are dear at the money if the workmanship and material are not good and sound; for in a badly-built cottage the bill for repairs will be high. We have, therefore, something more to take into account than the mere initial cost.

I think, perhaps, the best thing I can do, in discussing this and other details, will be to take a concrete case, as I have myself a plan which I have used as a model for labourers' cottages at Brandsby, in the North Riding of Yorkshire. This cottage has been built for 150l., and special care has been

taken with the quality of the work and construction. Indeed, to give an example of this, I may say that I have all the tiles pierced for nails, to my special order, instead of laying them on with mortar only, to hang by the lip, as is the usual custom throughout that part of the country.

Here let me say that I am able to give proof of the cost of this cottage. The agent of a well-known estate visited me some time ago for the purpose of looking at these cottages, and, though he was sceptical as to the cost, he asked for tenders from builders, and received two which came out at a trifle under 300l. for the pair. My own builder, too, informed me that he had built by contract a single cottage with parlour on the plan I have here in a very inaccessible village to which bricks had to be brought by traction from a considerable distance, and that he had accomplished it for under 160l. I am quite satisfied from my own experience that a country builder, who works on the job with his men, can build these cottages in pairs for a price varying from 140l. to 160l. each according to circumstances, though, no doubt, a contractor who did not work himself would require a larger margin of profit.

So far as external appearance is concerned, one must trust to simplicity and proportion rather than to ornament. Bad ornament is far worse than none, and you cannot have good ornament without materially adding to the cost. It is a great mistake to think that you cannot get a good effect with a severely straight building, and that a porch or a gable is in itself beautiful. On the contrary, porches or gables that are out of proportion, badly shaped, or made of ugly material such as ugly-coloured tiles, generally increase the ugliness of a building, while greatly adding to the cost.

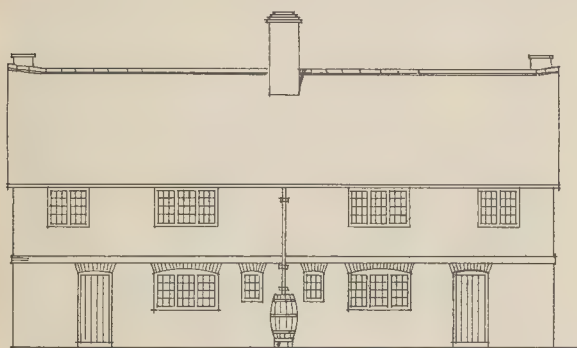
In the Brandsby cottage you see a per-

fectly straight building with a line of slightly-projecting bricks running the entire length on the level of the bedroom floor. That line, called a string-course, by making the cottages look lower, improves the proportion, and the extra cost of it over a plain wall might be estimated at about 1l. or under. It is a good example of what may be done to improve appearances by simple means.

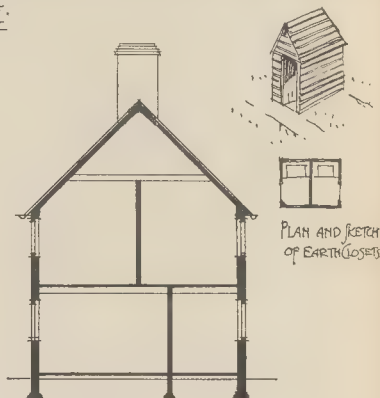
I must say that in the cottages I have built so far it has been omitted, because I have been experimenting, but it will be put in all future buildings on this plan. Again, in the elevation I have shown a slightly steeper roof than I have actually built, and also I have shown an extra course of bricks above the bedroom window. Both these small alterations make all the difference in appearance, and can be made at a trivial increase in the cost. These cottages should be either whitewashed or covered with ivy that is to be kept well trimmed every year. And may I say here that it is quite a mistake to think that ivy makes the walls damp. Ivy will protect the walls from driving rain, and, on account of its glabrous leaf, will remain dry underneath the foliage. Whitewash, too, if composed of lime with a mixture of Russian tallow, will protect the walls and give a fine appearance with red tiles.

The next question is whether your cottages should be single or in pairs. It is needless to say that building in a row is most undesirable and should be avoided where possible, but I doubt whether it is worth while making sacrifices in order to build single cottages to stand detached. In a pair of cottages built for labourers who are working for wages, not for small holders with land and buildings attached, you can get practically as much privacy as is required; and, as the cottages are built with 9-in. brick walls, it is an advantage to save one outside wall for the sake of warmth.

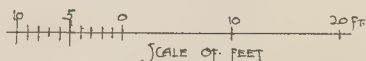
### THE BRANDSBY MODEL COTTAGE.



FRONT ELEVATION



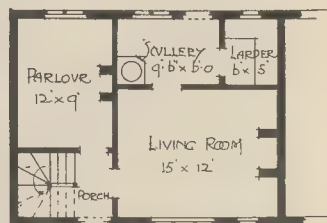
SECTION.



SCALE OF FEET

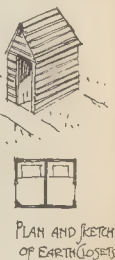


HALF GROUND-FLOOR PLAN.



ALTERNATIVE GROUND-FLOOR PLAN.

HALF 1ST FLOOR PLAN.



PLAN AND SKETCH OF BATHROOMS

You will notice that in the Bransby cottages, which are built in pairs, there is only one outside wall to each room, with the exception of one bedroom. Moreover, it is not altogether a disadvantage to have a next-door neighbour to help at times, especially in cases of sickness, and the necessary privacy can be secured where it is wanted at the back door by a palisade 6 ft. high to run a few yards to the outbuilding. Again, to prevent conversation from the neighbour's cottage being overheard, the partition wall between the two should, of course, be a 9-in. wall, and the roof timbers should be disconnected, so as not to act as a telephone between the adjoining houses.

The separation of the back doors by a sufficiently high fence running a few yards from the house is really important for comfort and peace, for there are more quarrels between neighbours arising from the back-yard than from any other source.

Next, as to internal arrangements. First of all, let me emphasise the importance of providing a kitchen living-room, which has not got a door entering into it straight from outside. In the Bransby model I have contrived a lobby at the entrance, from which the staircase leads to the bedrooms. The living-room itself should be the best room on the ground floor, but should not be too large to be easily warmed by a moderate-sized fire, and it should not have more than two doors into it. A good size is 15 ft. by 12 ft.; a greater length makes a cold end to the room. If possible the doors should be kept to the end of the room farthest from the fire. One of the commonest faults in the cottages at the exhibition at Letchworth was in this matter of doors. Many had a door next to the fireside corner—I wish the designer had to sit there on a cold winter's night with a blast blowing through to "improve" his rheumatism—and many more had three and even four doors into the room, sometimes one straight from out of doors, to say nothing of picturesque staircases open to the room to provide a pleasant draught on a cold winter's night. The avoidance of these very real discomforts is far more important than such luxuries as the ceiling of the lower rooms with lath and plaster or adding to their height. In the Bransby model the kitchen is 8 ft. high to the floor boards above, and I have saved 7 in. in the height of the building by leaving the floor joists uncelled. A greater height than this is unnecessary in the country, where there is abundance of good air coming into the house through open doors all day, and where the majority spend their life out of doors. I can speak with some certainty on this point, for I have lived in such rooms both summer and winter, and am confident that the height is sufficient. The money saved by the economies I have mentioned is far better spent in other comforts, such as larger area, better bedrooms, and other things I shall mention.

As to the bedrooms, I think I need not spend time in arguing the necessity of three bedrooms; but it is by no means necessary that there should be separate entrances to more than two. Except where it is intended to make provision for lodgers, the space is more valuable in the larger rooms than in a passage.

In the plans you have before you a separate entrance could be made to the third bedroom with ease by sacrificing a few feet in the front bedroom, and even then the bedroom area would still be larger than in most of the Letchworth exhibits. Indeed, in many of the cottages there, the third bedroom was much too small. A fireplace in each bedroom is worth more than many unnecessary luxuries often provided, more even, I think, than the bath, for which so much has been sacrificed in many instances.

There is one other matter about which there is often a great deal of controversy, and that is the parlour. Like many other people, I was at one time strongly prejudiced against it, but I have since become convinced that if it is possible to provide one—and quite the smallest room in the house will do—it is well worth doing so. Miss Cochrane has given many excellent reasons for this in her leaflet published by this Society, and I can thoroughly endorse what she says from my own experience. The woman who takes in sewing or washing will use such a room for storing her clean, finished work, as well as for

her sewing machine, if she has one, her little treasures also, or anything she wants to keep out of the way of the children or the soil of household work, to say nothing of the convenience of having a room into which the chance visitor may be shown—the clergyman, doctor, or squire's lady—when it is not always convenient to let them penetrate into the midst of the household.

A little more real knowledge and sympathy would soon dispose of the bourgeois prejudice that sums up the claims of a parlour as merely a snobbish desire for a place to store fine furniture. If it is useful for no other purpose, it is, at all events, a place in which a coffin may be placed; perhaps the mention of such an eventuality may bring home to those who have never thought of it the difficulties of those who have to live in a cottage with only one living-room where there is any aspiration to preserve the decencies of life.

There is, however, one other matter of considerable importance which has come prominently before the public lately, and that is the question of by-laws. There has been quite rightly a revulsion of feeling against the foolish by-laws that have been adopted in many country districts, which are quite unsuited to the surrounding circumstances; but it would be a fatal mistake to assume that there should be no by-laws at all. That would be merely playing into the hands of rural slum-owners. The Local Government Board has during the last few years compiled and issued a set of model by-laws for rural districts to which nobody could take objection on the score of strictness. They merely provide for the elements of sanitation about a cottage, such as proper windows in each room, an effective damp-course in the walls, and preservation from sewage pollution. There is great need for such regulations, and where such by-laws are adopted, the only evils of importance that can arise from them will be due to corrupt administration and malevolent attempts to create difficulties out of the letter of the law by interested parties who may for the time hold places of public trust. But the remedy for such evils is exposure and dismissal, rather than abolition of necessary laws.

In conclusion, I should like to say that the Bransby model, which I have so constantly referred to, is a cottage that fulfils the requirements of such by-laws, and can be built in any ordinary circumstances for about 150l. I have shown two ground plans, in one of which a parlour is provided, to the detriment of the scullery and the exclusion of the coal-house. This latter plan would cost more than 150l., by the cost of a separate coal-house. I must apologise for having talked so much about a child of my own invention, but it affords a concrete example, with the details of which I am familiar. It has, however, been built to meet certain local requirements, and it is quite possible that other places and conditions might demand alterations of detail and even changes in the plan. What I have tried to show is that it is possible to build such a cottage as a labourer can live in decently and comfortably for a sum that will bring in a reasonable return either directly or indirectly.

We append some notes on the construction of the Bransby model cottage:—

1. The windows are "Yorkshire (sliding) sashes." Not ordinary cord sashes. Casements may be substituted where "Yorkshire sashes" are not liked, but they will be a little more expensive.
2. The doors are "batten" doors with Norfolk latches.
3. The partitions between the two large bedrooms and that between the small bedroom and the stair-case lobby are of lath and plaster. The laths should be riven, not sawn.
4. The floor joists over the kitchen are uncelled, and are 7 in. by 2½ in. The roof purllins are 9 in. by 3 in., and must be of the best well-seasoned timber. The span for the purllins in the two big rooms is a long one.
5. The height of the kitchen is 8 ft. from the floor to the boards of the floor above, and the height of the bedrooms is 6 ft. to the top of the windows. The rafters are ceiled underneath, allowing the slope of the roof to be seen as far as the purllins. A flat ceiling is drawn across under the purllins. A flap ventilator may be placed in the chimney to ventilate the air space in the bedrooms above the windows.
6. The tiles of the ground floor must be set upon concrete.
7. The partition wall between the two cottages must be a 9-in. wall.
8. The roof is of "pantiles" hung by a "lip" and secured by nails.
9. There are cupboards on each side of the kitchen fire place in the rooms formed by the chimney breast, and there is a cupboard under the stairs.

## NOTES ON NEW BUILDINGS IN LONDON.

### IV.—THE NEW GAITY THEATRE AND GAITY HOTEL AND RESTAURANT IN THE STRAND.

THESE two blocks of buildings form undoubtedly one of the best and most effective recent contributions to our street architecture, and the position which they occupy at the entrance, as it were, to the new building domain in connexion with Aldwych and Kingsway is so striking and important in an architectural sense that we must be gratified to notice that so fine an opportunity has not been thrown away.

The introduction of the circular tower with its effective cupola at the angle of the site is peculiarly fitting for such a position, and seems in fact the only means by which the architectural difficulty of the awkward angle at this portion of the site could have been got over. As it is, the difficulty is not only avoided but is made (as all difficulties in the plan of a site should be made) an opportunity for a special architectural effect. The base of the building is of Portland stone, simple and severe in its treatment, with its numerous doorways leading to and from the various parts of the play-house. These doorways are of a pleasing proportion, having plenty of width in proportion to their height. The quaint-looking wrought-iron exit notices to all these doorways, however, do not add to the architectural effect, and the iron and glass shelters overhanging the footway detract somewhat from the general monumental feeling of the lower portion of the building. The small window openings introduced in an artless manner in the Strand elevation seem to suggest their realistic value, inasmuch as the occupants of this building will not want to be always observing the goings-on in the outer world. The windows lighting the offices on the principal story are well defined, forming a noteworthy feature, and in strong contrast to the small and simple-looking window openings directly over them, and which give light to the dressing-rooms on this side of the building. The loggia, again, gives welcome relief to the upper portion of this elevation, with its cornice of good proportion and detail, and a fine balustrade crowning the whole. On the ground story it is also pleasing to note the marking of the stage entrance, or "stage door," as it is commonly called, by the bold semicircular-headed niches, and also the scenery entrance to the stage by the large, simple, square-headed doorway.

The curve of the façade towards Aldwych, though it may have caused difficulties in the plan, is for architectural effect a clear gain, and the large mass of wall in the lower portion makes a fine contrast with the colonnaded loggia which crowns it. There are points in detail, however, which we must regret, and which are hardly worthy of a whole, which is so striking as a whole. Among these we must reckon the immense consoles or scrolls which form the termination of part of the front and side walls where the break for the circular tower occurs, and which to our thinking are coarse and out of scale. We may no doubt have Sta. Maria della Salute quoted against us, but we doubt if its scroll buttresses would be regarded as a satisfactory feature if anyone designed a modern church on those lines; they are interesting from association rather than as features for imitation. The consoles and swags under the large windows are also poor in detail, and one almost wonders how they got into such a design. The choice of the marble for the bands introduced into the stonework gives a warning as to one little point of effect. The mottled character of the marking of this marble, the lighter portions of which assimilate rather to the tone of the stonework, has the effect, at a little distance, of confusing the eye in regard to the joint of junction of the marble band and the stone cornices immediately above and below, so as to give a ragged effect instead of the clear sharp line which is desirable.

The treatment of the cupola and its immediate substructure is picturesque and effective, though here the detail will not bear too close consideration. The building must be taken as a whole; and in that sense it is certainly exceedingly striking and effective.

The adjoining building, the Gaiety Hotel and Restaurant, though it naturally aims at



less in an architectural sense, is—with the exception of one point to be noted just now—even more satisfactory than the theatre. Its great solid mass, accentuated by powerful rustication at the angles, and crowned with a simple but equally powerful cornice at the top, is exceedingly grand and imposing, and the details are better and more refined than in the theatre building. In particular the introduction of the large panels of sculpture in low relief, between the windows of the top story, has an excellent and truly artistic effect. The immense mass of the building, with its severe and simple treatment, is even more striking on the east front, which unfortunately will eventually be little seen, as it flanks a narrower roadway which will no doubt be built up with equally tall buildings on the other side. On the Strand side there is room to see the building. The main entrance to the hotel is near the centre of the Strand front, and is a little disappointing in not having been treated with more importance and architectural effect. It is supported, on the one hand, by substantial circular-headed openings to a buffet, and, on the other hand, in a similar manner by the entrances to Short's wine-house. The windows of the first story are finely proportioned and decorated, and form a pleasing relief to the grand simplicity of the mass, whilst the windows to the upper stories are simply and plainly introduced in a characteristic fashion.

On the east side the continuous balustraded balcony on the first floor level is an effective feature, and is in keeping with the solid and monumental masonry character of the whole building. The unbroken line of the cornice is an important element in this monumental character. It is refreshing to see a building which is free from that perpetual fidgetiness and breaking of lines of which we see so much in our modern street buildings.

The point, referred to just now, which we think very much open to question, is the almost calculated deviation of the ground-floor arches and window openings from the centre line. Of course what is intended to be conveyed is that the windows are simply disposed in the manner in which they are most conveniently required inside, and not in accordance with a merely conventional external symmetry. It conveys the impression, however, of having been, as we said, "calculated"—deliberately adopted to produce an expression of architectural freedom. Now we can quite agree that a heavy and massive arched ground story may be treated and regarded as if it were a solid wall, and the openings above it may ignore its arch centres; but when the keystones of the ground floor arches are brought close up to the sills of the window openings above, this separated and independent effect is not produced, and the result has an awkward appearance. The tiers of windows above the first floor are again out of centre with the first floor windows. To some, and we suppose to the architect who designed this building, this non-axial treatment of the windows may be regarded as a picturesque elusion of formal symmetry; but though it may be interesting to find it now and then, in old as in new buildings, it is after all an eccentricity, for which the best Renaissance buildings, and those which have commanded most general and permanent admiration, give no precedent. Then it is a question of construction also. On the east side we notice that the first floor windows are central with the large ground floor arches, but all the tiers of upper windows are independent of this centre line, and take a separate one of their own. The result of this is that very lofty and massive stone piers are built on the top of window openings, the flat stone arch of which could not support them, so that we are led at once to the conclusion that the masonic character is illusory, and that there must be a steel beam in the rear. This kind of arrangement (or derangement) of openings, whatever may be thought of it as architecture, is unquestionably bad building.

WAR MEMORIAL, GUILDHALL.—A memorial, executed in bronze by Mr. F. W. Pomeroy, is to be erected in the Guildhall, against the wall on the south side, to commemorate the services of the Royal Fusiliers, City of London Regiment, in the South African War, 1899-1902.

### THE ARCHITECTURAL DEVELOPMENT OF CITIES.

PROFESSOR BERESFORD PITE recently delivered a lecture before the members of the Leeds Philosophical Society on "The Architectural Development of Cities." Dr. Eddison, the President, occupied the chair.

Professor Pite began by laying down the principle—as the man so were his buildings, as were the buildings so was the street, as were the streets so was the city, and, conversely, as was the city so were the men who built it. A character was imparted to the citizens by the noble or mean aspect of their city. We had few instances at home that would repay attention like those at Liverpool around St. George's Hall, and at Cardiff, in the Bute Park, where the new municipal building, law courts, university, and museum were being grouped on a grand scale in harmony with the picturesque adjoining castle. The new city plans would have to be sought abroad—in the Continent, or in America, or in our Colonial Empire. Probably Turin and Berlin were characteristic of the most modern schemes on the Continent. He next proceeded to throw on the screen views of streets and public buildings in London, Paris, Berlin, and Vienna, drawing comparisons more or less favourable to our own metropolis. The special characteristics of the three Continental cities just named, he said, were the extraordinary effects of aggregated public buildings, every one of which had a purpose and a meaning. He remarked, in passing, that there seemed to be a settled pessimism among architects on the subject of the general aspect of our cities. Financial considerations entered largely into the question, and it became necessary to wait for times of prosperity before a change was made.

Referring to London he gave instances to show that each district or borough afforded opportunities for the local exercise of municipal patriotism, and he specially dwelt upon several of the most modern street improvements. The sweep of the curves of the river had afforded fine scope for the effective laying out of London, and the Thames Embankment, to the beauty of which, he said, Englishmen were scarcely yet alive, came in for high praise. Along the river from Somerset House to Fulham the buildings punctuated the historical progress with architectural effect, which effect was not even excelled by the Champs Elysées. The laying-out of the Place de la Concorde and of the Tuilleries Gardens, however, was very instructive to all who had to lay out public parks and gardens. The fine great school of architectural gardens seemed to have died out in England, and the art was lost so far as this country was concerned. The combining of trees with public buildings in the Champs Elysées and the Unter den Linden had, in his opinion, a doubtful effect, for the trees interfered with the effect of the buildings. In showing the Rathaus of Vienna, he pointed out that our efforts in Gothic architecture had produced remarkable results on the Continent.—*Yorkshire Post.*

### ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the evening meeting, on December 20, Mr. R. H. Forster in the chair, a paper was read by Mr. C. H. Compton, V.P., on "The History of the Abbey of Arbroath," situated some seventeen miles east of Dundee. The remains of the Abbey have recently been acquired by H.M. Commissioners of Works to be preserved for the use of the public. The Abbey was founded by William the Lion in 1178, who largely endowed it, and on his death, in 1214, was buried before the high altar of the Abbey church. The Abbey was colonised by Benedictine monks from Kelso, Reginald, one of them, being the first abbot. Owing to its exposed situation on the shore of the German Ocean, as from the unsettled state of the Scottish government during the XIIIth, XIVth, and XVth centuries, it was subject to the vicissitudes of the wars with England and internal feuds, as well as to the fury of the elements on several occasions, and to a dispute between the Ogilvies and the Lindsay, which ended in the subjection of the latter in 1350. In the year 1240 litigation arose between William de Ros and the abbot concerning the advowson of the Church of Haltwisel, which ended in 1329 in favour of the abbot. It was at this abbey that

Robert Bruce, in 1317, received the messengers from the two cardinals sent by Pope John XXII., after the battle of Bannockburn, commanding a truce for two years under pain of excommunication, with sealed letters addressed to Robert Bruce, "governing in Scotland," to which he made the spirited reply refusing his consent so long as the Pope and his legates, under English influence, withheld from him the title of king, and it was here that Bruce convened a Parliament of the nobility of Scotland, in 1320, when they framed their remonstrance to Pope John on account of the hardships which Scotland lay under from the anathemas of his Holiness and the invasions of Edward I. In 1523 David Beaton succeeded his uncle, James Beaton, as Abbot of Arbroath. The abbot and convent also appear in Queen Mary's reign on several occasions in support of her claims. The Act of Annexation, in 1567, attached the temporalities of the Abbey to the Crown. John, Lord Hamilton, commander of the Abbey, who was created Marquis of Hamilton, remained in possession until April 17, 1599, when he resigned the Abbey into the King's hands, who confirmed the same to his eldest son, James Hamilton, and on July 6, 1606, the King and Parliament dissolved all the temporalities of the Abbey and created them into a temporal lordship in favour of James, with the title of a lay Lord of Parliament, and the Act provided that the memory of the Abbey should be extinguished.

### Correspondence.

#### STANDARDISING QUANTITIES.

SIR,—I feel certain that the majority of those engaged in the profession known as "quantity surveying" will be obliged to you for opening your columns to the subject of standardising quantities. It has been a subject of the greatest interest to me ever since, some thirty years ago, I began to realise that there was no fixed rule on the subject of methods of measurement, order of billing, trade descriptions, or anything of the kind, but that each of the older surveyors followed his own custom with very little regard to the practice of any other.

The growing generation has a right to insist that with the improvement in education and the improvement in modern methods, and especially with the increased value of the materials used, F.S.I. employed by your correspondents in the present issue of the *Builder*, a clear and definite system should be laid down by the heads of the profession.

The Surveyors' Institution has recently appointed a Special Committee for the purpose of dealing with such questions as relating chiefly to quantity surveying, and if that Committee is going to justify its existence one of the first subjects to which it should turn its attention is the particularly important one now being dealt with. I have always been of opinion, although I am aware that many of my professional brethren differ from me, that it would be a desirable and possible to prepare a standard bill of quantities; it would necessarily be of very great length, but would embody the whole of the items likely to be used in any building of any class; from which it would be a comparatively easy matter to eliminate the items not required in the special building dealt with. If such a standard bill were issued with the authority of the Surveyors' Institution, and with the recommendation of the Committee referred to, and if all the members of the Institution agreed to arrange their quantities by this standard, and to take their measurements in the method adopted in it, the work of the quantity surveyor would be rendered more methodical and more presentable, and it would undoubtedly be far easier to "train up our pupils" in the way they should go.

A cynically disposed person might observe that it would become a simpler matter than it is now for the charlatans and quacks of our profession (and unfortunately our profession is as much open to this evil as any other) to issue bills of quantities which would more approximately resemble the proper product of a trained quantity surveyor than their efforts do at present; but I venture to think from the experience I have had that nothing in the world would really enable such imitation bills of quantities to be prepared that would deceive the expert eye, whilst I am equally convinced that contractors who are tendering in competition with an eager desire to work, and who are not now restrained from tendering by the fact that quantities are obviously bad, will themselves be greatly assisted by standardised quantities to discover whether their own estimates have been properly prepared or have not. It is a matter in which the public takes exceedingly little interest, but I think you will find among those who know its importance a

consensus of opinion that the suggested step is in the right direction.

A great difficulty that presents itself to any practical man in propounding a scheme for a standard bill is that in more important and elaborately detailed work the method of taking is naturally more elaborate than in simple and plain work. Quantities for a workshop or for a school are naturally of a different character, and there are many vital distinctions between those for building and for engineering work. I have seen an engineering bill of quantities in which the price of the brickwork per rod was inclusive not only of all cuttings and other labours, but of facings, arches, etc. It would be necessary to have two different masons' bills, one of which would provide for the stone classified and the labours described, and the other for the stonework taken, and all the independent labours measured; but this, although it would lengthen the standard bill of quantities, would give a choice in the preparation of the quantities to the clients who desired the stonework bill prepared in one method or another.

Of course, one other difficulty occurs. The preparation of a standard bill of quantities would be a work involving a great deal of time and labour; but the Surveyors' Institution is rich, and some of its funds might be wisely spent in remunerating the clients to prepare a draft standard bill of quantities which could be brought into shape by the efforts of the Committee.

HENRY NORTHCOTE, F.S.I.

SIR.—I should like to be allowed to add a few words to the discussion raised by Mr. H. Riley.

I venture to think that there is not so much difference of opinion as is sometimes supposed by London surveyors as has been suggested; the main point in which they do not agree being in the measurement of "labours."

In recent years there has been a greater tendency to lump items together and to include as many labours as possible with the description of materials. This, I think, the more accurate and rate custom, is to measure all labours whose value and quantity cannot be accurately ascertained from any general description included with the material on which the labour is required. Quantity surveyors are, as a rule, so pressed for time and have their fees so reduced that steps have to be taken to shorten the bills, and so save time and expense in the preparation of same, to the detriment of detail and sometimes even accuracy in "taking off." This makes it very hard for the estimator to realise the actual value of the work entailed in executing various items, without constant reference to the drawings (he has them) and even to constituting a certain amount of "taking off" on his own account which the quantity surveyor is supposed to have been paid to do.

Again, many surveyors measure separately labours which are not recognised at all by other surveyors.

With regard to the mode of measurement of materials, surveyors are, I think, pretty well agreed, and if some understanding could be arrived at on the measurement of labours, though I fear it would be somewhat difficult, quantity surveyors and builders generally would greatly benefit thereby.—Yours faithfully,

C. EDW. PEARSE, P.A.S.I.

SIR.—I am very pleased to read in this week's edition of your paper that Mr. L. A. Francis, F.S.I., suggests a representative of the building trade should attend each committee meeting. I am sure there are many members of the L.M.B.A. who would take a keen interest in this important discussion, and would be glad of the opportunity of being present.

The question raised by Mr. Henry Riley is, from a builder's point of view, a most important one, and would, I am sure, be of great assistance when pricing quantities, and help considerably in getting more reliable estimates. It would, in my opinion, also tend to limit the great disparity sometimes seen between the highest and lowest tenders.

F. G. MENTER.

#### LONDON COUNTY COUNCIL AND DISTRICT SURVEYORS.

SIR.—Some time ago in your valued paper an article was written regarding the difficulties builders and others experienced in finding out who was the acting district surveyor in the interim owing to the long delay in appointing new district surveyors to the vacant districts.

Having read in your last week's issue what the Council now propose to do, it does occur to me, that if it is proposed by the Building Act Department of the London County Council (as reported to the General Council at their meeting on Tuesday week last) to do away with something like twenty-four districts from the vast area of London, that the difficulty of finding out who the district surveyor is, and perhaps of obtaining his prompt attention to certain works that may be required to be done, will be very considerable to builders and others of the general public.

[Apart from my own personal convenience and

the general satisfaction I have met with in dealing with district surveyors, and believing them to be a highly capable body of men, to gradually retire or do away with the services of twenty-four of these gentlemen (seven of the districts now being vacant) might be considered unfair, and I should judge that they may have something to say to such a procedure, for it is highly probable that in most cases they have relinquished most of their private practices for the effective carrying out of the work of their office.

Considering that the additional Amendment Act, 1905, which has just been sanctioned by Parliament, and is coming into force January 1, 1906, entailing, as it will do, more work in the various districts, I should have thought that more district surveyors should have been appointed to have effectively carried out the various Acts for the general benefit of the community, and not a less number, as proposed by the Building Act Committee.

What with the constant "jiggling" with Acts relating to buildings, etc., in London, soon no one, not even district surveyors, will be able to say definitely what is necessary to be done.

Now that there is a fairly good knowledge of the existing Building Act on the part of builders, it seems to us that it would be a good thing to leave well alone.

C. Y. C.

#### FIREPLACE IN SOLIHULL CHURCH.

SIR.—Mr. Bagnall would have made his question somewhat easier to answer if he had correctly described the so-called "mortality chapel" at Solihull as the old vestry of the church, which is clearly a fireplace in ancient vestries may occasionally be met with, and Mr. Bagnall will find references to several in *Proceedings of the Society of Antiquaries of London*, 2nd S. XIX. 179 and XX. 24; he will also probably find notes of others in the volumes of the *Ecclesiologist*.

Besides their primary use of giving warmth, to the person or clerk at any rate, such fireplaces were useful for heating charcoal for the censer, boiling water, and divers other purposes for which fire is needed.

W. H. ST. JOHN HOPE.

#### KING'S NORTON SCHOOL COMPETITION.

SIR.—The King's Norton Education Committee have invited architects to submit competition designs for a new school for 1,200 children. The conditions are very objectionable. No premiums are offered; but the conditions state that the accepted design will be the property of the committee (page 8).

Would it not be desirable for architects to abstain from taking part in a competition containing this and other objectionable conditions? Why should there be no premiums?

JAMES TODD.

#### THE WEST LONDON SYNAGOGUE.

SIR.—It is due to the memory of my lately deceased partner, Mr. Barrow Emanuel, and to myself that you should correct an error in your obituary notice of the late Mr. H. H. Collins in to-day's *Builder*, wherein you state that the West London Synagogue, in Upper Berkeley-street, was a work of Mr. Collins.

It is true that Mr. H. H. Collins competed for that building against the late Fred Cookrell, Wyatt Papworth, and my own old firm of Davis & Emanuel about thirty-five years ago; but he was not successful.

The competitive designs were submitted to the late Philip Hardwick, the younger, who recommended ours, and our design was carried out by my late partner and self.

HENRY D. DAVIS F.R.I.B.A. (retired).

### Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 29, 1855.

THE timber huts sent out to the Crimea are much complained of. The roofs are not watertight, the sides are not windtight, and the stoves do not give heat enough. At Aldershot there have been two fires in these timber huts. As this is a model camp, we presume the fires were model fires also: a warm look out this cold weather for our men in the Crimea.

The huts in use at Aldershot and in the Crimea have many faults. The framing is clumsy, the boarding is faulty, and when once put up the whole must become mere firewood if removed, as rusty nails cannot be drawn out of thin boards, twisted and warped by sun, rain, and wind. Crimean weather deals with parchment if placed near to it: this with parchment is placed near to it: this ought not to be. The uses of a hut are to afford shelter and protection to the men. There should be means of warmth, means of ventilation, and easy means of removal without destruction.

### Illustrations.

#### DECORATIVE PAINTING: "COMMERCE."

THIS is a monochrome reproduction of the design by Mr. J. H. Amschowitz which gained the Royal Academy prize this year for "Design for the Decoration of a Public Building."

In reference to his intentions in the design, the artist writes:—

"I have endeavoured to convey as realistic an impression as possible, for I think such a subject has its necessary limits, and does not lend itself to a wider margin wherein imagination and allegory have scope. By mass and line in the composition I have sought to express the solid vitality of merchandise applicable to barter and exchange; and by the arrangement have striven, with all due deference, to be guided by the teachings of the Venetians."

#### LONDON TEMPERANCE HOSPITAL, HAMPTSTEAD-ROAD.

THE perspective view we publish shows the buildings as they will appear when the enlargement scheme has been realised. At present the funds will not permit of more than the building of the out-patients' department, consisting of a basement and ground floor, the general arrangement of which is shown on the accompanying plans.

In this department it is proposed to pave the whole of the ground floor with marble terrazzo paving; a dado of the same material will be put round most of the patients' rooms; while the walls of the operating-room will be entirely covered with terrazzo of a light-green shade. The remaining wall surfaces will be plastered and painted. The doors in all patients' departments will be Canadian hardwood veneer, flush both sides. The general waiting hall will have ample top light and ventilation with steel roof trusses and metal glazing bars and patent wired glass. Fire-resisting construction will be adopted throughout.

When the whole scheme is completed there will be accommodation for laboratories, museum, nurses' and students' lecture and recreation rooms, isolation and observation department, porters' apartments, patients' day-rooms in communication with the existing wards, and a new eight-bed ward for female casualty patients.

The casualty patients will be received on the ground floor in the out-patients' department, and taken up by the electric lift provided, and across the bridge on the first floor, and drafted into their respective wards.

The elevations are intended to be in red sand-faced bricks, with Portland stone dressings. The roof will be slated with thick green slates.

The architects are Messrs. Rowland Plunbe & Harvey.

#### ALL HALLOWS, LOMBARD-STREET.

As a sequel to the measured drawings of this church which we published last week, we now give illustrations of two pieces of decorative furniture included in its fittings, from drawings by Mr. Arthur Kidd, a student of the Royal College of Art.

##### The Sword-rest.

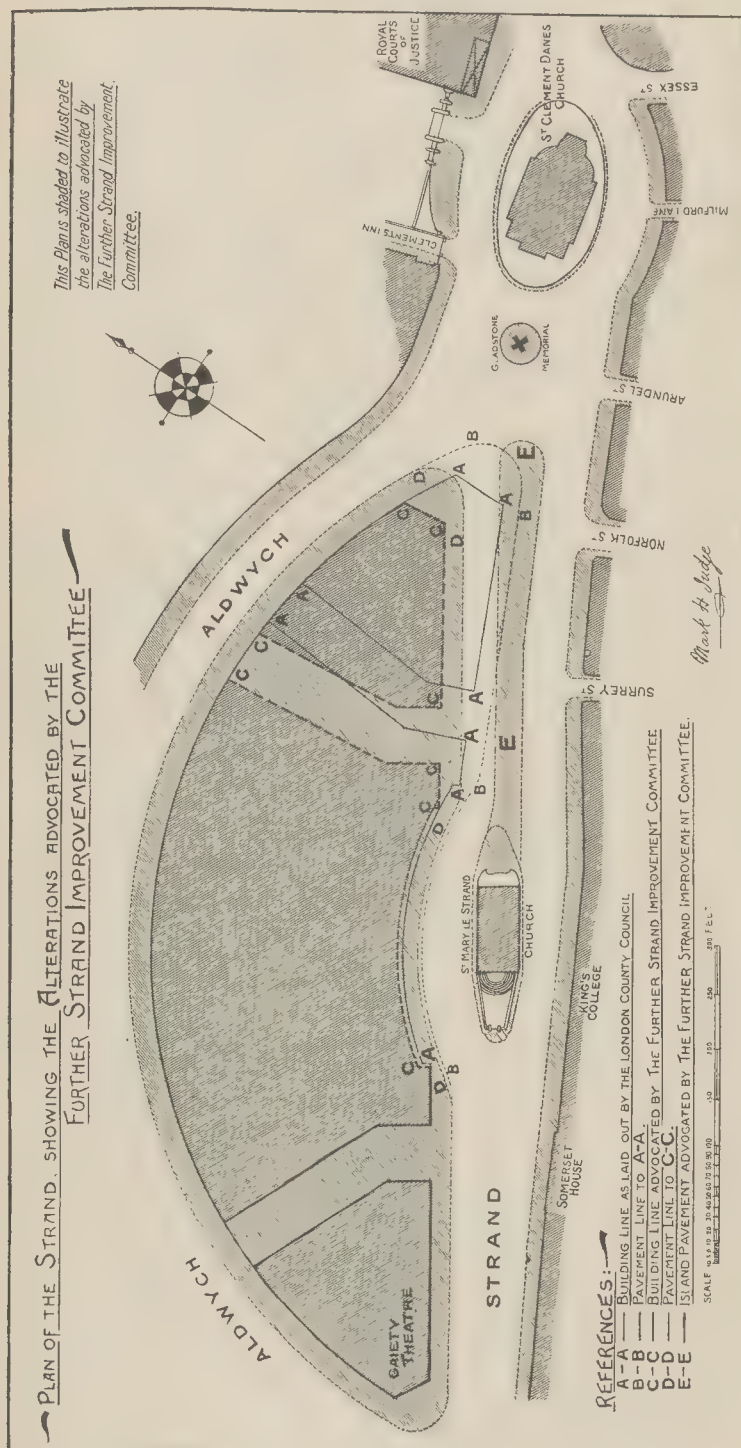
This illustration is reduced from a full-size drawing. The sword-rest was removed from St. Dionis Backchurch to All Hallows in 1878, and is now fixed in the centre of the Corporation pew (see plan previously published). It is of wrought-iron, painted, and gilt. The gilded parts and armorial bearings are original, the remainder of the paint-work modern. The extreme height to the top of the crown is 6 ft. 3½ in.

##### Upper Part of Font and Cover.

This illustration is reduced from Mr. Kidd's full-size drawing of the upper part of the font and cover. The cover is of ash, and the font itself of white marble. The height of the cover from the lid to the top of the figure group is 3 ft. 8½ in., and the outside diameter of the font 1 ft. 10 in.

We gave the whole design of the font on a smaller scale last week in a separate illustration in the text; but think it worth while to illustrate the detail on a larger scale.





#### THE NORTH LINE OF THE STRAND.

We give a reproduction of the plan which the "Further Strand Improvement Committee" are intending to memorialise the London County Council to adopt. The plan explains itself, and the reasons for and against its adoption have been referred to in our columns, and are known to most of our readers. The mere abnormal widening of the street at that point would not, in our opinion, have been worth the cost, and therefore we have

not supported it. If, however, a garden strip in the centre were included in the scheme, as shown on the plan, this would no doubt be a great public street improvement, but it must be remembered that it means a pecuniary loss to the Council, and eventually to the ratepayers, of considerably over 300,000/. Apart from that, we should be very glad to see it carried out in this form, i.e., with a centre space planted with trees. Other wise it would be a throwing away of money, as the Strand is

quite wide enough at that point. It may be urged (as we see Mr. Decker does in a letter in the *Times*) that the alteration ought to be made in view of the traffic line only, to prevent the traffic going east having to double a headland; but the fact is that, though this looks awkward on the plan, those who are in the habit of frequently passing that way must see that the actual inconvenience to traffic is more imaginary than real.

## USEFUL WORK FOR THE UNEMPLOYED.

A "Builder and Contractor" writes to us to suggest that if there is one thing more needed than another by the poorer classes it is cheap house room; and in respect of this he makes the following suggestions:—

"Is it not possible to utilise some, at least, of the labour which the unemployed desire to give to meet this want? Although the difficulties which, even on a superficial consideration of this suggest themselves, are many, I do not think they are insurmountable, and if the various questions were debated by a committee, no doubt a workable scheme could be devised.

It would be necessary to provide a supervising body, say, similar to the London County Council Works Department, for it is obvious that, although the manual labour can be done by workers who are being constantly changed, the supervision and management cannot be entrusted to persons of unknown reputation, who are here to-day and gone to-morrow, and whose very needs may make them unscrupulous in representing their qualifications, and whose responsibility would end with their temporary employment.

The first thing to be done is to obtain suitable land at a low price in different parts of London; there are still fields and land to be had in the suburbs. To form roads and sewers much unskilled labour could be utilised; and, although the work could be done cheaper by skilled labour, these suggestions are for the employment of men standing idle. But the helpfulness of this fund will be much lessened in its scope if those employed under it are not strongly induced to get work elsewhere at the first opportunity; at the same time the scheme should not result in lowering the pay of the skilled worker who is in constant employment, and, therefore, the full trade-union rate of wage should be booked to each man according to the trade he works at, but only half or two-thirds should be paid him in cash at the time, the balance being banked for him and payment deferred until some subsequent period of illness or enforced idleness, or taken as part payment of one of the houses should he desire to possess one."

## THE POST OFFICE LONDON DIRECTORY.

THE edition of this excellent work for 1906—the 107th edition—has just been issued by Messrs. Kelly's Directories, Ltd. (High Holborn, W.C.). The first impression one has in handling the work and turning over the pages is of its increasing size, for it now contains 3,479 pages, and with the London County Suburbs, which is bound up with the Directory, we have before us 4,631 pages, exclusive of advertisements. The second impression—and that after examination of the contents of the work—is as to the care with which it must have been edited, and the good sense which has ordered its arrangement. The Directory is a model of good arrangement and of accuracy, and the present issue, containing two good maps—the London area and the suburban area—has been brought well up to date (for instance, the change of address of Mr. Paul Waterhouse, announced in the *Builder* on the 9th inst., is included in the useful list of architects given). The scope and character of the Directory are well known to our readers, most of whom must feel that it is an indispensable adjunct to an office.

The publishers can supply the London Directory alone, without the County Suburbs, and they also issue the two together as one or two volumes.

In issuing the Post Office London Directory for 1905 the publishers announced that, in view of the tendency to make the fullest use of the facilities offered by the railways serving the metropolis, and the large number of persons coming to town daily from residences considerably beyond what is known as the suburban area, it had been decided to issue the Directory of the Six Home Counties more frequently. The first volume, containing the counties of Kent, Surrey, and Sussex, was accordingly published in the summer of 1905, and met with such success that it has been decided to issue the companion volume, containing the counties of Essex, Herts, and Middlesex, in the summer of 1906. The two works, which will contain the whole of their

respective counties, outside the County of London, will be issued alternately every year.

## WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of the Westminster Council was held on Thursday, last week, at the City Hall, Charing Cross-road.

**Parliament-street Convenience.**—The Works Committee submitted a lengthy report respecting the litigation between the Council and the London and North-Western Railway Company regarding the entrance to this convenience in front of the railway company's premises at 35, Parliament-street. The judgment of Mr. Justice Joyce, having been upheld by the House of Lords, the Committee stated that they had negotiated with the railway company and had agreed to pay them the sum of 1,000*l.* as compensation, and also to reduce the length of the railings above ground from 33 ft. 2 in. to 16 ft., which would involve a reconstruction of the staircase affording entrance to the convenience. The Committee further reported having received tenders for the execution of the necessary work, and recommended that the tender of Messrs. Patman & Fotheringham should be accepted. This was agreed to. (The tenders will be found among our usual lists.)

**Bursting of Hydraulic Main in Piccadilly-circus.**—The Council agreed to make a formal claim against the London Hydraulic Power Company for a sum of 457*l.* 12*s.* 6*d.* in respect of the bursting of this main.

**New War Office Paving.**—It was agreed to execute certain paving work in connexion with the dedication to the public of 3,000 ft. super. of land in Whitehall. The cost is estimated at 250*l.*

**Clinker-Crushing Plant.**—The Highways Committee recommended that the Council should lay down a clinker crushing and screening plant at Shot Tower Wharf, at a cost not exceeding 400*l.* Alderman Emden said that he hoped the Council would expend a sum of not less than 1,400*l.*, as it would enable them to give work to the unemployed. He moved that the report be referred back. Alderman Everett said that the reason that the Committee did not propose to expend more than the 400*l.* was that the Council had only a four years' lease of Shot Tower Wharf. At a future meeting the Committee would be considering the advisability of renewing their lease, and then the matter of the clinker-crusher could come up again. The Council, he admitted, ought to have a dust destructor, but it was no use to think about that until the question of the lease was settled. At the present time the Council was paying 1*s.* 6*d.* per ton to have the clinker barged away, and if they crushed it builders would pay them as much as 2*s.* 6*d.* per ton for the material. After further discussion the Mayor decided that Alderman Emden's amendment to refer back was out of order. The Committee's recommendation was then carried.

**Widening of Piccadilly.**—On the recommendation of the Improvements' Committee it was agreed to inform the London County Council that the City Council was prepared to undertake the necessary paving and other works in connexion with this widening at an estimated cost, to be borne by the London County Council, of 6,000*l.*, in the case of the improvement between Saville-street and Piccadilly-circus, and 1,500*l.* in the case of the improvement between Duke-street and St. James's-street, exclusive in each case of the cost of any necessary alterations to companies' mains.

## Books.

*A Treatise upon the Law Affecting Sewers and Drains, with Plans.* By ARTHUR P. POLEY, B.A., of the Inner Temple. (London: W. Eyre and Spottiswoode. 1905.)

THE object of this treatise, as set forth in the preface, is to elucidate the meaning of the words "drain" and "sewer," and to set forth the statutory and other duties, rights, and obligations of local authorities and private persons in respect to sewers and drains inside and outside the Metropolitan area, and the author states that he has kept in view the requirements of persons outside the law, such as, amongst others, architects, surveyors, builders, sanitary inspectors, and owners of property. We must confess we were prepossessed in favour of any treatise consisting of 111 pages, exclusive of the index, which should deal with matters of such complexity, yet of such practical importance to a large number of persons and of everyday occurrence; but the little volume before us, although carefully prepared and brought up to date, well printed and furnished with a good index, lacks clearness in the form in which its subject matter is presented to the reader. A table of contents

would have been of assistance in enabling the scheme of the work to be quickly grasped. It is divided into two parts, Part I. dealing with Metropolitan or London County Borough drains and sewers, Part II. with extra Metropolitan drains and sewers under the Public Health Acts; whilst Part II., at p. 42, treats generally of the duties and obligations of local authorities and of occupiers and owners one to another *inter se*, and of the legal machinery to be employed in enforcing and obtaining those obligations and rights. The author has printed the various sections of the statutes referred to in the text with the intention of saving the reader the trouble of referring to an appendix, but this renders the statutes difficult to trace and presents the text in an unattractive form, and there are no side notes to assist the eye. The lay reader requires his legal information presented to him in a highly palatable form, and this volume fails in this respect; whilst the legal profession will probably prefer some of the more exhaustive treatises on this subject. The plans which accompany the volume, however, are of considerable assistance in enabling the reader to master some of the more complicated systems of drainage which have been the subject of legal decisions.

*The Law of Light and Air.* By ALFRED A. HUDSON and ARNOLD INMAN. Second Edition. (London: Sweet & Maxwell. 1905.)

IN his preface to the second edition of this work the author explains that its publication has been accelerated owing to the change effected in the law of light by the decision in the House of Lords of the case of *Colls v. the Home and Colonial Stores*; but seven years have elapsed since the appearance of the first edition, and the public will welcome a later edition of so excellent a little textbook, which forms what the author expresses the hope that it may do—"a compact digest of the law of light and air for lawyers, surveyors, and students." This preface is dated October, 1905, and the authors state that the volume has been brought up to date, but in the table of cases we fail to find one or two recent cases, such as *Kine v. Jolly* (1905, 1 Ch. 489) and *Ambler v. Gordon* (1905, 1 K.B. 417).

*Elementary Electrical Engineering.* By J. H. ALEXANDER. (London: Crosby Lockwood & Son. 1905.)

THIS book is intended to be used as a class-book by junior and senior students, and also by working electricians. It is the outcome of a series of lectures on electrical engineering given by the author to an evening continuation class. The author is evidently more at home in describing the practical part of the work of an electrical engineer than in describing theory. In describing the elementary phenomena he has made a few slips, and there are several misprints. He is, however, painstaking, and has successfully simplified the explanation of some of the more abstruse effects of electricity which puzzle beginners. The descriptions of the modern types of lamps and the apparatus used for the generation and distribution of electrical energy are on the whole trustworthy, and the author has in most cases made a good selection by choosing the most instructive types of apparatus. The book is very elementary, and so it forms a useful introduction to more advanced works.

*The Inventor's Adviser and Manufacturer's Handbook to Patents, Designs, and Trade Marks.* By REGINALD HADDAN, F.C.I.P.A. (London: Harrison & Sons. 1905.)

THIS, being the sixth, edition of a practical and useful manual is published in view of the material changes which have been lately introduced under the Act of 1902 in the examination and issue of patents by the adoption of an official inquiry into the novelty of the invention. Whilst not neglecting the legal and controversial questions involved in the administration of the Patent Acts, Mr. Haddan is mainly concerned with the commercial side of inventions and patents and furnishes inventors, patentees, traders, and others who are interested in patent property with a full exposition of the causes and conditions which contribute to uphold, or to lessen, the value, as apart from validity, of patent rights. The distinction is important,



since the pecuniary value of a patent depends considerably upon the method of obtaining it. Mr. Hadden cites a great variety of reported cases, decisions, and similar authorities for his statements and conclusions. The volume contains a large amount of information about the regulations and procedure which govern the patenting of inventions and the registration of trade marks and designs at home and abroad, and provides copies, in their own several languages and characters, of the prescribed forms.

**Motor-Vehicles for Business Purposes.** By A. J. WALLIS-TAYLER, A.M.Inst.C.E. With 134 Illustrations. (London: Crosby Lockwood & Son, 1905.)

At the commencement of this handbook the author remarks that the motor-vehicle as adapted for business purposes "may now be said to have arrived at a state of perfection." This is a very rash statement for an engineer to make. We are quite in accord with the succeeding suggestion that the commercial utility of such vehicles has been sufficiently proved by actual working to place its future on an assured basis. Nearly half the book is devoted to the description of light and heavy passenger cars operated by electricity, steam, oil, and petrol motors, and in the other half is a comprehensive and able summary of light goods vans and heavy freight waggons of the kind that appeal directly to many of our readers. Practically all the best-known types are illustrated and described, and the chapter on "The Cost of Maintenance and Running" is of much practical interest to prospective users.

**The Use and Care of Chains for Lifting and Hauling.** By HENRY ADAMS, M.Inst.C.E., M.I.Mech.E. (Published by the author, 1905.)

A SERVICEABLE discussion upon an important point of detail will be found in this pamphlet, reprinted by permission of the Civil and Mechanical Engineers' Society, before whom it was read as a paper in 1887. As a matter of fact, Professor Adams performs a little more than is promised by the title, for a fair share of attention is given to the manufacture of chains, due emphasis being placed upon the necessity for sound welds, which have more to do than anything else with the question of reliability. Coming to the maintenance of chains, the author describes in detail the methods proved by his experience to be the most suitable for securing long life and efficiency. Periodical examination, prompt repair on the least indication of defects or excessive wear, regular lubrication—except in the case of hoist chains that are better used dry—protection from dust and grit, and frequent annealing are the chief points of economy in the maintenance of chains, and on these Professor Adams gives some brief practical hints with the substance of which we entirely agree.

**Practical Brickwork.** Edited by PAUL N. HASLUCK. (London: Cassell & Co., Ltd. 1905.)

This volume presents in a handy form the subject matter of a series of articles by Mr. Rufus E. Marsden, originally published in serial form. As a graduated course of instruction in brickwork it should be found of real service to technical students and others. All the chief details of the bricklayer's art are explained simply and clearly, and every chapter contains a considerable number of excellent drawings. The author commences with the bonds in common use, and leads through different forms of work up to the construction of arches and domes. The discussion of the subject is far more complete than that to be found in some works on building construction which cover too much ground to permit the treatment of details in the manner followed by the author of this useful little book.

**Johnson's Book-keeping and Accounts, with Notes on Auditing, etc.** By GEORGE JOHNSON, F.S.S., F.C.I.S., etc. (London: Eppingham Wilson, 1905.)

THE last word has not yet been spoken or written concerning book-keeping, and the student or trader has now a goodly array of manuals and text-books from which to make a selection. Here he will soon find himself in the "advanced" class, but,

although possibly sometimes out of his depth, and he will find firm ground by steady application.

Dispensing both with preface and introductory chapter, the author plunges into the subject in the first of the 220 pages to which the work now runs, and proceeds to furnish a wealth of illustration and a plentiful variety of specimen transactions. As indicated in the title, this treatise does not stop short at ordinary commercial book-keeping, but includes such matters as company accounts, bankruptcy, and executorship accounts, and other more complicated business procedure indispensable to the auditor. Nevertheless, much of the information given under the headings named is calculated to be of service to the ordinary investor, the trustee, and others apart from the professions concerned. This is especially noticeable in the case of the section dealing with the book-keeping recommended to executors, in which the disposition of an ordinary estate is followed through the various stages. The dedication of this edition is to "Emile Garcke, Esq., F.S.S., who has done much to maintain for England a foremost place in the application of electricity to traction and other commercial purposes," and who has also, it may be added, himself written upon "Factory Accounts" and kindred matters.

**Engineering Standards Committee Report of Progress of Work.** (London: Published by the Committee. November, 1905.)

THIS report contains an account of the formation and organisation of the Committee, and states the general nature of the work undertaken by the various sections. Most of this matter is ancient history to readers of the *Builder*, as we have given the substance of it in various references from time to time. Up to July last, nineteen reports have been issued, the numbers sold serving to demonstrate very clearly the relative popularity of the several publications. Dividing these into four main groups we have the subjoined figures:—Structural Steel, 6,270 copies; Portland Cement, 2,330 copies; Pipe Flanges and Screw Threads, 2,024 copies; Railway, Tramway, and Ships' Materials, 1,620 copies; and Electrical Apparatus, 812 copies. The pamphlet concludes with a complete list of the reports issued, with notes setting forth the contents of each, and a list of the standard templates prepared up to the present time. These lists are very handy to intending purchasers for the purpose of reference.

**A Handbook of Commercial Law.** By F. G. NEAVE, Solicitor. (London: Eppingham Wilson.)

THIS is a clear and useful little book for persons who are not lawyers, and gives a capital outline of the law on a number of commercial subjects. The portion most interesting to our readers is probably that on Fire Insurance, in which the law is well summarised.

#### BOOKS RECEIVED.

**KNIGHT'S ANNOTATED MODEL BY-LAWS.** Seventh Edition; edited and revised by W. A. CASSON. (Knight & Co.)

**THE ARCHITECTS' LAW REPORTS AND REVIEW.** By Arthur Crow, F.R.I.B.A. (Printed for the author.)

**ENGLISH DOMESTIC ARCHITECTURE OF THE XVIIth AND XVIIIth CENTURIES.** By Horace Field and Michael Bunny. (Geo. Bell & Sons.)

#### TRADE CATALOGUES.

WE have received from the British Promethes Company, Ltd., of Kingston-on-Thames, an interesting illustrated catalogue of their electric heating apparatus. They classify their heating appliances into two groups—radiators and convectors. In the radiator type, large radiator lamps are employed, and the great bulk of the heat energy is radiated outwards, and is absorbed, reflected, or radiated from neighbouring objects. The radiant heat does not appreciably heat the air through which it passes, and hence radiators can be used out of doors, on balconies, etc. In the "convector" or non-luminous type, the resistances are generally embedded in enamel, and their temperature is very much lower than

that of the filaments of the heating lamps. The air in contact with the resistances gets warm and rises, and so convection currents are formed in the air. It is claimed that, under normal conditions, this method of heating rooms is much the more efficient. We think, however, that this statement needs modification. Scientifically speaking, the heating will be the same for the same consumption of current. Convector apparatus only localise the heat more in their neighbourhood. Anyone contemplating heating by electricity would do well to write for this catalogue.

We have received from Messrs. R. J. Nicholson & Co., of Cannon-street, Manchester, a series of pamphlets describing small petrol electric-lighting sets. These sets are suitable for the electric lighting of cottages or small houses in the country. For instance, the No. 1 set consists of a two-brake, horse-power petrol engine, directly coupled to a small dynamo. The storage battery consists of twenty-seven small cells, capable of maintaining six 16-candle-power lamps or twelve 8-candle-power lamps alight for five hours. Provision is also made on the switchboard so that the dynamo can be connected with the lights directly, and so fifteen or twenty lamps could be burning at once. The whole cost of the power outfit is 70*l.* 10*s.* The recent great improvements which have been made in petrol engines make a miniature electric-lighting set of this nature a possibility, and if someone in the house has an elementary knowledge of mechanical and electrical matters we see no reason why it should not be successful. It would be interesting to know, however, the cost per unit generated of this plant, and whether the fluctuations of the light when the dynamo is running in parallel with the accumulators are appreciable.

### The Student's Column.

STEAM BOILERS AND PIPES.—XXV.  
THE FLOW OF STEAM (continued).

FOR the convenience of readers we have collected in Table XXX. the allowances for the resistance of fittings and valves stated in last week's article.

TABLE XXX.—APPROXIMATE LENGTHS OF STRAIGHT PIPE EQUIVALENT TO PIPE FITTINGS AND VALVES. (All lengths are stated in multiples of nominal internal pipe diameter.)

Description.	Screwed Wrought-Iron Pipe.		Flanged Pipe.	
	Joints with Square Shoulders	Joints with Reamed Shoulders	Flange with Reamed Shoulders	End of Pipe with Reamed Shoulders
Bends .....	4 to 10	4 to 10	4 to 10	4 to 10
Round Elbows .....	100	50	40	40
Tee-Pieces .....	150	75	60	60
Sockets and Couplings .....	20	10	10	10
Valves, Fullway .....	150	75	60	60
Valves, Globe .....	300	150	120	120

The equivalent lengths representing the various fittings must be added to the length of pipe, the latter measurement including the length of all fittings.

Then the weight of steam discharged per minute with any given loss of pressure can be calculated by formula (63), or the required diameter for a given discharge can be determined by formula (66).

Example (34).—Find the weight of steam at 100 lb. pressure per square inch that can be conveyed with a pressure loss of 1 lb. per square inch through a 2-in. wrought-iron pipe, 100 ft. long, and fitted with one globe valve, five coupling sockets, one round elbow, one bend, and two tee-pieces.

To 100 ft. we add the equivalent lengths given in Table XXX. as follows:—

	Diameters.
One globe valve .....	800
Five sockets .....	100
One elbow .....	120
One bend .....	10
Two sockets on bend .....	40
Two tees .....	800
	850

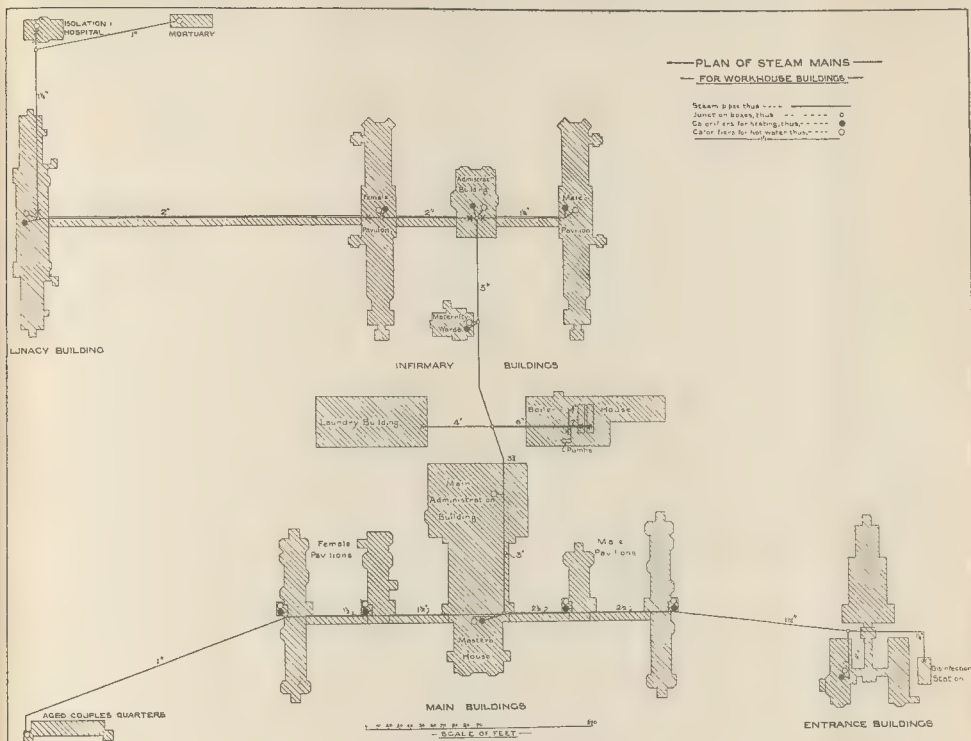


Illustration to Student's Column: Fig. 67.

To find the length in feet of 850 diameters we multiply by the diameter and divide by twelve, thus:—

$$\frac{850 \times 2}{12} = 141.66 \text{ ft., say } 142 \text{ ft.}$$

Formula (63) for the weight of steam delivered per minute is

$$W = 60 \sqrt{\frac{(p_1 - p_2) D^5}{l}}$$

In the present example  $(p_1 - p_2) = 1$ , by Table XXV:  $D = 0.2307$ ,  $d^5 = 32$ , and  $l = (100 + 142) = 242$ .

Substituting these values, we have

$$W = 60 \sqrt{\frac{1 \times 0.2307 \times 32}{242}}$$

$$60 \sqrt{\frac{7.38}{242}}$$

$$= 60 \sqrt{0.0305} = 10.47 \text{ lb.}$$

Example (35).—Find the diameter of a pipe to convey per minute 20 lb. weight of steam at the pressure of 50 lb. per square inch, with a pressure loss of 1 lb. per square inch. The pipe line to be 100 ft. long and provided with the fittings stated in example (34).

Formula (65) for the diameter of the pipe is

$$d = 0.2 \sqrt[3]{\frac{W^2 l}{(p_1 - p_2) D}}$$

The required values are  $W^2 = 400$ ,  $l = (100 + 142) = 242$ ,  $(p_1 - p_2) = 1$ , and  $D$ , by Table XXV = 0.1202.

Substituting these values, we have

$$d = 0.2 \sqrt[3]{\frac{400 \times 242}{1 \times 0.1202}}$$

$$= 0.2 \sqrt[3]{805,400}$$

By logarithms the fifth root of 805,400 is

$$\log. 5.9060 \div 5 = 1.1812$$

The number corresponding with the mantissa .1812 is 1518, and, by insertion of the decimal point at the place indicated by the index, we get 15.18.

Hence the required diameter is

$$0.2 \times 15.18 = 3.036 \text{ in.}$$

Instead of calculating the results directly, as in the foregoing examples, the required weight of steam discharged ( $W_1$ ) can be ascertained from Table XXVII. in the manner explained on pp. 624-5, ante.

First obtain from Table XXX, the equivalent lengths of the various fittings in terms of pipe diameter, and convert the sum of these values to feet. Add the value so obtained to the measured length of the pipe line, and calculate the value of  $W_1$  by the formula given at the bottom of p. 624, or if the pressure loss differs from that upon which Table XXVII. is based, use one or other of the two succeeding formulae on p. 625.

To make matters clear we give the following examples, using the assumptions in examples (31), (32), and (33), with the addition of the equivalent length to compensate for fittings, as in example (34). In these, as in the preceding examples, absolute pressures are taken.

Example (36).—Find the weight of steam discharged per minute by a 3-in. diameter pipe 400 ft. long, with a drop of pressure from 60 lb. per square inch to 59 lb. per square inch, and connected with the valve and fittings stated in example (34).

The sum of the equivalent lengths of the various fittings is 850 diameters, and the corresponding length in feet = 142 ft. as before.

Referring to Table XXVII. we find that the weight of steam, at 60 lb. pressure per square inch, delivered through a 3-in. diameter pipe, is 35.30 lb.

Then, denoting the equivalent length for fittings by the symbol  $l_1$ , the required discharge will be

$$W_1 = \frac{W}{\sqrt{1 + l_1}}$$

and, substituting the proper values,

$$W_1 = \frac{35.3 \times 10}{\sqrt{400 + 142}}$$

$$= \frac{353}{23.3} = 15.15 \text{ lb.}$$

Example (37).—Find the weight of steam

discharged per minute by a 3-in. diameter pipe, 100 ft. long, with a drop of pressure from 60 lb. per square inch to 56 lb. per square inch, and connected with the valve and fittings stated in example (34).

The required discharge will be

$$W_1 = \frac{W}{\sqrt{1 + l_1}} = \frac{W 10 \sqrt{(p_1 - p_2)}}{\sqrt{1 + l_1}}$$

Inserting values as before, we have

$$W_1 = \frac{35.3 \times 10 \times \sqrt{4}}{\sqrt{100 + 142}}$$

$$= \frac{706}{23.3} = 30.3 \text{ lb.}$$

Example (38).—Find the weight of steam discharged per minute by a 3-in. diameter pipe, 400 ft. long, with a drop from pressure of 60 lb. per square inch to 56 lb. per square inch.

The required discharge will be found by the formula used in example (37), and by inserting the proper value, we get

$$W_1 = \frac{35.3 \times 10 \times \sqrt{4}}{\sqrt{400 + 142}}$$

$$= \frac{706}{23.3} = 30.3 \text{ lb.}$$

It is interesting to compare the results in examples (36), (37), and (38) with those in examples (31), (32), and (33), as they show very clearly the important influence of fittings and valves in reducing the flow of steam.

Summarizing the most convenient rules and other aids given in the present and preceding articles for computing the diameters of main and branch pipes for the conveyance of steam in ordinary distribution systems, we have the following:—

Formula (63).—Giving the weight of steam discharged per minute through a pipe of any diameter and length, with a given loss of pressure.

Formula (65).—Giving the diameter of a pipe of any length for the discharge of any weight of steam per minute, with a given loss of pressure.

Table XXVII.—From which can be



obtained results similar to those calculated by either formula (63) or formula (65).

Table XXIX.—By the aid of which the diameters of branch pipes can be proportioned roughly, without calculation or reference to Table XXVII, when the diameter of the main pipe has once been determined.

Table XXX.—Giving approximate equivalent lengths to be added to the measured length of pipe for the purpose of compensating for the reduction of flow due to valves and various kinds of pipe fittings. These equivalents can be used in connexion either with formula (63) and (65), or with Table XXVII.

Hence, two methods of procedure are open to the designer—(1) by formulae and (2) by tables.

In every case it is necessary that the weight of steam to be delivered should be correctly estimated for each department of the building or group of buildings to be supplied.

It is outside the scope of the present series of articles to give data as to, and to discuss methods of computing, the quantities of steam necessary for the operation of machinery, the generation of electricity, and for the various domestic purposes of public institutions. Assuming that the reader possesses, or is able to obtain, data of the kind, he will have no difficulty in settling suitable sizes for the different service pipes by the means we have already set forth.

For the purpose of demonstrating the use of the foregoing formulae and tables we take as an example the steam distribution system in the workhouse buildings, of which Fig. 67 is a block plan.

To arrive at the calculated weight of steam delivered to each point of supply would necessitate the enumeration of all main and branch pipes with their valves, bends, elbows, and other pipe-fittings. The large amount of detail involved by the adoption of such a course would not materially further our present object, which will be amply fulfilled by the consideration of the mains and chief branches proceeding from the boiler-house to the different buildings and departments, with approximate allowances for the valves and fittings.

The following summary of the steam mains shown in Fig. 67 is condensed from the engineer's specification, and will serve as the basis of our computations, the various pipes being distinguished below by numbers to facilitate reference.

#### Boiler-house.

- (1) 7-in. collecting pipe in boiler-house, supplied from one or both of the two Lancashire boilers, each 30 ft. long by 7 ft. diameter.
- (2) 4-in. main to electricity generating station.
- (2a) 1½-in. branch to pump-room.
- (3) 6-in. main to junction-box in subway between boiler-house and laundry building.

#### Laundry Building.

- (4) 4-in. main from junction-box in subway to engine-room, with branches to other departments of the laundry.

#### Infirmary Buildings.

- (5) 3-in. main from junction-box in subway to junction-box in subway beneath the administration building of the infirmary, with junction-boxes and branches for steam supply to the maternity wards (1 in.), the administration building (1½ in.), and the male pavilion (1½ in.).
- (6) 2-in. continuation of the main from the junction-box in subway beneath the administration building to a junction-box in the lunacy building, with (1½-in.) branches for steam supply to female pavilions and lunacy building.

#### Isolation Hospital and Mortuary.

- (7) 1½-in. continuation of the main from lunacy building to a point outside the isolation hospital, with 1-in. branch to the hospital, and 1-in. branch to the mortuary.

#### Main Buildings.

- (8) 3½-in. main from the junction-box in subway between the boiler-house and laundry building to the administration building, where a 1½-in. branch is taken off for heating and cooking.
- (9) 3-in. continuation of the main to a

junction-box at the meeting of the subways behind the master's house, where a 1½-in. branch is taken off for steam supply, and whence submains proceed right and left.

- (10) 2½-in. submain as far as the second male pavilion, with branches to each pavilion, and a continuation of the submain to the entrance buildings.
- (11) 1½-in. submain to the second female pavilion, with branches for steam supply at each pavilion.
- (12) 1-in. continuation of the submain past the second female pavilion to the aged couples' quarters, with service branches to each of these buildings.

#### Entrance Buildings.

- (13) 1½-in. continuation of the submain from the main buildings, with 1½-in. branches to the front entrance building and the disinfection station.

Steam is generated in the boiler-house at a pressure of 110 lb. per square inch (125 lb. absolute), and is supplied without reduction to the electricity generating sets.

Beyond the main leading to the latter, the pressure is reduced to 60 lb. per square inch (80 lb. absolute) for distribution, and is further reduced in buildings where steam at lower pressure is necessary.

### STEAM BOILERS AND PIPES.—XXVI.

#### THE FLOW OF STEAM (concluded).

HAVING stated the diameters of the steam mains of the system under consideration, and given a plan showing the distances from point to point, we will calculate approximately the weight of steam that can be delivered through each of the pipes, and afterwards compute the same weights by the aid of Table XXVII.

In order to make the results more nearly correct we must allow something in each case for vertical lengths of pipe that cannot be shown on a plan, and appropriate allowance must also be made for valves and pipe-fittings.

The following calculations are made by formula (63):—

$$W = 60 \sqrt{\frac{(p_1 - p_2) D^5}{L}}$$

the values of D being taken from Table XXV. directly or by interpolation.

(1) For the 7-in. collecting pipe we take the length at 20 ft., adding an equivalent length of 180 ft. to compensate for valves, separators, and other fittings, and allowing for a drop of pressure from 125 lb. to 124 lb. per square inch.

Then

$$W = 60 \sqrt{\frac{1 \times 0.2845 \times 7^5}{200}} = 293.4 \text{ lb.}$$

(2) For the 4-in. electricity plant main, we take the length at 100 ft., with an allowance of 400 diameters (133 ft.) for valves and fittings, and a drop of pressure from 124 lb. to 123 lb. per square inch.

Then

$$W = 60 \sqrt{\frac{1 \times 0.2822 \times 4^5}{100 + 133}} = 66.79 \text{ lb.}$$

(3) To the point to point length of this main, about 70 ft., add 30 ft. to cover vertical portions and 600 diameters (300 ft.) to compensate for pressure reducing and stop valves, expansion joint, bends, and other fittings. Drop of pressure, say, from 80 lb. to 79 lb. per square inch.

Then

$$W = 60 \sqrt{\frac{1 \times 0.1869 \times 6^5}{100 + 300}} = 114.4 \text{ lb.}$$

(4) The actual length of pipe from the junction-box to the laundry engine-room is about 90 ft., to which 700 diameters (233 ft.) should be added for valves and sundry fittings. Drop of pressure from 79 lb. to 78 lb. per square inch.

Then

$$W = 60 \sqrt{\frac{1 \times 0.1848 \times 4^5}{90 + 233}} = 45.93 \text{ lb.}$$

(5) To the measured length of about 240 ft. add 800 diameters (200 ft.) for junction-boxes, valves, and fittings, and take the pressure loss at (79-78) = 1 lb. per square inch.

Then

$$W = 60 \sqrt{\frac{1 \times 0.1848 \times 3^5}{240 + 200}} = 19.17 \text{ lb.}$$

(5a) The length of the branch to the male

pavilion is about 80 ft.; say, 100 ft., to which add for various valves and fittings 1,350 diameters (140 ft.), the allowance being increased by the fact that this pipe is of wrought-iron with screwed joints and fittings, which cause greater reduction of flow, as shown in Table XXX.

Taking the drop of pressure at (78-76) = 1 lb. per square inch.

$$W = 60 \sqrt{\frac{2 \times 0.1826 \times 1.25^5}{100 + 140}} = 4.09 \text{ lb.}$$

(6) The continuation of the main in 2-in. diameter to the female pavilion measuring about 100 ft., a suitable allowance for junction-boxes and fittings would be 530 diameters (90 ft.), and the pressure loss may be put at (78-77) = 1 lb. per square inch.

The 2-in. continuation of the same main to the lunacy building measures 260 ft. from point to point, the allowance for valves and fittings should be, say, 1,000 diameters (166 ft.), and the drop of pressure from 77 lb. to 76 lb. per square inch.

Then

$$W = 60 \sqrt{\frac{2 \times 0.1826 \times 2^5}{(100+90)+(260+166)}} = 8.26 \text{ lb.}$$

(7) The continuation of the main in 1½-in. diameter has a length of 170 ft., and it will be sufficient to allow the equivalent of 530 diameters (55 ft.), which, with a drop of pressure from 76 lb. to 75 lb. per square inch will give

$$W = 60 \sqrt{\frac{1 \times 0.1782 \times 1.25^5}{170 + 55}} = 2.95 \text{ lb.}$$

(8) The main to the administration building proceeds in ¾-in. diameter for about 70 ft., and, allowing 500 diameters (146 ft.) for valves and fittings, we have, with a pressure drop from 79 lb. to 78 lb. per square inch

$$W = 60 \sqrt{\frac{1 \times 0.1848 \times 3.25^5}{70 + 146}} = 33.42 \text{ lb.}$$

(9) The 3-in. continuation of this main measures about 110 ft., and adding 800 diameters (200 ft.) for valves, junction-box, and fittings generally, the discharge, with a drop of pressure from 78 lb. to 77 lb., will be

$$W = 60 \sqrt{\frac{1 \times 0.1826 \times 3^5}{110 + 200}} = 22.70 \text{ lb.}$$

(10) Up to the second male pavilion the right-hand submain, in 2½-in. diameter, has a measured length of about 150 ft. Adding for fittings along the line, and at the two pavilions the equivalent of 1,200 diameters (250 ft.), the discharge, with a drop of pressure from 77 lb. to 76 lb. per square inch, is

$$W = 60 \sqrt{\frac{1 \times 0.1804 \times 2.5^5}{150 + 250}} = 12.59 \text{ lb.}$$

(11) The submain on the left hand, in 1½-in. diameter, measures 125 ft. up to the second female pavilion. Allowing the equivalent of 1,200 diameters (150 ft.) for fittings, and a pressure drop from 77 lb. to 76 lb., we get

$$W = 60 \sqrt{\frac{1 \times 0.1804 \times 1.5^5}{200 + 150}} = 3.75 \text{ lb.}$$

(12) The 1-in. continuation of the same main from the second female pavilion to the aged couples' quarters has the measured length of about 240 ft. Adding 800 diameters (66 ft.) for valves and fittings, and taking the drop of pressure to be from 76 lb. to 75 lb.

$$W = 60 \sqrt{\frac{1 \times 0.1782 \times 1^5}{240 + 66}} = 1.45 \text{ lb.}$$

(13) The length of the 1½-in. continuation to the entrance buildings is about 175 ft. To this should be added about 530 diameters (66 ft.) for valves, junction-box, and fittings. Then with a drop of pressure from 75 lb. to 74 lb. per square inch

$$W = 60 \sqrt{\frac{1 \times 0.1739 \times 1.5^5}{175 + 66}} = 4.46 \text{ lb.}$$

This completes the mains and submains enumerated in Article XXV., and we will now compute, with the aid of Table XXVII., the weight of steam that can be discharged by each of them. To save unnecessary repetition we refer the reader to the preceding calculations for the lengths, the equivalent lengths for valves and fittings, and the pressure losses.

For the purpose of a rough estimate the progressive decrease of pressure from the boiler to the most distant pipe might be ignored, but for more exact computations the weight of steam discharge should be obtained

from Table XXVII, by interpolation in cases where the discharge is not there given for the exact pressure under consideration.

The simple rule for ascertaining the weight ( $W_1$ ) of steam discharge for any length of pipe and loss of pressure other than 100 ft. and 1 lb. per square inch respectively, is that as stated on p. 625 ante:—

$$W_1 = \frac{W}{l} 10 \sqrt{(p_1 - p_2)}$$

Of course, where  $(p_1 - p_2) = 1$ , this term can be omitted.

Using this rule in conjunction with Table XXVII., we have the following results for the mains and submains.

$$(1) \quad W_1 = \frac{414.8 \times 10}{\sqrt{200}} = 293.4 \text{ lb.}$$

$$(2) \quad W_1 = \frac{101.9 \times 10}{\sqrt{233}} = 66.76 \text{ lb.}$$

$$(3) \quad W_1 = \frac{228.6 \times 10}{\sqrt{400}} = 114.3 \text{ lb.}$$

$$(4) \quad W_1 = \frac{82.5 \times 10}{1.323} = 45.91 \text{ lb.}$$

$$(5) \quad W_1 = \frac{40.2 \times 10}{440} = 19.17 \text{ lb.}$$

$$(5A) \quad W_1 = \frac{4.4 \times 10 \sqrt{2}}{10} = 4.02 \text{ lb.}$$

$$(c) \quad \text{III} \quad 14.4 \times 10 \sqrt{2} \quad 8.26 \text{ lb}$$

$$4.4 \times 10^{-2} \text{ lb}$$

(8) W  $\frac{49 \times 10}{\sqrt{225}} = 33.34 \text{ lb}$

$$(9) \quad W. = \frac{40.0 \times 10}{\sqrt{216}} = 22.73 \text{ lb.}$$

$$(10) \quad W_1 = \frac{25.1 \times 10}{\sqrt{310}} \quad 12.55 \text{ lb.}$$

$$(11) \quad W_1 = \frac{7 \times 10}{2 \times 2.2} = 3.74 \text{ lb.}$$

$$(12) \quad W_1 = \frac{2.5 \times 10}{\sqrt{206}} = 1.43 \text{ lb.}$$

$$(13) W_1 = \frac{6.9 \times 10}{1.541} = 4.44 \text{ lb.}$$

Comparison of these results shows that they are practically identical with the discharges calculated by formula (63).

Finally, we can use Table XXIX. for checking the proportions of the mains and submains.

(1) Starting with the 7-in. diameter main, No. 1, which has to supply No. (2) of 4-in. diameter, and No. (3) of 6-in. diameter, we find in the first column of the table that 7 in. = 23,570, that 4 in. = 5,817, and 6 in. = 16,030. As the sum of the two latter values (5,817 + 16,030) = 21,847, a margin of (23,570 - 21,847) = 1,723 is left, which is more than sufficient for the 14-in. branch (No. 2a) in the boiler-house to supply the pumps, and leaves a margin for the future supply of steam to the machinery for operating mechanical stokers and the granpers of an economiser.

(3) Main No. 3 of 6-in. diameter has to supply, from the first junction-box, No. 4 of 4-in. diameter, No. 5 of 3-in. diameter, and main No. 8 of  $3\frac{1}{4}$ -in. diameter. The values by the table are 4 in. = 5,817, 3 in. = 2,832, and  $3\frac{1}{4}$  in. = 3,461; total = 12,110. By the same table we see that a 5-in. diameter pipe would be too small, and  $5\frac{1}{2}$  in., being an unusual size, 6-in. diameter is the most suitable for adoption. Moreover, it provides a margin for future increase of demand.

(5) The 3-in. diameter main (No. 5) has to supply a branch to the maternity wards (1 in. diameter), No. 6 of 2 in. diameter, and branches each of 1½ in. diameter to the administration building and the male pavilion of the infirmary buildings.

The values of these pipes by Table XXIX. are  $(181.8 + 1,027 + 314.5 \div 314.5) = 1,837.8$ . As the value of a 3-in. pipe by the same table is 2,832, the diameter adopted appears larger than actually necessary. But, as  $2\frac{3}{4}$  in. is an odd size, the adoption of 3 in. is advisable.

(6) No. 6 has to supply a 1½-in. branch to the female pavilion of the infirmary buildings, and No. 7 of 1½-in. diameter to the isolation hospital and mortuary.

The values of these pipes by the table are (314.5 × 3) = 943.5, and as the value of the 2-in. branch is 1,027, the diameter seems adequate. It would not be so, however, if the three branches were taken off at the end, owing to loss by friction in the comparatively great length of the main. As the female pavilion is near the commencement, the diameter is suitable.

(8) No. 8 of 3 $\frac{1}{2}$ -in. diameter supplies a 1 $\frac{1}{4}$ -in. branch to the administration building, and No. 9 of 3-in. diameter. The value of a 3 $\frac{1}{2}$ -in. pipe by the table is 3,461, and the combined value for the other two pipes is  $(314.5 + 2,832) = 3,146.5$ . Hence, the diameter is suitable.

(9) No. 9 of 3-in. diameter supplies a 1½-in. branch to the master's house, a 2½-in. submain (No. 10), and a 1½-in. submain (No. 11). The value for the 3-in. main is 2,832, and the combined value for the pipes supplied is  $(314.5 + 1,797 + 499.9) = 2,611.4$ . Therefore the diameter adopted is correct.

(13) No. 13 of  $1\frac{1}{2}$ -in. diameter has to supply two  $1\frac{1}{4}$ -in. diameter branches in the entrance buildings. The value of a  $1\frac{1}{2}$ -in. pipe = 500 and the value of two  $1\frac{1}{4}$ -in. pipes = 629.

Consequently it appears that the main demand for steam in these buildings would be easily met by two 1-in. branches, or, at any rate, by one of 1½-in. and one of 1-in. diameter. The employment of 1½-in. branches, although in excess of theoretical requirements is desirable so as to leave ample space for the water of condensation which is relatively greater at the extremities of a steam system. For the same reason, the service pipes for the isolation hospital, mortuary, and aged couples' quarters are of larger area than is called for by theory.

**Conclusion.**—Much more could be written upon the design of steam-pipe installations, notably upon the strength of pipes for different pressures, the design and application of steam separators, steam traps, and other auxiliaries, the utilisation of exhaust steam pipe systems for the return of condensate water to the boiler-house, and upon many practical details relative to the erection of pipe systems generally.

To treat all these branches of the main subject fully, and to illustrate all the apparatus, fittings, and fixings in an adequate manner would require a separate series of articles. Therefore, in dealing with steam pipes, as with steam-boilers, we have not attempted to say everything that could be said but rather to deal with the more important points that come directly within the province of the architect.

## OBITUARY.

Mr. SETTLE. The death is announced by Mr. W. Moss Settle, of Barrow-in-Furness and Woodgarth, Ulverston, Lancashire, architect and surveyor, in his 30th year. Mr. Settle was elected an Associate of the Royal Institute of British Architects in 1899, and a member of the Architectural Association in 1900. He made the design for the new street front, illustrated in the *Lancaster* of July 19, 1902. He was architect to the Walney Estates Company, of several houses and business premises in Barrow, the King Alfred Hotel, Vickerstown, and of a cottage contributed to the Cheap Cottage Society at Vickerstown recently held on February, 1901 limited to land. In 1901 Mr. Settle won the third premium with his plans for a large school at Vickerstown for the Barrow School Board. Messrs. Settle & Farmer, of County-square, Ulverston, were the architects of the Bank of Liverpool branch premises at Dalton-on-Wharfe, Lancs., the premises at Dalton-on-Wharfe, Lancs. branch in County-square, Ulverston (1897-1900); for the building of the Golden Ball, Dalton (1901) and—in Ulverston—the enlargement of the post-office (1900), additions to the Gawthfield House, Dalton (1900), and the lodge for Mr. R. W. Wakefield, etc., at Todbus for Mr. H. Crossfield, schools at Haveringham, and for the Millom School Board, and of cottages at Allithwaite (Upper), Grange-over-Sands. Of the recent work at Ulverston carried out by Messrs. Settle & Brundrit we may mention some houses in Kilner's park, and other premises in Clarence-street and the Swarthmoor Co-operative Stores, and residences in Thistle-street, Millom, and one for Mr. W. Dalgleish at Grange-over-Sands. Mr. Settle was an architect of considerable talent and originality, and we much regret to hear of his early death.

GENERAL BUILDING NEWS.

**CATHOLIC CHURCH, HAYDOCK.**—The new Roman Catholic Church of the English Martyrs, Haydock, was opened by the Bishop of Liverpool on the 17th inst. The church takes the place of the old school chapel, and has been built to accommodate some 400 persons at a total cost of 1,860*l.* Messrs. R. & L. Lomax, of Platt Bridge, have been the builders, from the designs of Messrs. Curran, of Warrington.

**CHURCH RESTORATION, ELLINGHAM.** The reopening of the parish church of St. James's, Great Ellingham, after partial restoration, took place a short time ago. The floor of the church has been relaid with new stone, and worn and broken windows have been replaced by new ones of leaded oak outside, and of stained glass inside. The choir stalls, panelled and studded inside, have been added with pitch-pine, panelled roof to the vestry, forming a ringers' floor above. The old minstrel gallery has been retained in its original form and redecorated. The rood screen has been removed, and the choir stalls have been brought to their original position, in the first bay of the nave, and, to harmonise with the colour scheme of the architect, have been painted a dark green. A carved oak pulpit has been erected, and the old altar-table in the chancel has been replaced by a new one of stone, which has been kneeshed. The work was carried out by Messrs. Hawes & Sons, Norwich, under the supervision of Mr. Arthur Reeve, of Westminster.

GLASGOW TECHNICAL COLLEGE.—The first section of the new buildings for the Glasgow and West of Scotland Technical College was opened on the 21st inst. The Governors appointed Mr. David Barclay to be their architect, and he has designed buildings which will ultimately consist of five large wings, two parallel to George-street and three at right angles to them and parallel to Montrose-street. Of these, all except the principal portion of the front wing to George-street, have been completed. The walls facing the streets are of red Dumfriesshire stone; all the other exterior walls are covered with white enamelled brick. The style is a free adaptation of Italian Renaissance, and the long staircase of the central block, when completed, will have as its centre block of three arches, slightly projected, in which will be three arched doorways. The first floor story is 20 ft. in height, and in the centre block is treated with solidity and breadth, forming a base to a columnar facade of columns in pairs, surmounted by acanthus capitals, and the disengaged wings, which will be the finishing feature of the building, will be of a more quasi-towers, finished with a balustrade and corner turrets. The same style and character has been adopted in the frontage to Montrose-street, which is 300 ft. long. The frontage to George-street will be 348 ft. long, over 100 ft. in height, and will contain a large hall, a lecture hall, a basement, and a sub-basement. The construction of the building will cost about 70,000*l.*, and a further expenditure of about 30,000*l.* for equipment is necessary.

**BANGOR UNIVERSITY COLLEGE.**—At a recent meeting of the council of the University College of North Wales, it was, upon the recommendation of the Plans Committee, resolved to take forthwith the preliminary steps necessary in connexion with the appointment of an architect for the new college buildings. The Council decided that the appointment should be made by a limited competition, a small number of architects being selected to submit designs. In the meantime public notice will be issued inviting architects desirous of competing to send in their names, though the selection will not necessarily be confined to architects who have actually applied for the post.

new INSTITUTE, ABERCYNON.—A workmen's club and institute has just been opened at Abercynon. The building consists of four lock-up shops on the ground floor, reading-room, committee-rooms, library, games-room, billiard-room and hall to accommodate 1,150 persons. A gallery having five exits and a seating capacity of 1,000 persons has been added to the building. Williams Bros., of Ynysybwl, The heating, electric wiring, and fire-extinguishing appliances have been provided by Messrs. R. Alger & Son, Newport, and the ventilation and sanitary appliances by Mr. J. W. Wilkinson, Cardiff. The Bath, Forest, and other amusements have been supplied by Messrs. Turner & Sons, Cardiff. The cost of the building will be about 12,000 £. The architect is Mr. F. Gibson, Pontypridd.

**PUBLIC OFFICES, WOKING.**—The new offices for the Woking Urban District Council have been practically completed. The building was designed by the District Surveyor, Mr. G. J. Woodbridge, and has been erected by Messrs. Drowley & Co., of Woking, whose contract was for 3,978*l*. The exterior of the building, facing the railway, is in red brick, with blue dressings, and the roof is covered with Broadleaved tiles. The entrance is reached by a flight of six steps, and there is a balcony above the entrance hall, 18 ft. by 74 ft., giving access on the right hand to the assistant overseer's office, and on the left to the clerk's general office, 22 ft. by 18 ft 10 in. Behind the latter is the clerk's private office, 17 ft. by 18 ft.



square, with strong room in 14-in. brickwork, lined with cement, and fitted with a special door supplied by Milner's Safe Company. In the rear of the building are the surveyor's general and drawing office, 30 ft. by 17 ft., and his private office, 17 ft. by 15½ ft. Communicating with the former, but with a separate entrance from the yard, is a pay office, where the Council's employees will receive their weekly wages without interference with the general work of the department. A small room for samples of materials, etc., submitted by various firms is provided. Also on the ground-floor, besides lavatories, is a telephone exchange. A wide staircase, with teak treads and risers, and oak newells, balusters and hand-rails, leads to the first and second floors. On the first floor, overlooking the road, are a committee-room, 21 ft. by 18 ft., and the sanitary inspector's office, 18 ft. square, with a waiting room 15 ft. by 7½ ft., between the two, and giving access to the balcony. The rear of the building on this floor is entirely taken up by the Council chamber, 40 ft. by 30 ft. It is lighted on three sides by means of five windows, the area of illuminant being electricity—as throughout the building—supplying four electroliers and five wall brackets. In common with the other rooms, it will be heated by slow combustion open grates. The accommodation on this floor is completed by a cloak room and lavatories. On the second floor is a room, 15 ft. by 18 ft., which can be used for meetings of committees and other semi-public bodies not directly connected with the Council. Then there are the caretaker's quarters and a clock-chamber.

**POLICE AND FIRE STATION, EDINBURGH.**—Edinburgh Dean of Guild Court met on the 14th inst. There were fifteen applications before the court. Five warrants were granted, and an equal number of cases were remitted to the Burgh Engineer. The city authorities were granted warrant to take down 21 to 27, Saunders-street, Stockbridge, and to erect a police and fire station there. The site has been acquired by the city, and the proposal is to build a district police and fire station, with rooms in the upper stories for the staffs of these departments. The fire station will consist of an engine hall, with duty and recreation rooms. In the meantime it is proposed to provide stabling for horses in connexion with the fire engines. That accommodation will be dispensed with if it should be decided to use motors instead of horse-drawn fire engines. The police station will consist of a charge office, witness room, sergeants' and superintendent's room, muster room, and five cells. In the rear a workshop has been provided for the fire department, with an ambulance shed for the police. The whole block will include eleven dwelling-houses for the two branches of the service, and will be four stories in height. Estimates have been accepted to the extent of 7,798*l.* on the plans prepared by the City Architect's Department.

**THE BRADFORD CHEAP COTTAGE BUILDING SCHEME.**—A Buildings Sub-committee of the Bradford Corporation, under the chairmanship of Mr. A. Gadie, had before them on the 13th inst. the scheme of Messrs. Mawson & Hudson, architects, for the building of cottage property on a design the object of which was to effect economies in the building of this kind of dwelling and to make the residences more attractive. Two plans were presented, showing alternate designs, and the promoters of the scheme asked for an expression of opinion upon them from the Buildings Committee. The houses were to have rubble walls, faced with cement rough cast; there were to be no outbuildings; the roads were to be narrower and, except in thoroughfares or main streets, asphalted instead of paved with setts; and there were to be gardens back and front. The sub-committee were unable to entertain the scheme on account of the insufficient road space proposed to be allowed, this falling short of the minimum stipulated in the by-laws. It was felt to be undesirable to endeavour to obtain an amendment of the by-laws, those at present in force being regarded as more favourable than the model by-laws of the Local Government Board.

**FREE LIBRARY, PRESTONPANS.**—A new free library has been opened at Prestonpans. The building consists of a reading-room, recreation-room, and book-room, with library's house adjoining. Mr. James P. Alison, architect, Hawick, prepared the plans for the work, the total cost amounting to 1,500*l.*

**FREE LIBRARY, THORNE.**—The foundation-stone of a new public library was laid at Thorne on the 14th inst. When completed the building will comprise on the ground floor an entrance-hall, with a leading library capable of storing 20,000 volumes, a librarian's room, and a news-room. On the first floor will be a magazine-room, reference library, and a ladies' room. Annexed is a caretaker's cottage of five rooms. The building will be faced with Nostel bricks, with dressings of Ancaster stone. The total cost, including furniture, heating, and the architect is Mr. H. S. Bellan, of Doncaster, the contractor being Mr. William Barton, of Thorne.

**PROPOSED HOSPITAL EXTENSIONS, WALKER GATE.**—On the 14th inst. Dr. R. Deane Sweeting held an inquiry at the town hall, Newcastle, into an application by the Newcastle Corporation for sanction to borrow a sum of 45,000*l.* for the extension of their infectious Diseases Hospital at Walker Gate. The Town Clerk said tenders had been obtained, and subject to consent being obtained to borrow the necessary money, the Newcastle had been accepted at the price of 39,720*l.* To this must be added the cost of furnishings, construction of sewer, and provision for expenses and contingencies, which would bring up the total estimated cost to 45,000*l.* It was proposed to increase the accommodation from 165 beds to 189, an addition of 24 beds. Mr. Holford, the Property Surveyor, explained the plans and the general scheme. It comprises the erection on a further portion of the Walker Estate of two new pavilions, a nurses' home, additions to the present isolation block, and several necessary alterations to the administrative block and other parts of the building. All the buildings are of the same character as those at present existing.

**BUILDING AND IMPROVEMENT SCHEMES, DONCASTER.**—The Doncaster Corporation have, according to the *Sheffield Telegraph*, three schemes on hand and in process of development which will entail in the near future an expenditure of fully 50,000*l.* One enterprise consists of the widening of Chequer-lane and the erection of a set of elementary schools in that district, the former being essential to the carrying out of the latter, and the joint cost will amount to 20,000*l.*, 2,000*l.* being for the widening of the road, and 4,000*l.* for the cost of the site of the schools. The full scheme provides for an educational establishment for 1,000 boys, 540 boys, 380 infants, and 540 girls; but in the first instance it is only proposed to proceed with the boys' school, which will entail an expenditure of 5,000*l.*, or, counting the cost of the site, a sum of over 9,000*l.* Another scheme is the erection of a model lodging-house in Fishergate at a cost of 6,250*l.*, 5,000*l.* being for the buildings, and 1,250*l.* for the site. It will contain accommodation for 126 persons, male and female. The other scheme has to do with the municipal technical school and the girls' secondary school. The Education Authority propose to build a new municipal technical school of which, exclusive of the site, is 14,500*l.*, and to this must be added 5,000*l.* for the equipment, making a total of 24,000*l.* It has been decided to erect these new buildings on the south-east side of St. George's Church, with a frontage to Gray Friary-road and Church-view. One building will be used as a secondary school, and the other for engineering work. The plans are being prepared by Mr. W. H. R. Crabtree, the Borough Surveyor, and a commencement will probably be made early in the coming year.

**CO-OPERATIVE PREMISES, BEDLINGTON.**—New premises have been built by the Bedlington Co-operative Society at Bedlington. The work has been carried out by the firm of Mr. T. Tulip, of Choppington, at a cost of about 4,000*l.*

**THEATRE, STOCKTON.**—The new Hippodrome Theatre, which has been erected at Stockton, was opened on the 18th inst. The building provides accommodation for 2,300 persons, and has cost about 14,000*l.* Messrs. George and Robert Nicholson were the builders, and Mr. W. Hope, of Newcastle, the architect of the work.

**SOLDIERS' AND SAILORS' HOME, FIMLICO.**—A new wing is in course of being built at the Home in Eccleston-street, S.W., and the scheme for extension comprises accommodation for 60 more bed-cubicles, a lecture hall with 400 seats, recreation-rooms, and an enlargement of the kitchen and refreshment bar. The trustees bought and adapted the existing buildings at an outlay of 12,000*l.*, their former premises in Buckingham Palace-road having been acquired for the extension of Victoria Railway Station. Mr. Robert Curwen is the architect of the additional wing.

**CHARING CROSS RAILWAY STATION.**—It is announced that the contract for removing the roof and for the work of rebuilding will be given to Messrs. Andrew Handyside & Co., Ltd., of Derby, and that upon the advice of Sir Benjamin Baker and Sir John Wolfe Barry, in consultation with Mr. Tempest, engineer to the company, the directors have resolved to replace the present roof with one after a more modern kind and at a lower level, which will moreover facilitate any future widening of the terminus. The engineers recommend that by way of protecting the feet of the principals should be united with steel hawsers during the removal of the roof. It is anticipated that the new works will be completed in the course of seven or eight weeks, so far as to admit of the station being re-opened.

**MEMORIAL HALL, ELSON.**—A new parish hall has been erected midway between Elson and Thirbury. The building, which is being of brick, and was designed by Mr. Mount of Staple-in, Messrs. C. J. Lear & Son, of Alverstoke, were the builders.

## STAINED GLASS AND DECORATION.

**ST. PETER'S CHURCH, BETHNAL GREEN.**—The Church of St. Peter, Bethnal Green, was reopened on Monday, the 18th inst., after undergoing thorough repair. A new vestry for the clergy has been built on the north side of the church. Carved oak screens have been erected on each side of the choir, and on the north forming a choir vestry and the south side enclosing the lower part of the organ. A low screen of marble with marble steps has been added to the chancel, and portions of the nave are laid with tessellated pavement. A new octagonal pulpit of carved oak has been erected next the chancel screen, and a new marble font takes the place of the old one. New wrought-iron gas brackets and standards have been supplied by Messrs. Stroud. The roofs, walls, and seats have been repainted. The arch and ceiling to the sanctuary have been decorated, and above the arch are four angels bearing scrolls with texts. The subject of the Adoration of the Magi occupies the three panels of the arch above the altar, and upon either side are figures of SS. Peter and Paul, the other panels representing a conventional treatment of the vine. The decoration of the sanctuary has been executed by Messrs. Heaton, Butler, & Bayne. A great improvement effected by the removal of the galleries which crossed the centre of the nave windows, and the nave has been enlarged by taking down a partition which enclosed the staircase to the galleries at the west end of the church. The work, including the decoration round the nave windows, has been carried out by Messrs. F. A. Willmott, of Ilford, under the direction of Mr. John Medland, architect, of London.

**WINDOWS, ST. PATRICK'S CATHEDRAL, DUBLIN.**—At St. Patrick's Cathedral a memorial has been erected to the late Dr. Salmon. The memorial comprises two windows of painted glass (the Rev. C. E. Kempe) descriptive of scenes in the life of Peter, and a medallion portrait of the late Provost by Mr. Albert Bruce-Joy, R.H.A. The medallion is in bronze and is surrounded by a framework in the same metal, which has been designed by Sir Thomas Drew, R.H.A. Beneath it is a bronze tablet, upon which a Latin inscription in raised letters has been placed. The memorial is placed in the Chapel at the end of the north choir. The stonework of the memorial was carried out by Messrs. Sharpe & Emery.

## APPOINTMENT.

**DUNDEE.**—Mr. J. H. Langlands, who since 1888 has acted as architect to the Dundee School Board on an *ad interim* appointment, has been officially selected as the architect and measure for the Board.

## SANITARY AND ENGINEERING NEWS.

**WATER SUPPLY, ALFRETON.**—Mr. W. H. Radford, C.E., of Nottingham, has submitted to the Alfreton Urban Council a report as to the best means of increasing their present water supply. He estimates that to supply the 200,000 gallons a day, including the water sold to the Midland Railway Company. The cost of making extensions at Lindway No. 1 Reservoir would be about 1,512*l.* per 1,000,000 gallons whereas at Butterley it would cost 1,652*l.* per 1,000,000 gallons. At Butterley only 5,000,000 gallons could be stored, while at Lindway 11,000,000 gallons could be stored extra. Lindway No. 1 Reservoir would have to be reconstructed, with the addition of filter beds. The 7-in. supply main was altogether too small. He suggested that a new 9-in. main should be laid by the side of the old one, which would cost 5,309*l.* This would avoid the necessity for pumping at Cotes Park. The following are his estimates: Reconstructing Lindway No. 1 Reservoir, to hold 16,000,000 gallons, 15,880*l.*; new 7-in. main between Butterley and Lindway reservoirs, 1,430*l.*; filter beds, 840*l.*; clear water reservoirs, to hold 100,000 gallons, 1,200*l.*; new 9-in. main from Lindway to Cotes Park, 5,300*l.*; total for works, 24,650*l.* Mr. Radford, in conjunction with the proposal to increase the storage at the Butterley reservoirs, the cost of which he estimates to be 12,560*l.*

**SEWERAGE SCHEME, STRETTON.**—The new sewerage works at Stretton have now been completed and opened. Messrs. Manergh & Son were the engineers, the contractor being Mr. W. Morley, and the total cost has been about 12,000*l.*

**WATER MAINS, PENZANCE.**—Col. A. G. Dufford, R.E., representing the Local Government Board, held an inquiry at the Guildhall, Penzance, on Wednesday, last week, into the application of the Corporation to borrow 4,500*l.* for the purpose of laying new water mains, for the replacement of certain parts of the town. Mr. T. H. Cornish (town clerk) explained the object of the application. The population of the district, he said, which would be supplied by water was 13,131 at the last census; the assessable value was 59,038*l.*; the balance of the outstanding loan was 46,810*l.*; the area was 72 acres; and a 1d. rate would produce 225*l.* The application was taken



borrow 4,600, for thirty years for the purpose of laying new mains from the reservoir to the town. At present water was brought in by two mains connected with the high-level reservoir for supplying the higher district of the town, and another main for supplying the central and lower parts of the town. Since these mains were laid extensive building operations had been carried on on both sides of the town, and the mains had not allowed the residents to have the fullest supply of water. They believed that this would best fulfil the necessary requirements, and it was thought that the 9-in. main now only allowed the diameter of 7 in. It was now proposed to lay a new 12-in. main from the reservoir to the bullock market. It was not proposed to disturb the existing line of pipes. Mr. F. Latham (Borough Surveyor) gave details of the proposed scheme.

**PROPOSED PONTON DOCK, ABERDEEN.**—The Aberdeen harbour engineer, Mr. R. Gordon Nicol, has prepared a report to the Docks and Pilotage Committee on the propriety of providing another pontoon dock for the accommodation of fishing and other vessels at the port. The site which best fulfils the necessary requirements is to be found in the immediate vicinity of the existing dock at Albert Quay. At this place there can be obtained deep water berth outside the quay wall, suitable for the reception and working of a new dock, without further expenditure on constructional work than is required for the attachment of the dock to the quay wall. Taking current prices of materials into account, the cost of the dock complete, attached to the quay wall and fitted up ready for work, would be about 10,860. The cost of constructing the timber jetty and dolphins would amount to about 6,990, based on prices for this class of work when executed departmentally. Mr. Nicol recommends that the whole of the work be executed by contract. The new scheme could, in his opinion, be brought into working order before the end of 1906, and would represent a capital outlay of 26,778.

### FOREIGN.

**FRANCE.**—The Government of the United States have given to the City of Paris a subvention of 250,000 dollars in consideration of the erection of the American National Institute on ground belonging to the Municipality. —M. Alphonse Gosset, architect, of Reims, has submitted to the Municipal Council of Paris a scheme for a "Théâtre Populaire" to contain 4,000 spectators. This establishment, which it is proposed to erect on the site of the old Marché du Temple, is proposed to be in semi-circular form with all the seats in steps. On each story there are to be three foyers, eight staircases and nineteen doors, assuring a speedy exit on to an arched gallery running all round the building. The cost is estimated at 4,000,000 francs. —A monument to the memory of Cornélie is to be erected in Paris, from the designs of M. Allou (sculptor) and M. Lator (architect). It will be composed of a bronze portrait statue of the poet, with, at the base of the pedestal, two other figures, one symbolising "Tragedy," and the other representing Rodrigue, the well-known character in Le Cid. —The Government is about to establish a school of naval engineering, and a naval magazine, on the portion of the Champ de Mars bordering the Avenue Suffren, near the Eiffel tower. —It is proposed to erect at Calais, by subscription, a monument to the memory of Jacquard, the eminent mechanician, and inventor of the loom which bore his name.

**SOUTH AFRICA.**—The Duke of Connaught is to be invited to lay the foundation-stone of the new municipal buildings in Durban during his visit to Natal in February next. —Three new schools are to be erected in King Williams' Town. —The Standard Bank buildings in Maitland have been practically rebuilt by Messrs. Cronwell & Carter, the architects who designed and supervised the work being Messrs. Stott & Kirkby. —The Natal Government Railways invite tenders for the erection of buildings of brick and wood and iron on a portion of the Natal-Cape Railway between Donnybrook and Dronk. —The chapel to the memory of the "old boys" of St. Andrew's College, Graham's Town, who fell in the South African wars between 1877 and 1902, is to be built in Grahamstown. When completed the building will cost 7,800.

**GERMANY.**—The new theatre at Halberstadt, built from designs by Herr B. Sehring, at a cost of 500,000 marks, was opened on October 1, 1905. —Professor Hermann Grahn, who was for many years professor at the Technical Schools at Charlottenburg, died recently in his seventy-sixth year at Charlottenburg. —The new theatre at Nuremberg, designed by Herr Seeling, was opened on September 1; the building is intended to accommodate an audience of 1,422 persons. The architect of Munich have lodged a protest against the monotonous rows of houses that are being erected in their town; they suggest that the houses should no longer be built absolutely parallel with the line of the

street, but that each house should have an individuality of its own, within certain prescribed limits. —The memorial at Nuremberg to the Emperor William I. was unveiled on November 19; the memorial, which is in the form of an equestrian statue, is the work of Professor von Ruemann and Herr Hans Grissel.

### MISCELLANEOUS.

**PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.**—Mr. George Waymouth, architect, has removed his offices from 23, Moorgate-street, to Raymond House, Theobald's-road, Gray's Inn, W.C. Telephone number, 4,867, as before. —Mr. W. F. Harber, architect, has removed from 11, King's-mansions, Cheyne-walk, to 1, Lamport House, Royal Hospital-road, Chelsea, S.W. —Mr. W. Hoffman Wood, surveyor, has removed his offices from 14, Park-square, Leeds, to 8, Queen-square, in the same city.

**SLATE TRADE.**—Prices for the coming year have now been fixed at all the quarries, and show reductions of from 10 per cent. to 20 per cent. Objections were raised to some of these reductions, but it is generally believed to be best for the trade, and that the "bedrock" of prices has now been reached; also that merchants can now get good, sound Welsh slates to compete successfully with the inferior foreign and colonial slates which have been put on the market the last few years.

**FLOODS.**—PRESIDENT'S SONNARS. MIDDLESBROUGH.—For many years past serious inconvenience and loss have been experienced in certain parts of Middlesbrough situated on the low-lying marshlands at the mouth of the Tees. In 1896 Mr. Frank Baker, the Borough Engineer, made an unsuccessful endeavour to persuade the town council to establish a pumping station for alleviating the flooding of the Marsh-road district. Since that date the town has increased considerably, many hundreds of houses having been erected, and an enormous volume added to the sewage. To show the extent of the trouble taking place in the district, it may be stated that in December, 1901, the area flooded was between ten and eleven acres, and contained more than three hundred houses, the quantity of water in that particular flood being equal to 307,000 cub. ft., or practically 2,000,000 gallons. After the Council had decided to proceed with the floods prevention scheme some difficulty was experienced in finding a suitable site near the required point. Ultimately a plot of land was obtained upon which an engine-house has been built and equipped with pumping plant capable of delivering 15,000 gallons of water per minute through a lift of 16 ft. These works only form a portion of the general scheme for alleviating the flooding of the district, and during the heavy rains which took place in October and November last the machinery performed valuable service, the maximum quantity pumped during the week ending November 18 being upwards of 25,000,000 gallons. It is unfortunate that the town council did not accept the recommendation that the second pair of engines and pumps should be laid down at the same time, because, useful as the existing plant may be, its capacity is scarcely sufficient for dealing with a thoroughly satisfactory manner with exceptionally heavy floods.

**CHURCH BUILDING SOCIETY.**—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting, on the 21st inst., at Westminster Society's house, Dean's-yard. Mr. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building new churches at Beckton, S. Michael, East Ham, Essex, 120l. for the first portion; Knapthill, Holy Trinity, near Woking, 80l.; Roker and Fulwell, S. Andrew, near Sunderland, 150l.; and Fulwell, S. Barnabas, near Norwich, 180l.; in lieu of a former grant of 105l.; towards rebuilding the Church of St. John, Crowthorne, near Witney, Oxon, 45l.; and towards enlarging or otherwise improving the accommodation in the churches at Botolphsham, Holy Trinity, near Cambridge, 45l.; Botolphsham, Holy Trinity, 10l.; Hereford, Holy Gloucester, S. Luke, 10l.; S. Mary, near Framlingham, Norfolk, 25l.; and Barnes, S. Mary, Surrey, 100l., in lieu of a former grant of 75l. A grant was also made from the Special Mission Buildings Fund towards building a mission church at Hextable, Swanley, Kent, 30l. The following grants were also made for works completed:—Prescot, Christ Church, Flints, 30l. on account of a grant of 55l.; Lakenheath, S. Mary, Suffolk, 20l. on account of a grant of 40l.; Hucknall, Huthwaite, near Mansfield, 40l.; Luton, S. Saviour, Beds, 145l., making 275l. S. Columba, Major, S. Columba, 60l.; Cornwall, 60l.; Cardiston, S. Michael, near Shrewsbury, 25l.; Kirtlington, S. Mary, Oxon, 20l.; Oxenton, S. Kirtlington, near Cheltenham, 15l.; Borsdal, John the Baptist, near Cheltenham, 50l.; Maney, S. Peter, near Sutton Coldfield, 125l.; Churchdown, S. Andrew, near Cheltenham, 100l.; all 275l. S. Peter, near Peterborough, 15l., making in all 25l. In addition to this the sum of 180l. was paid towards the repairs of twelve churches from trust funds held by the Society.

**EDINBURGH PLUMBERS.**—The fourth annual supper of the Edinburgh and Leith Plumbing Trade was held at the Royal British Hotel, Edinburgh, on the 16th inst. Mr. Daniel MacFie, of Messrs. James Milne & Sons, who presided, in his remarks, reviewed the conditions of trade since the middle of the last century, pointing out how greatly they had improved of recent years. Scientific plumbing and medicine went hand in hand, and the doctor and plumber divided the honours in the decreasing of mortality. In proposing "The Plumbing Trade," Mr. R. K. Hill said the year just closing had been the worst they had ever had, but he was hopeful that there would be an improvement next year. He deplored the introduction of municipal trading, and said that if the system adopted by the Gas Commissioners were followed by the Electrical Department and the Borough Engineer's Department their trade would be "done" to a very large extent. He considered that private enterprise was quite able to cope with all the work that was to be done. Mr. Alexander Morrison, in reply, advised the trade to co-operate and fight against municipal trading.

**CRYSTAL PALACE ENGINEERING SCHOOL.**—The "Wilson Premium" for the best paper read before the Crystal Palace Engineering Society during the present session has been awarded by the Council to W. L. Wilkinson for his paper on "Building and Road Construction in India." Other papers read during the session were:—"Motor Car Construction" by J. R. Barnes; "The Construction of Tube Railways" by A. W. Agnew; and "The Electro-Thermal Treatment of Metals" by D. Gollan. The premium was presented to Mr. Wilkinson by Sir William Mather on the occasion of the ninety-ninth celebration of certificates at the above school on Thursday, December 21, at which he presided.

**HOUSES OF CELEBRITIES IN LONDON.**—A memorial tablet, executed in encaustic ware, has just been affixed upon the front of No. 6, Fifth-street, Soho, whither Hazlitt removed in 1823 from Bonverie-street, Fleet-street. He died in that house on September 18, 1830, in the presence of his son and Charles Lamb, and was buried in the churchyard of St. Anne's, Soho. A similar tablet now distinguishes the house, No. 71, Berners-street, Oxford-street, where Coleridge lived during some eighteen months in 1812-3. We gather that a recent project to set a tablet on No. 3, The Grove, Highgate, was relinquished because the demolition of the house was contemplated. Coleridge went, in 1816, to live with James Gillman at Moreton House, Highgate, and removed shortly afterwards with him to No. 3, The Grove. The two houses are illustrated in Mr. A. W. Gillman's volume, "The Gillmans of Highgate."

**WAR MEMORIAL, WOOLWICH.**—A memorial has been erected at the junction of Frances-street and Artillery-place in honour of the officers of the Army Ordnance Department and the warrant-officers, non-commissioned officers, and men of the Army Ordnance Corps who fell in the South African campaign. The monument, designed from the original drawing by Mr. C. M. Jordan, consists of a base, after the Ionic order and wrought in Aberdeen granite, having on the four sides two drinking-fountains and two inscribed panels. A bronze figure of a man of the Army Ordnance Corps in active service stands on the pedestal; the figure was modelled by Mr. F. Cocks and cast by Messrs. J. W. Singer & Sons.

**LONDON AND BRIGHTON MOTOR WAY.**—A body of promoters have framed a Bill under this title for constructing a fenced motor way in the counties of Surrey and Sussex to be used by vehicles propelled by mechanical or chemical power, to the exclusion of those drawn by animals and of foot-passengers. The proposed road will begin at the junction of Galpin and London road, Croydon, and, passing through Beddington, Chipping, Mersham, Horley, Balcombe, Cuckfield, Clayton, and Patcham for a length of rather more than forty miles, will terminate on the western side of the London and Brighton road near the Sussex County Police Station, Brighton. The company intend to erect an electricity generating station on the banks of the River Wandle near its source by Waddon Mills, Croydon, and to take twenty-nine perches of common lands at Tyler's Green, Cuckfield. There will be no tunnels, but many bridges, along the new route, and no gradient rate will exceed the maximum of one in thirty. The plans will be prepared by Mr. Richard Hassard, C.E., with Sir Douglas Fox as consulting engineer.

**THREE MANCHESTER CHURCHES THREATENED.**—In terms of a measure which will be introduced in the course of next session of Parliament a body of trustees will be incorporated for the purposes of demolishing the churches of St. Peter, St. Simon and Jude, and St. Martin, Manchester, and of applying the proceeds of the sale of the sites and materials to certain ecclesiastical objects in or near the city of Manchester. The church of St. Martin, in German-street, Oldham-road, was built in 1872-3, after the Early English style, and consists of chancel, nave, and



aisle, with a bell-cote over the porch; the church of St. Simon and Jude, in Granby-row, was built in 1841-2 by the Manchester and Eccles Church Building Society, and contains 800 sittings. In St. Peter's-square, at the end of Mosley-street stands the church of St. Peter, erected in 1788-94 after designs by James Wyatt. The tower, to the south, was added in 1824 by R. Goodwin and forty-five years ago the Salomons carried out the interior decoration. The church, which is cruciform on plan, was designed after the simple Doric style and has room for 1,000 sittings. The altar-piece is by A. Carracci, or his school; the work by Salomons included the organ-case, altar recess, and eight paintings in monochrome, being studies from various masters. (See *The Builder* of September 8, 1860.)

**COMPENSATION AWARD.**—The terms of the award made by the late Mr. James Green as arbitrator in the matter of the compulsory sale of about 2,000 sq. ft. of land near the northern approach to Tower Bridge have just been published. The Great Eastern Railway Company preferred a claim of 16,598, in all, as against the London County Council in compensation for the compulsory surrender of the land which forms portion of their property in Chamber, Royal Mint, and adjoining streets. The railway company's claim was computed by Mr. W. H. Ellwell; a country valuation was supported by evidence given by Mr. A. Rose Stenning and the late Mr. H. H. Collins. The award stands thus:—(1) land taken, 962; (2) damage to the security of the rent arising from the circumstance that part of the property affected is leased to the Great Northern Railway Company for 999 years, 5011; and (3) consequential damage to the houses by reason of the alteration of the character of Little Prescott-street—stated, by request of Sir Edward Clarke, in the form of a special case for the opinion of the High Court—5,859. Sir Edward Boyle, K.C., and Mr. Eldon Bankes, K.C., appeared for the claimants, and Sir Edward Clarke, K.C., and Mr. Edward Morten for the London County Council.

**CHURCH OF ST. PETER, GREAT WINDMILL-STREET, SOHO.**—Some months ago the Bishop of London appointed a commission to consider the expediency of pulling down this church, having regard to the diminished numbers of the resident population. The project was warmly opposed by many of the parishioners, who protests, we gather, have resulted in the relinquishment of the scheme. The church was built in 1860-1 after designs, in the Decorated style, by R. Brandon. It stands on the east side of Great Windmill-street, on a site adjoining that of the (old) Argyll dancing-rooms, formerly the tennis-court of Plovidilly Hall. The dancing-rooms have since been absorbed in the Trocadero Restaurant.

**THE VACANT SITE, ALDWYCH.**—Three offers have been made to take a building lease of the site in Aldwych. One syndicate offers to take a 99 years' term at 50,000, per annum for the erection of the "Irving Repertoire Theatre," with a statue in front of it of the late Sir Henry Irving; another project relates to the building of a covered theatre with shops and a restaurant after the plans, lately modified, of Mr. Gilbe Scott; and the third, being of a similar character, is promoted by a French syndicate for whom Mr. Delmar Blow will act as joint architect. The promoters of the second undertaking—known as "Paris in London"—offer a rental of 55,000.

**WAR MEMORIAL, DURHAM.**—A cross has been erected in front of Durham Cathedral to the memory of the officers and men of the Durham Light Infantry who fell in the South African War. The monument, which stands 40 ft. high, was designed by Mr. Hodges, of Hexham, the sculptor being Mr. Milburn, of York.

**BRITISH FIRE PREVENTION COMMITTEE.**—At a meeting of the British Fire Prevention Committee on December 20, Mr. W. Noble Twelves, M.I.Mech.E., A.M.I.E.E., was elected a member of the Executive Committee, in place of Mr. Lionel J. Langridge, who was at the same time nominated to serve on the General Testing Arrangements (Standing) Sub-Committee.

**INTERNATIONAL SOCIETY OF SCULPTORS, PAINTERS, AND GRAVERS.**—At the annual general meeting of the International Society of Sculptors, Painters, and Gravers, the Hon. Secretary, Mr. Stirling Lee, read a Report of the treasurer, Bailey and Bradford, of the sixth Annual Exhibition in London, which will open to the public on Monday, January 8, 1906, at the New Gallery, Regent-street. The evening reception of the society will be held at the New Gallery on Saturday, January 6, while on Wednesday, January 10, an opening *déjeuner* will take place at the Savoy Hotel.

**REVERENDS, ST. MARK'S, NEWPORT.**—At St.

Mark's Church, Newport, recently, the Bishop of Llandaff dedicated the new reredos which has just been erected in the church. The whole of the sanctuary floor has been taken away and a new one laid, making it one step higher. This is composed entirely of marble. The floor is in large squares of Sienna and Connemara green, divided by bands of Devon and Cornish serpentine. The steps are of Irish red. The reredos has been taken away and replaced by a new one of oak. It consists of a canopy and tracery of oak with carved panels of the emblems of the Passion, and a centre figure of the emblem of St. Mark. The centre has a projecting canopy, with carved pinnacles surmounted with birds. The cornice, extending the whole length of the reredos, is finished at each end by a turret buttress with carved bands surmounted with open tracery and pinnacle-work, the final being a carved pelican. The east wall is panelled to a height of 7 ft., and a credence table worked into it. This paneling is returned on the north and south sides as far as the communion rail, and into the latter side is worked a canopy and carved sedilia of three seats. A new communion rail is also made. The whole has been entrusted to and carried out by Mr. William Clark, sculptor, Llandaff.

**ROOD SCREEN, KILHAMPTON.**—At Kilhampton Church on Christmas Day the ceremony of unveiling and dedicating a rood screen, as a memorial to the late Mr. G. G. F. Fyfe, was held. The screen is from the design of Mr. G. Fyfe-Pryne. The three figures are after those in Poundstock Church, and are carved in white wood. The cross and base are carved in oak. Mr. Pryne has also designed the carved panels which will be fixed underneath the figures, and these, together with the oak carvings, are already in hand at Messrs. Hems & Sons' studio, Exeter, who are carrying out the work.

**TRADES TRAINING SCHOOL.**—At Carpenters' Hall, London-wall, on Tuesday, last week, the Lord Chief Justice distributed the prizes, certificates, and medals gained during the year at the Trades Training School, (Chairman of the committee) at the examinations of the Carpenters' Company in sanitary building construction and in carpentry, and in the architectural and building construction evening classes at King's College. Captain C. R. B. Drummond (Master of the Carpenters' Company) presided, and was supported by members of the committee which conduct the school. Mr. John Wilson, (Chairman of the committee) stated that the number of students was increasing, and that there were now 265 members on the books. The rule that no students should be admitted unless they were engaged during the day as mechanics in the trade in which they sought instruction was very rigidly enforced.

The Lord Chief Justice, in addressing the students, said it was extremely interesting to see that there were candidates who desired to improve themselves by passing examinations in what he might call the technical knowledge of sanitary building construction, one of the most important developments of sanitary and hygienic science of the present day. He said he had no doubt that some of our most beautiful architectural efforts of the last 300 years, viewed from the standpoint of modern sanitary construction, were lamentably defective. There was perhaps a better aspect of the question which went beyond individual advancement, individual skill, or individual success by the man who sought to make progress by working in their leisure hours. There was the removal of the reproach too freely cast about by people who did not understand the question that the British workman could not do as good work as his foreign competitor. He denied that altogether. He asserted that the skilled and instructed British workman was as good in his own line as any workman in any other part of the world, and the reproach, if anything, was not a reproach which could be brought against the workmen themselves, but against those who, forty or fifty years ago, did not give the operative opportunities enough of improving himself and thereby raising himself to the higher branches of his trade.

**ENTRANCE, ETC., BUILDING TRADES.**—The annual dinner in connexion with the Edinburgh, Leith, and District Employers' and Allied Trades' Association, and the Building Trades' Exchange of the City and District of Edinburgh, was held in the Royal British Hotel, Princes-street, Edinburgh, on the 21st inst. Mr. Patrick Kerr presiding over a company numbering over a hundred. The croupiers were Messrs. W. Thomson, James Moserip, and James Millar. After the loyal and patriotic toasts had been honoured, "The Corporations of Edinburgh and Leith," was proposed by Parish Councillor Slater, who said he hoped that the Corporations would co-operate more in the future than they had done in the past. In replying for Edinburgh, Councillor A. A. Murray said the building trade was one of the most important in the city, and one that the Corporation ought to recognise to the full, for among Edinburgh buildings were to be found some of the best examples of architecture. Referring to the recently appointed

Tramways Committee of Edinburgh Town Council, he said it was nonsense to say that there was no work for them to do. He hoped to see Edinburgh and Leith co-operating in the future in such schemes as the tramways, etc. Councillor Craig, Leith, said he did not think corporations should put their hands into the mortar tub and build houses in opposition to the ratepayers. He was certain that builders were perfectly able, and willing to build houses that would satisfy all classes of people. Messrs. David Metie and W. Graham-Yooll replied for the building trades, proposed by Mr. David Dick (Glasgow). Mr. Metie said they had passed through a very dull season, but he believed they had come through the worst, and were entering upon a new cycle of prosperity. Mr. Graham-Yooll regretted that full use was not being taken of the Building Trades' Exchange. It would be infinitely to the advantage of those in the trades if they had a regular market at a stated hour where they could meet merchants. "The Architects and Surveyors" were proposed by Councillor Neill M'Leod, and replied to by Mr. Harold O. Tait (Glasgow), F.R.I.B.A., and Mr. Robert Jordan. "Kindred Associations" was proposed by Mr. James Miller, Messrs. Robert Russell and John M'Ewan (Glasgow) replied.

### CAPITAL AND LABOUR.

**GLASGOW GLAZIERS.**—The majority of the Glasgow operative glaziers, to the number of about 100, have struck work consequent upon a three months' notice issued by the masters, who intimated a reduction in wages from 8s. 6d. to 8s.—the week being of 51 hours. A conference was held, at which the employers stated that, owing to the state of the building trade, they would require to fall into line with the masons, joiners, and plumbers' employers. They desired, further, that the by-laws might be altered so as to make the wages fixed for a year, as in the case of the joiners, instead of for three months, as at present. They considered their reasons fair and valid, but the proposals were rejected by the men.—*Scotsman*.

### Legal.

#### ACTION FOR BREACH OF COVENANT.

MR. JUSTICE BRAY, in the King's Bench Division on the 21st inst., delivered a considered judgment in the case of *Williams v. Gabriel* and others, an action by the plaintiff against the defendants to recover damages for breach of a covenant for quiet enjoyment. The facts of the case succinctly appear from the following judgment.

His lordship said that in this case the plaintiff sued the defendants as the representatives of Arnold Gabriel deceased, for damages for breach of a covenant for quiet enjoyment. The statement of claim contained an alternative claim for trespass, nuisance, and negligence, but at the trial counsel for the plaintiff has asked the case, as he was bound to do, on breach of covenant. The facts were these:—On October 19, 1886, the said Arnold Gabriel demised to the plaintiff a shop and kitchen on the ground floor of a building known as Aberdeen-buildings, in Emmott-street, Limehouse, and four rooms on the first floor above the shop and kitchen and a portion of a yard adjoining the premises to be occupied for the purpose of a coffee-house. The lease was for 21 years, determinable by the lessee at the end of the seventh or fourteenth year, and the rent was 40l. The only material covenant by the lessor was the covenant for quiet enjoyment which provided that Arnold Gabriel for himself, his heirs, executors, administrators, and assigns covenanted with the plaintiff that the plaintiff paying the rent therefor reserved and performing and observing the covenants on his part therefor should and might peaceably enjoy the demised premises during the said term without any interruption or disturbance by Arnold Gabriel or any person claiming under him. Aberdeen-mansions were a block of flats recently built and intended to be let out in flats or tenements, and there were several floors above the premises demised to the plaintiff. About the year 1891 Gabriel assigned his reversion in whole of the buildings to Jackson. There is no evidence that at this time the buildings were out of repair. Some considerable time before 1904 the buildings other than those occupied by the plaintiff got very much out of repair, all the tenants other than the plaintiff left, and the plaintiff's rooms became injured by wet. In 1904 Aberdeen-buildings got so dilapidated that proceedings were taken by the London County Council against the owners under the London Building Acts, which resulted in an order of March 25, 1904. At this time the reversion was vested in Messrs. Attenborough as mortgagees, a Mr. Hargreave being the mortgagor. On July 4 these gentlemen began to pull down the buildings, and after a time completely expended part of the plaintiff's premises, and the plaintiff was forced by these operations to leave in May, 1905. The plaintiff alleged that there was an

interruption of his quiet enjoyment, for which the representatives of the original lessor were liable. There was no doubt that the plaintiff had suffered considerable damages, but the defendants denied liability *in toto*. His lordship then dealt at some length with the decided cases bearing on the point, and said he must hold that there had been an interruption of the plaintiff's quiet enjoyment, but, on the facts, he is of opinion that Messrs. Attenborough could not claim under the lessor, Arnold Gabriel, the right to do the acts complained of, and therefore that his representatives were not liable for what Messrs. Attenborough did. He accordingly entered judgment for the defendants with costs.

## PATENTS OF THE WEEK.

### APPLICATIONS PUBLISHED.\*

28,359 of 1904.—J. E. RUSSELL: *Cooking Ranges*. This relates to a cooking range, and consists in the mode of mounting and operating a damper to control the heat from the fire, comprising a rod engaging with an inclined lug and drawn forward or pushed back.

26,511 of 1904.—A. BLACK and D. BLACK: *Windows*.

This relates to a window having sliding and hinged sashes, and consists in the lower sash being connected on to an endless chain running on pulleys and the upper sash being likewise connected to an endless chain running on pulleys, each chain being operated by means of wheel and worm gear.

2,194 of 1905.—J. WENHAM: *Inspection Boxes for Electric Light Leads and the like*.

This relates to inspection boxes for electric wires and cables and the like, and consists in the employment of pockets or recesses, and wooden or other suitable plugs to which the cover or frame may be secured by ordinary wood screws or nails.

2,766 of 1905.—C. G. MAJOR, E. C. STEVENS, and P. H. STEVENS: *Locks and Switches for Gates of Electrically-Controlled Lifts*.

This relates to a lift wherein a starting mechanism is electrically controlled, and consists in the combination of a hand catch on the door, a hand switch, and an interlocking trigger automatically actuated by the lift cage.

3,558 of 1905.—C. P. SHOWELL: *Window Casement Opening Mechanism*.

This relates to a window casement opening mechanism, having upon the movable casement a bracket provided with a pivoted joint, to which is attached the one end of an arm or link, the other end of said link being pivotally attached to a screw nut, which is made to work upon a screw. The one end of this screw is pivotally carried in a plain angle bracket, which is secured to the fixed part of the frame, the other end of the said screw being made square in section, so as to enter a square hole in a small bevel tooth wheel, which is carried in a suitable bearing upon an angle bracket, the outer end of the wheel-bearing boss being preferably riveted over to prevent its being turned, but yet leaving it free to rotate. Gearing into this bevel wheel is another smaller wheel, which is free to rotate upon a fixed stud carried upon the said bracket and at the back of the said wheel, and in one therewith is formed a cord-grooved pulley, upon which the operating cord is carried, suitable bearings being made in the bracket for the cord to pass through.

5,294 of 1905.—J. H. HINDLE: *Safety Appliances for Cage Lifts*.

This relates to safety appliances for cage lifts, and consists in the passing of the suspending ropes of lift cages partially around "V"-grooved pulleys, so that the friction between the rope and the pulley due to the weight of the cage alone prevents the pulley from rotating, a spring being applied to rotate the said pulley, in case the friction disappears, either from the rope stretching or breaking, the rotation of the pulley operating the safety catches or grips which arrest the downward motion of the cage.

5,530 of 1905.—O. LEINERBROCK: *Adjustable Metallic Network as Cover Protector for Earthenware Against Cracking*.

This relates to an adjustable metallic network as cover protector for earthenware against cracking, the network being made of wire or short pieces of metallic flat ribbons, fastened together by links or joints of suitable form, and tightened or loosened by link pieces connected therewith. The links are adapted to be shortened in themselves, and are connected to the netting with one end and to a support piece with the other end, and tighten the netting in the vertical direction.

6,417 of 1905.—J. LEVER: *Roof Ventilator or Chimney Top*.

This relates to a ventilator or chimney top formed with two series of exterior or air up-take passages surrounding the main up-take, one

series leading into an enlarged cavity situated above the said central up-take and the other series leading into a hood or cover, having its lower part overhanging and enclosing the upper part of the walls of the enlarged cavity.

6,894 of 1905.—J. DUGDALE: *Fastener for Windows and the like*.

This relates to a fastener for windows and the like, composed of two or more pieces of metal, wood, or other suitable material pivoted to any convenient portion of the upper sash of a window frame, and arranged to be locked or latched in a box or spring fastening secured to the top of the lower sash.

7,228 of 1905.—E. A. RAWLINSON: *Prices or Latrines, Earth-Closets, and Water-Closets*.

This relates to privies or latrines, and consists in the combination with an auxiliary platform hinged to the inclined front of the body of the privy or latrine, of an auxiliary adjustable cover having a scooped back and being arranged to slide on the main cover.

8,402 of 1905.—L. SCHLIENTHEIM & DIESENER, LTD.: *Method of Constructing Mosaic Walls or of Covering Surfaces with Mosaic*.

This relates to a method of constructing mosaic walls, and consists in the wall first being covered with a thin layer of cement mastic and, before this is dry, a mosaic, consisting, say, of marble chips, and cement is floated thereon by means of a trowel or the like. Then the surface is smoothed down slightly with a trowel, when the mosaic is slightly set it is compressed by a device which, while capable of travelling over the surfaces, applies the pressure always in a direction normal, or practically normal, to the surface of the wall, so as to bring the whole to a true surface and afterwards be removed by wiping or scraping. The work is then allowed to stand for two or three days, when it is scraped with a flat steel scraper, after which it is rubbed with sandstone, or other abrading material, and water until a flat and sufficiently fine surface has been obtained.

9,373 of 1905.—R. DUNCAN: *Coin-freed Locks for Lavatories*.

This relates to coin-freed locks for lavatories, and has for its object to provide means whereby locks can be actuated not only by the introduction of a penny piece, but also by its equivalent in half-pennies, and is applicable to that class of locks by which upon the insertion of a penny the coin forms the medium by which the sliding knob of the lock engages with the latch, and thereby allows of the latter being withdrawn, while upon the latch being drawn back a second time by means of an inner independent revolving knob the penny is released, and falling into the coin box provided at the lower part of the lock.

13,264 of 1905.—A. COLE: *Water-closets*.

This relates to a water-closet, and consists in the combination of a casing, a rotary bowl within said casing, means for rotating said bowl to empty the contents of the same, means rendered operative by the operation of the bowl, and rotating means for electrically sterilizing the contents of the said bowl.

19,245 of 1905.—J. BROADFOOT & SONS, LTD., and J. R. APPELEY: *Weather-tight Sliding Windows*.

This relates to a weather-tight sliding window, and consists of a counterbalanced window frame carried between guides on a fixed frame and electrically sterilizing the contents of the said bowl.

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## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

D.ember 18.—By SEDGWICK, SON, & WHEAL (at King's Langley), King's Langley, Herts.—Vicarage-la, two freehold cottages, w.r. 22l. 2s. .... 3355

December 18.—By WATTS & SONS, Smithfield.—Lons-la, "The White Hart" p.h., and house and shop adjoining, and freehold rental of 160l. reversion in 40 yrs. .... 3,900

December 19.—By CROFTS & CO. Tooting.—73, 75, and 77, Longley-rd., n.t. 73l. y.r., g.r. 12l. y.r. 90l. .... 610

By FLEURET, SONS, & ADAMS. Sydenham.—88, 90, and 92, Wells-rd. (n.), n.t. 19l. y.r., g.r. nil, y.r. 90l. .... 740

By MADDISON, MILLS, & MADDISON (at Yarmouth). Yarmouth, Norfolk.—24, Rodney-rd., l. r. 16l. 10s. .... 340

December 20.—By HARRODS'. Wood Green.—1, Mount View-villas, n.t. 94 y.r., g.r. 6l. 10s., y.r. 36l. .... 340

By E. & S. SMITH. Clerkenwell.—30 to 39, St. Helena-pl., l. r. 6 y.r., g.r. 11l. 10s., w.r. 818l. .... 455

Pentoville.—46, Collier-st., with builder's yard and workshop, area 2,300 ft., l. r. 50l. .... 540

Contractions used in these lists.—E.g., for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; t. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.s. for unexpired term; p.s. for per annum; y.s. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gds. for gardens; yd. for yard; gr. for grove; h.b. for beerhouse; p.h. for public-house; o. for office; s. for shops; ch. for court.

## MEETINGS.

### MONDAY, JANUARY 1.

London Institution.—Professor Vivian B. Lewes on "Our Atmosphere and its Wonders," illustrated by experiments. 4 p.m.

### TUESDAY, JANUARY 3.

London Institution.—Professor Vivian B. Lewes on "Our Atmosphere and its Wonders," illustrated by experiments. 4 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting of the Members. 8 p.m.

Architectural Association Discussion Section.—Mr. P. I. Turner on "The Houses of Parliament." 7.30 p.m.

### FRIDAY, JANUARY 5.

London Institution.—Professor Vivian B. Lewes on "Our Atmosphere and its Wonders," illustrated by experiments. 4 p.m.

## PRICES CURRENT OF MATERIALS.

\*.\* Our aim in this list is to give, as far as possible, the average prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

	BRICKS, &c.	
Hard Stocks .....	1 7 0	per 1000 alongside, in river.
Rough Stocks .....	1 4 0	" " "
Grizzles .....	2 0 0	" " "
Facing Stocks .....	2 0 0	" " "
Shippers .....	2 0 0	" " "
Flettons .....	1 5 6	at railway depot.
Wire Cut .....	1 1 0	" " "
Best Fareham Red .....	3 12 0	" " "
Best Red Pressed .....	5 0 0	" " "
Rushon Fluting .....	5 0 0	" " "
Best Blue Pressed .....	4 1 0	" " "
Staffordshire .....	4 6 8	" " "
Do, Bulstone .....	3 15 6	" " "
Best Moorbridge .....	3 15 6	" " "
Fire Bricks .....	19 0 0	" " "
GLAZED BRICKS.		
Best White and .....	12 0 0	" " "
Ivory Glazed .....	11 0 0	" " "
Stretchers .....	16 0 0	" " "
Headers .....	16 0 0	" " "
Quoins, Bulstone, .....	14 0 0	" " "
and Flats .....	14 0 0	" " "
Double Stretchers .....	14 0 0	" " "
Double Headers .....	15 0 0	" " "
One Side and two .....	15 0 0	" " "
Ends .....	15 0 0	" " "
Two Sides and one .....	15 0 0	" " "
End .....	14 0 0	" " "
Plays, Chamfered, Squints, .....	12 0 0	" " "
Best Dipped Slat .....	12 0 0	" " "
Glazed Stretchers, and Header .....	12 0 0	" " "
Quoins, Bulstone, .....	14 0 0	" " "
and Flats .....	14 0 0	" " "
Double Stretchers .....	14 0 0	" " "
Double Headers .....	15 0 0	" " "
One Side and two .....	15 0 0	" " "
Ends .....	15 0 0	" " "
Two Sides .....	15 0 0	" " "
Plays, Chamfered, Squints, .....	14 0 0	" " "
Second Quality .....	2 0 0	" " "
White and .....	s. d.	
Dipped Slat .....	6 9	per yard, delivered.
Glazed .....	5 3	" "
Thames and Pit Sand .....	26 0	per ton, "
Thames Ballast .....	26 0	per ton, "
Best Portland Cement .....	11s. 0d.	per yard, delivered.
Best Ground Blue Lime .....	27s. 0d.	per ton at rly. dpt.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 0d. | per yard, delivered. |

Stourbridge Fireclay in sacks ..... 27s. 0d. | per ton at rly. dpt. |

PRICES CURRENT.—Continued on page 713.

\* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



# COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENT.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

## COMPETITION.

Nature of Work.	By whom Required.	Premiums.	Designs to be delivered
*PROPOSED PUBLIC BUILDING LLANDIDOEES	Mr. David Davies	Not stated	Jan. 13

## CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Wombwell.—Road Materials	Wombwell U.D.C.	J. W. Harrison, Surveyor, Town Hall, Wombwell	Jan. 2
Dartford.—Gravels	Dartford U.D.C.	W. Kay, Clerk, Council Offices, Dartford	do.
*ARTIFICIAL FLAG PAVING	Willisdon District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	do.
*ROAD-MAKING AND PAVING WORKS	do.	do.	do.
Mablethorpe.—Children's Wing to Convalescent Home	The Committee	R. H. Fowler, Architect, Louth	Jan. 3
Crumpsall.—400 yds. of Opal Tiling at Workhouse	Manchester Guardians	A. J. Murgatroyd, Architect, 23, Stratford-street, Manchester	do.
London.—112 Spans of 10 ft.	Salford U.D.C.	A. Izas, 237, Grosvenor House, Old Broad-street, E.C.	do.
Bourton.—Water Supply Works	Bengal and N.W. Ry. Co.	A. P. I. Cotterell, Engineer, 28, Baldwin-street, Bristol	Jan. 4
Glasgow.—Repairing Embankment of Clyde	Faringdon U.D.C.	Office of Public Works, City-chambers, Glasgow	do.
Bognor.—Private Street Works, Circus-street, etc.	Glasgow Corporation	Surveyor, Council Offices, Bognor	do.
Elgin.—Dwelling-house, Culbarr-street	Bognor U.D.C.	C. C. Dalg, Architect, Elgin	do.
Salford.—Retorts, Firebricks, etc.	Salford Gas Committee	W. W. Woodward, Engineer, Gas Offices, Bloom-street, Salford	do.
Leeds.—Paving and Flagging Streets	Leeds Corporation	City Engineer's Office, Municipal Buildings, Leeds	do.
Saltburn-by-the-sea.—Private Street Works	Saltburn U.D.C.	G. S. L. Sainsbury, C.E., Surveyor, Council Offices, Windsor-st., Saltburn	do.
Manchester.—48 tons of Cast-iron Pipes	Manchester Waterworks Committee	Secretary, Waterworks Offices, Town Hall, Manchester	Jan. 6
Leith.—Additions, etc., to North Fort-street School	Leith School Board	G. Craig, Architect, 85, Duke-street, Leith	do.
Saddlesworth.—Road Materials	The U.D.C.	B. Rowbotham, Clerk, Council Offices, Uppermill, near Oldham	do.
*PAVING, DRAINAGE, REPAIRS TO ROOFS, ETC.	St. Marylebone Guardians	A. Savon Snell, Architect, 22, Southampton-buildings, W.C.	Jan. 8
Bristol.—Open Timber Sheds, Portishead Docks	Bristol Docks Committee	W. W. Squire, Engineer, Cumberland-road, Bristol	do.
2 Cornish Boats at Eastville Workhouse	Bristol Guardians	J. J. Simpson, Clerk, St. Peter's Hospital, Bristol	do.
Leamington-on-Tyne.—Grated, Iron Girders, at Cemetery	Newburn U.D.C.	T. Gregory, Surveyor, Council Offices, Newburn	do.
Newton Abbot.—Laying-out Cattle Market	Newton Abbot U.D.C.	L. Stevens, Surveyor, Town Hall, Courtenay-street, Newton Abbot	do.
Pontypridd.—General Stores	Pontypridd U.D.C.	P. R. A. Willoughby, Engineer, Council Offices, Pontypridd	do.
Manchester.—Filling-up 62 Wash-bins, Lavatories, etc.	Manchester Corporation	City Architect, Town Hall, Manchester	do.
Bolover.—Reconstruction of Sewage Disposal Works	Bolover U.D.C.	O. G. Furness, Engineer, Town End, Bolover	do.
Manchester.—Strengthening Hoyle-street Bridge	Manchester Corporation	City Surveyor's Office, Town Hall, Manchester	do.
Manchester.—Strengthening Charlton-street Bridge	do.	do.	do.
Teignmouth.—Making-up Upper Ferndale-road	Teignmouth U.D.C.	Q. F. Gettings, Surveyor, Town Hall, Teignmouth	Jan. 9
Perry Barr.—Bowley Bag and Blast Furnace Chimney	Perry Barr U.D.C.	R. Bailey, Surveyor, Council House, Green-lane, Hamstead, B'ham	do.
Edmonton.—Private Street Works	Edmonton U.D.C.	T. Burgess, Surveyor, Council Offices, Ashton-in-Makerfield	do.
*REPAIRS TO PONTPOON, ETC., FULHAM	Metropolitan Asylum Board	G. Bades Leach, Engineer, Town Hall, Lower Edmonton	do.
*NEW FILTER TO RESERVOIR, TOTENHAM	do.	Office of the Board, Embankment, E.C.	Jan. 10
Manchester.—Reconstruction of Poland-street Bridge	Manchester Corporation	City Surveyor's Office, Town Hall, Manchester	do.
Manchester.—Reconstruction of Jasper-street Bridge	do.	do.	do.
*LAYING SEWERS AND FORMING ROADS	Director General, Ordnance Survey	do.	do.
Southampton.—Thin Zinc Plates	Brighton Corporation	W. Newton Duan, 1 and 2, Bucklersbury, E.C.	Jan. 11
Brighton.—Granite Kerbs and Channel	Brighton Corporation	Office in Charge of Works, Ordnance Survey Office, Southampton	Jan. 12
Monmouth.—Hareford-road Sewer, etc.	Monmouth Corporation	Borough Surveyor, Town Hall, Brighton	do.
Manchester.—Materials	Manchester Rivers Committee	G. F. Grimwood, Engineer, Monmouth	Jan. 13
Leeds.—Heating to Infirmary Wards at Workhouse	Leeds Guardians	Secretary of Rivers Department, Town Hall, Manchester	do.
Leeds.—Widowhood, Wall of Workhouse, Etc., Beckett-st.	do.	T. Winn & Sons, Architects, Albion-street, Leeds	do.
Gavesham.—Provided School and Caretaker's House	Oxfordshire Education Committee	W. H. Ashford, A.R.I.B.A., 90, New-street, Birmingham	do.
*NEW SCHOOLS, HIGHWAY ESTATE	Berkshire Education Committee	Edmund Fisher, Architect, 10, York-building, Adelphi, W.C.	do.
*WEIGH OFFICES, MESS-Room, ETC., FOLKESHILL	Coventry Gas Committee	F. W. Stevenson, Engineer, Gasworks, Coventry	Jan. 15
Reading.—Stores	Berkshire County Council	County Surveyor's Office, Bank-chambers, Cross-street, Reading	do.
Durban, Natal.—30-in. Steel Pipes	Durban Corporation	W. H. Douglas, C.E., District Offices, Hamilton	do.
Motherwell.—Sewers	District Comm. Wd., Co. of Lanark	J. B. Langley, Architect and Surveyor, 49, Doan-gate, Manchester	do.
Newcastle-under-Lyme.—Engineering, King's Baths	Baths Committee	do.	do.
Newcastle-under-Lyme.—Wal Tiling, King's Baths	Leeds Y.M.C.A. Committee	W. H. Thorp, Architect, 61, Albion-street, Leeds	do.
Leeds.—Building in Albion-street and Albion-place	Hawwell U.D.C.	Council's Surveyor, Church-road West, Hawwell	do.
*ROADMAKING, ETC., WORKS, MANOR COURT-RD.	Bath and Clifton R.D.C.s	W. F. Bird, C.E., Midasmore, Norton	Jan. 16
Peasefold St. John.—Water Supply	Leeds Corporation	C. W. Young, Sec., Nichols-lane, London, E.C.	do.
Leeds.—Police Station and Mortuary	Durham Education Authority	W. H. Bondle, Architect, 33, Grainger-st., West, Newcastle-on-Tyne	do.
Crookhill.—Council School	do.	Clark & Moscor, Architects, Fethams, Darlington	Jan. 17
Leesholme.—Council School	Fulham Borough Council	Borough Surveyor, Town Hall, Fulham, S.W.	do.
*MAKING-UP CARLISLEVALE Y. LANGTHORNE-ST.	East Indian Ry. Co.	C. W. Young, Sec., Nichols-lane, London, E.C.	do.
Durban.—Spans for Juma Bridge	Hamstead Borough Council	Borough Engineer, Town Hall, Haverstock-hill, N.W.	do.
*WORKS, MATERIALS, AND SERVICES	Hamstead Borough Council	Union Offices, Edgware	do.
*OFFICES AT WORKHOUSE	Hamstead Borough Council	A. O. Schenk, Engineer, Harbour Offices, Swansea	Jan. 18
Swansea.—Extending West Pier Seawards	Hamstead Borough Council	City Chambers, 64, Cochran-street, Glasgow	Jan. 19
Shieldhall.—Precipitation Tanks	Hamstead Borough Council	Nicholls & Stockwell, Architects, 25, Regent-circus, Swindon	do.
Swindon.—Ferndale-road Council School	Hamstead Borough Council	T. M. Lockwood & Sons, Architects, Foregate-street, Chester	Jan. 20
Malpas.—3 Blocks of Cottages	Hamstead Borough Council	Borough Engineer's Office, Wigan	do.
Wigan.—Underground Conduits	Hamstead Borough Council	C. H. Cooper, Borough Engineer, Town Hall, Wimbeldon	Jan. 22
Wimbeldon.—Air Compressors, Durnsford-road	Hamstead Borough Council	A. E. Nicholls, Borough Engineer, Corporation Offices, Folkestone	do.
Folkestone.—Shelter, with Conveniences, Marine-gdus	Hamstead Borough Council	Willcox & Ralke, Engineers, 65, Temple-row, Birmingham	do.
Stratford-upon-Avon.—Sewage Disposal Works	Hamstead Borough Council	Engineer, King's Cross Station, London, N.	Jan. 23
Enfield.—Contract No. 1 of Railway to Outley	Hamstead Borough Council	F. W. Pearce, P.E.I., Town Hall, Twickenham	Jan. 24
Twickenham.—Sewage Disposal Works, Section F	Hamstead Borough Council	H. Entwistle, Surveyor, Council Offices, Swinton, Manchester	do.
Pendlebury.—Sprinklers, Slack Brook Sewage Works	Hamstead Borough Council	Borough Engineer, Town Hall, Camberwell, S.E.	Jan. 29
*STORES, MATERIALS, ETC.	Hamstead Borough Council	J. A. Schuurman, Architect, 23, High-street, Ipswich	do.
Ipswich.—New School, Ranelagh	Hamstead Borough Council	J. F. Stow, Engineer, Corn Exchange, Uxbridge	Jan. 30
Hillingdon East.—Sewer Works	Hamstead Borough Council	T. Stoes, Architect, Westgate, Thirsk	Jan. 31
Thirsk.—Lambert Hospital Extension	Hamstead Borough Council	County Surveyor, County Hall, Lewes	Feb. 2
*ADDITIONS, ETC., AT SCHOOL, PLUMPTON	Hamstead Borough Council	F. J. Wood, County Surveyor, County Hall, Lewes	do.
Plumpton.—Additions, etc., to School	Hamstead Borough Council	Clerk to the Council, Manor House, Cheshunt	Feb. 12
*ISOLATION HOSPITAL	Hamstead Borough Council	A. E. Murray, Architect, 37, Dawson-street, Dublin	No date
Dublin.—Rebuilding Premises	Hamstead Borough Council	H. G. Bailey, Clerk, City-chambers, Chester	do.
Barton.—Sewer	Hamstead Borough Council	General Superintendent, Osborne-street Bath, Manchester	do.
Manchester.—1,000 ft. of Seamless Copper Tubing	Hamstead Borough Council	J. A. Bean, County Surveyor, Moorhall, Newcastle-on-Tyne	do.
Newcastle-on-Tyne.—Reps., Puttag, etc., Police Stns.	Hamstead Borough Council	G. Riley, Architect and Surveyor, 24, Albert-street, Oswaldtwistle	do.
Oswaldtwistle.—Repairs, etc., to Sewer	Hamstead Borough Council	Office of the District Committee, 44, Eastern-road, Romford	do.
*ADDS, HORNBURCHURCH P.R.-LA., SOBS, ROMFD.	Hamstead Borough Council	do.	do.

## PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*SURVEYOR AND INSPECTOR OF NUISANCES	Dawlish U.D.C.	150l.	Jan. 20

Those marked with an asterisk (\*) are advertised in this number.

Competitions, iv.

Contracts, iv. vi. vii. x.

Public Appointments, xviii.

CANTEBURY.—For Canterbury new post-office.—		
Amaro & Sons	11,800	112
Pamos & Foad	10,090	50
W. H. Martin	10,750	227
G. Browning	10,750	230
Sturty Building Co., Ltd.	10,460	473
G. H. Dennis & Son	10,168	190
New Zealand Lte	10,168	205
W. Strange & Sons Ltd.	9,943	238
Hayward & Parnam	9,650	336
W. H. Hyde	9,638	160
Rowland Bros.	9,733	534
Gann & Co., Ltd.	9,487	252
G. E. Wallis & Sons, Ltd.	9,487	814
McElhoulburn & Co.	9,190	260
W. K. Grigg	9,134	199



**FULHAM.**—For making-up the carriageway of Finlay-street, for the Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.—

	Roadway.	Footway.
Borough Surveyor.....	£1,868 3 11	—
A. B. Champness.....	1,300 0 0	—
G. W. Wimpey & Co.....	1,168 0 0	—
H. J. Greenham.....	1,155 0 0	—
J. Meares.....	1,115 0 0	—
J. Mowlem & Co.....	1,088 0 0	—

[Borough Surveyor's estimate for paving the footways is £403.]

† This amount includes both roadway and footway.

**FULL.**—For alterations and additions to the violent and troublesome and attendants' blocks at the City Asylum, Willoughby, for the Asylum Committee of the Corporation. Mr. Joseph H. Hirst, City Architect, Town Hall, Hull:—

	Hebbelerwhite	& Wilson.	£14,485 10 0
Sons.....	£16,100 0 0	E. Good & Co.....	15,948 0 0
G. Houlton.....	15,948 0 0	Sons, Ltd.....	14,028 16 6
G. Eckles.....	15,500 0 0	G. H. Panten.....	14,000 0 0
A. J. Darnley.....	15,258 16 6	G. Jackson & Son.....	13,924 0 0
T. Goates.....	15,239 0 0	H. Arnold & Co.....	13,757 0 0
S. R. & T. Kelsey.....	15,203 0 0	J. H. Fenwick, Hull*.....	13,175 0 0
H. T. Arnot.....	15,197 4 10		

**LEEK.**—For erecting post-office:—

	Credit Old Materials.
J. Gallimore.....	£4,546
J. Heath & Sons.....	4,530
Sampson Hall.....	4,475
T. Grace.....	4,325
C. Corne & Son.....	4,245
J. & J. Warner.....	3,920
T. Godwin*.....	3,256

**LONDON.**—For retilling first class swimming bath, St. Smith-street Baths, for the Westminster City Council:—

T. Pearce.....	£1,228	0 0	Hudson & Co.	£950	0 0
W. H. Hyde...	1,157	0 0	Spiers & Son...	940	0 0
Barnes & Co...	1,093	17 0	J. R. Sims....	933	0 0
Burton Bros...	1,030	0 0	E. Jenner.....	794	0 0
T. W. Haylock	1,012	0 0	T. Coulthard...	774	0 0
Heming & Co.	1,004	0 0	Jones & Son*	718	0 0
Love & Co. ..	970	0 0			

**LONDON.**—For alterations, etc., to the public convenience at Parliament-street, S.W., for the Westminster City Council:—

J. Mowlem & Co., Ltd.....	£493 0
Patman & Potheringham.....	317 3

**LONDON.**—For making-up roadway of Harbord-street, Fulham, for the Fulham Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.—

H. J. Greenham, Rosebank Wharf, Fulham\* £594

**LONDON.**—For alterations and additions to the Grange, West Heath-road, Hampstead, N.W. Messrs. Inman & Sturges, architects, 7, Bedford-row, W.C. Quantities by Messrs. Smyth & Dearnley, 7, John-street, Adelphi, W.C.:—

Ryder & Son .....	£10,762	J. Smith & Sons..	£9,288
Melbourne .....	10,307	W. King & Son ..	9,000
S. S. Scott .....	10,147	G. Godson & Son ..	8,967
J. Simpson .....	10,010	Miskin & Sons ..	8,860
J. Dorey, Ltd.....	9,700	Holland & Hannen	8,888
Kilby & Gayford ..	9,483		

**SHEFFIELD.**—For erecting a residence in Graham-road. Mr. G. M. M. Wilson, architect and surveyor, 37, Surrey-street, Sheffield. Quantities by the architect:—

J. H. S. Randall.....	£3,150	0	0	E. B. Dyson & Son.....	£1,871	10	0
Smith & Nunn.....	2,500	0	0	W. & A. Forsdyke & Johnson.....	1,803	4	0
T. Gray & Sons.....	2,216	0	0	E. & W. Oxley.....	1,807	3	0
A. B. & Co.....	2,175	0	0	C. Portess.....	1,865	0	0
Bannister ..	2,175	0	0	B. Powell & Son.....	1,860	0	0
D. Smith.....	2,003	0	0	C. Ward.....	1,815	12	7
B. A. & Co.....	1,957	0	0	J. T. Robertson.....	1,800	0	0
H. Boot & Son.....	1,913	0	0	E. Moore.....	1,768	0	0
J. Richerby ..	1,912	7	0	A. Bradbury*.....	1,755	0	0
J. & H. Whelan.....	1,900	0	0				
H. Kynne.....	1,899	0	0				

\* Accepted subject to slight revision.

**ST. ALBANS.**—For new post-office, St. Albans:—

C. W. Dumbleton..	£3,350	A. W. Nash .....	£2,852
D. Parkins & Co..	3,290	G. Wiggs .....	2,780
F. W. Stanley .....	3,205	F. Gough & Co..	2,784
E. Dunham .....	3,197	H. Salisbury & Son	2,780
J. T. Bushell .....	3,147	C. Mislin & Sons ..	2,780
Spreckley & Smith	3,035	Vail & Williamson..	2,777
F. & G. Foster .....	2,989	E. Brown & Son* ..	2,650
W. H. Hyae .....	2,885		

**SOUTHAMPTON.**—For alterations and additions to Moira House, Above Bar. Messrs. Hair & Buckhill, architects, Southampton. Quantities by Mr. C. I. Hair:—

Lawrence .....	1,100	Stevens & Co. ....	£1,193
Jenkins & Co. ....	1,235	J. Nichol .....	1,137
Long .....	1,279	Golding & Ansell ..	1,137
Dyer & Sons .....	1,200	Rylands Bros.,	
Bagshaw & Son. ....	1,195	Shirley .....	1,023
Wright & Son ....	1,194		

**STRANORLAR.**—For building and completing new Presbyterian Church, Stranorlar, for the Committee of Stranorlar Presbyterian Church. Mr. John McIntyre, architect, Letterkenny:—

Smith Bros.....	£2 270 0	S. D. Ansell & Co.	
J. M. Clay.....	1,896 0	Strabane*....	£1,498 10
L. Woods .....	1,701 0		

**SUTTON.**—For a new post-office, Sutton:—

Y. Hopkins	5,690	C. Ansell	£4,900
J. Longley & Co.	5,589	F. & G. Foster	4,870
H. C. Payne	5,446	F. J. Shipland	4,760
P. & E. Davy, Ltd.	5,260	W. Smith & Sons	4,718
J. Burges & Son	5,227	J. Appleby & Sons	4,713
Narriott & Salter	5,100	Braid, Pater, & Co.	4,647
Martin, Wells, & Co., Ltd.	5,029	J. Shabourne & Co.	4,594
Drowley & Co.	4,999	F. Gough & Co.	4,594
Cropley Bros. Ltd.	4,993	R. Jones & Son*	4,554
Guthrie Bros.	4,980	J. F. Holliday	4,573
K. P. Bulled & Co.	4,975	F. G. Lawrence	4,199
W. H. Hyde	4,963		

**WALSALL.**—For erecting new school for 336 senior boys and girls and manual training centre, Hillary-street, for the Education Committee. Messrs. Bailey & McConall, architects, Bridge-street, Walsall:—

G. H. Marshall.....	£3,967	J. Barclay & Son.....	£3,300
W. & J. Webb.....	3,690	H. J. Ham.....	3,358
Smith & Son.....	3,685	T. Mason.....	3,301
W. Tapscott.....	3,666	J. Hall & Son.....	3,345
G. Insley.....	3,638	G. Guest & Son.....	3,330
H. F. Wootton.....	3,625	T. Hardy.....	3,330
G. Webb.....	3,535	T. Tildesley.....	3,295
E. Mallia.....	3,520	G. E. Jackson.....	3,294
H. Wilcock & Co.....	3,507	Brookhurst & Wood.....	3,250
W. Vistance.....	3,498	H. Gough & Son.....	3,250
F. Lindsay Jones.....	3,420	T. Wootton, Blox- wich*.....	3,200
T. Herbert.....	3,400		
W. Kendrick.....	3,300		3,063

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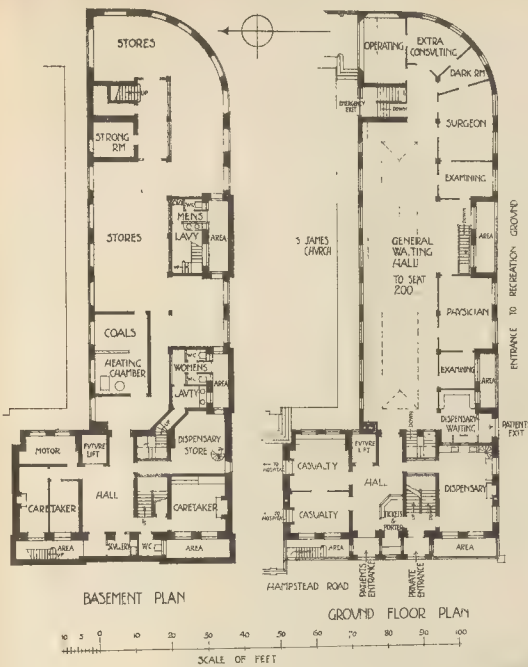
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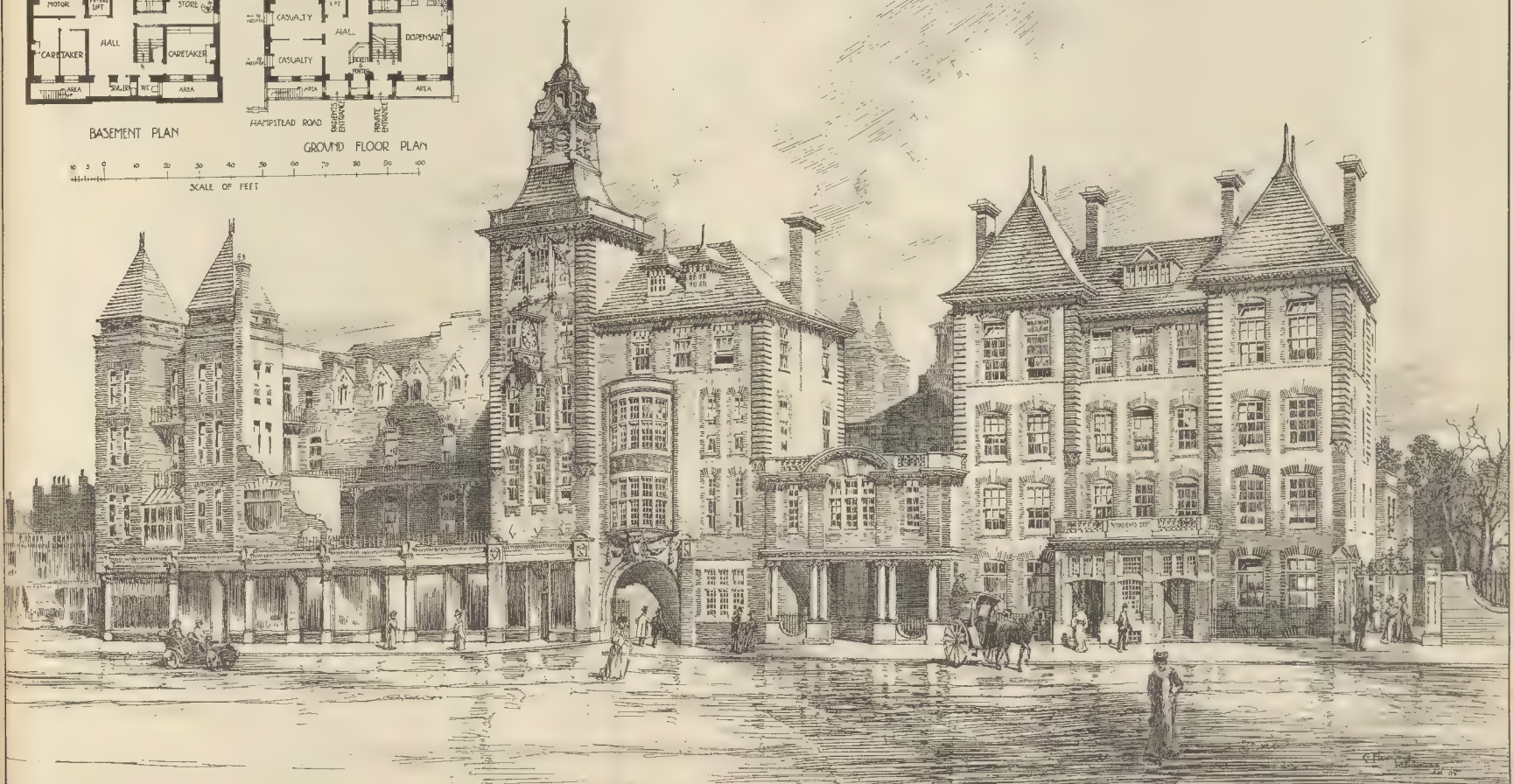
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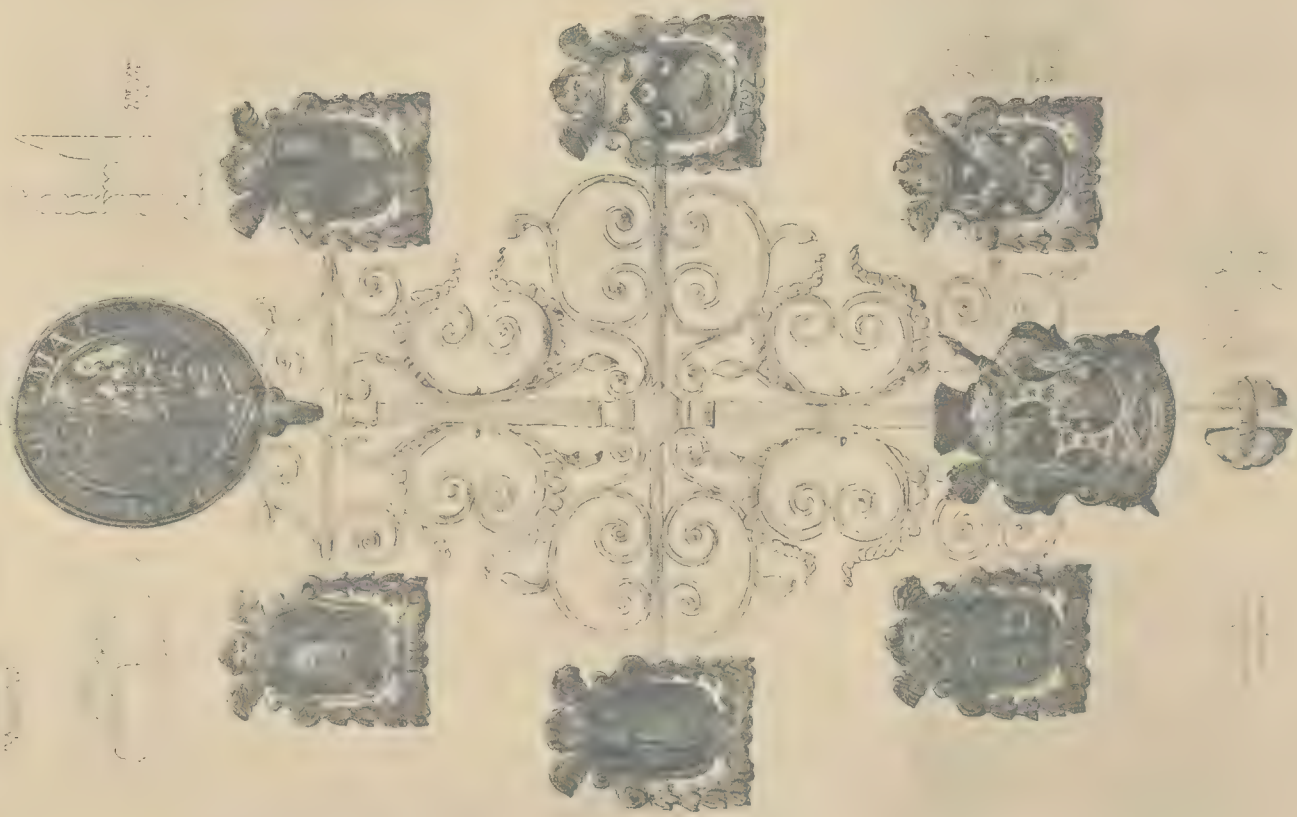
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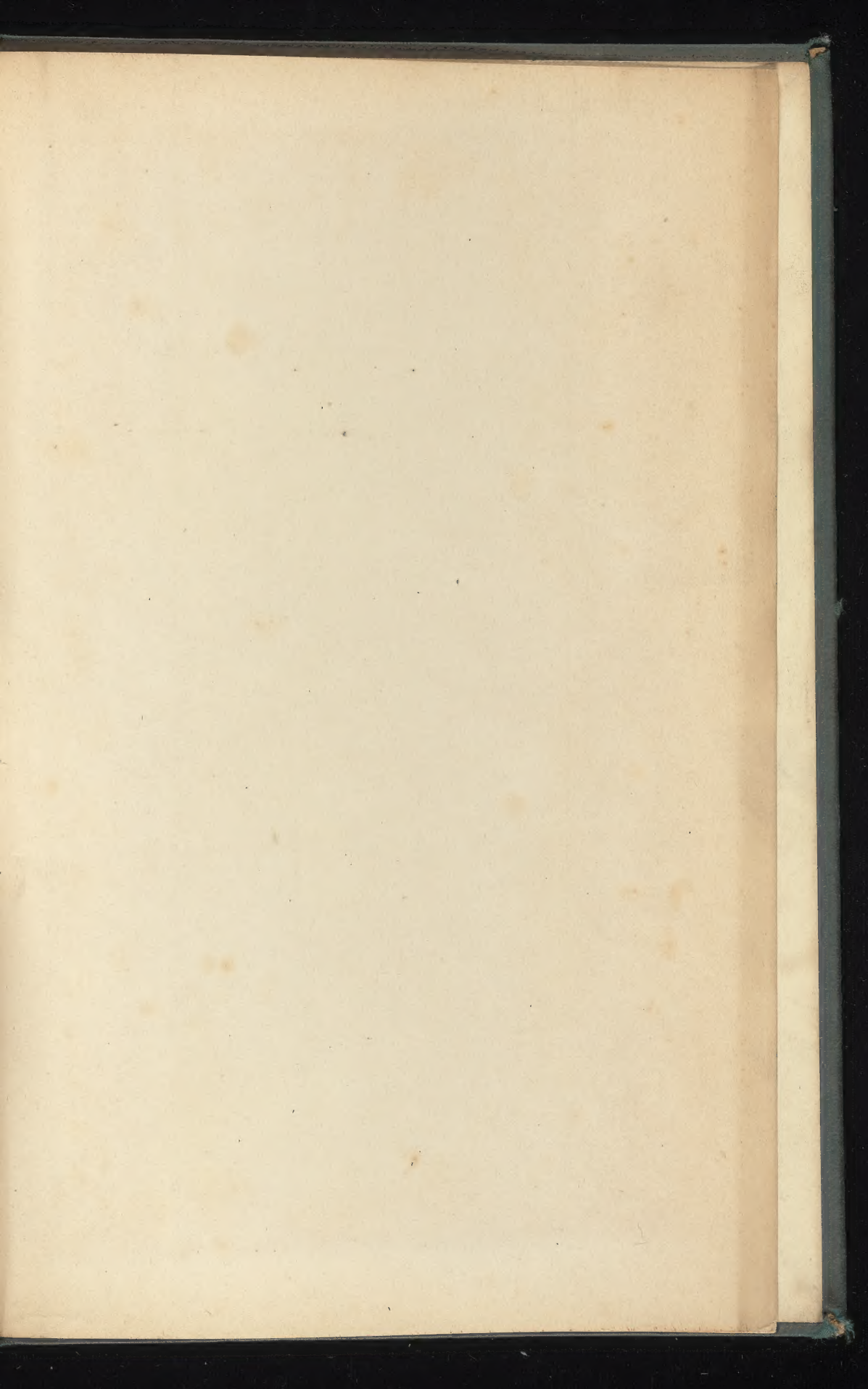
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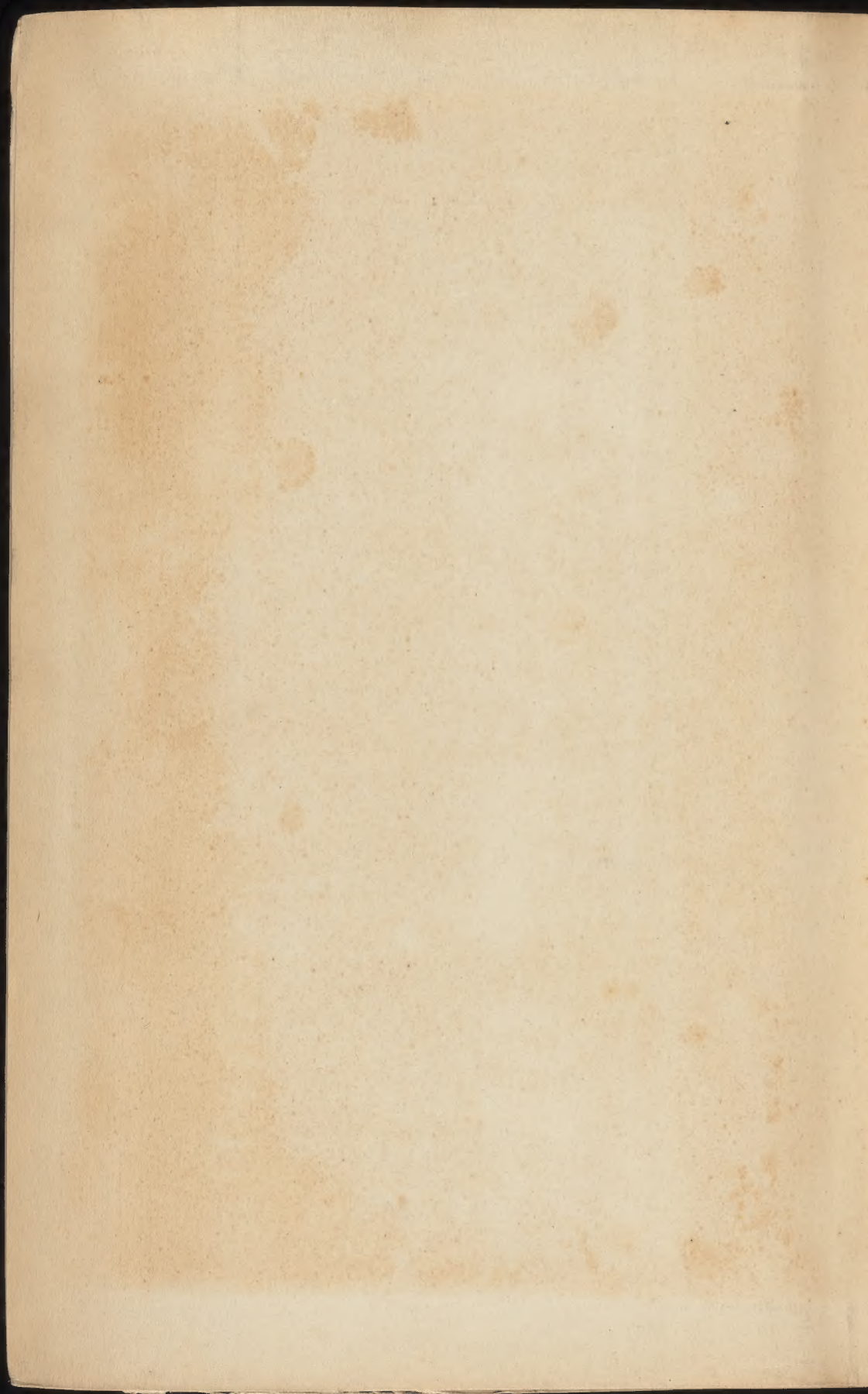
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